LINEARLY ELASTIC ANALYSIS OF PLANE FRAMES SUBJECTED TO COMPLEX LOADING CONDITIONS

by

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Development of Methods for Computer Simulation of Beam-Columns and Grid-Beam and Slab Systems

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The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Federal Highway Administration.

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PREFACE

This report presents an analytical tool for the solution of plane-frame structures. The computer program developed for the solution is intended to be well suited for solving complex structures with a minimum of hand calculations.

The solution techniques developed rely on the linearly elastic behavior that many plane frames exhibit under design loads. This linearity allows the user to solve a structure for many loading cases and combinations of loading cases at a cost only slightly greater than that of a single solution.

This is the twenty-first in a series of reports that describe work under Research Project No. 3-5-63-56, "Development of Methods for Computer Simulation of Beam-Columns and Grid-Beam and Slab Systems". Reports No. 56-1, 56-3, 56-4, 56-7, and 56-14 provide background information for this report.

Duplicate copies of the program deck and test data cards for the example problems in this report may be obtained from the Center for Highway Research, The University of Texas at Austin.

Thanks are due to the members of the staff of the Center for Highway Research for their assistance in producing this report.

> Clifford O. Hays, Jr. Hudson Matlock

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LIST OF REPORTS

Report No. 56-1, "A Finite-Element Method of Solution for Linearly Elastic Beam-Columns" by Hudson Matlock and T. Allan Haliburton, presents a finiteelement solution for beam-columns that is a basic tool in subsequent reports.

Report No. 56-2, "A Computer Program to Analyze Bending of Bent Caps" by Hudson Matlock and Wayne B. Ingram, describes the application of the beamcolumn solution to the particular problem of bent caps.

Report No. 56-3, "A Finite-Element Method of Solution for Structural Frames" by Hudson Matlock and Berry Ray Grubbs, describes a solution for frames with no sway.

Report No. 56-4, "A Computer Program to Analyze Beam-Columns under Movable Loads" by Hudson Matlock and Thomas P. Taylor, describes the application of the beam-column solution to problems with any configuration of movable nondynamic loads.

Report No. 56-5, "A Finite-Element Method for Bending Analysis of Layered Structural Systems" by Wayne B. Ingram and Hudson Matlock, describes an alternating-direction iteration method for solving two-dimensional systems of layered grids-over-beams and plates-over-beams.

Report No. 56-6, "Discontinuous Orthotropic Plates and Pavement Slabs" by W. Ronald Hudson and Hudson Matlock, describes an alternating-direction iteration method for solving complex two-dimensional plate and slab problems with emphasis on pavement slabs.

Report No. 56-7, "A Finite-Element Analysis of Structural Frames" by T. Allan Haliburton and Hudson Matlock, describes a method of analysis for rectangular plane frames with three degrees of freedom at each joint.

Report No. 56-8, "A Finite-Element Method for Transverse Vibrations of Beams and Plates" by Harold Salani and Hudson Matlock, describes an implicit procedure for determining the transient and steady-state vibrations of beams and plates, including pavement slabs.

Report No. 56-9, "A Direct Computer Solution for Plates and Pavement Slabs" by C. Fred Stelzer, Jr., and W. Ronald Hudson, describes a direct method for solving complex two-dimensional plate and slab problems.

Report No. 56-10, "A Finite-Element Method of Analysis for Composite Beams" by Thomas P. Taylor and Hudson Matlock, describes a method of analysis for composite beams with any degree of horizontal shear interaction. Report No. 56-11, "A Discrete-Element Solution of Plates and Pavement Slabs Using a Variable-Increment-Length Model" by Charles M. Pearre, III, and W. Ronald Hudson, presents a method of solving for the deflected shape of freely discontinuous plates and pavement slabs subjected to a variety of loads.

Report No. 56-12, "A Discrete-Element Method of Analysis for Combined Bending and Shear Deformations of a Beam" by David F. Tankersley and William P. Dawkins, presents a method of analysis for the combined effects of bending and shear deformations.

Report No. 56-13, "A Discrete-Element Method of Multiple-Loading Analysis for Two-Way Bridge Floor Slabs" by John J. Panak and Hudson Matlock, includes a procedure for analysis of two-way bridge floor slabs continuous over many supports.

Report No. 56-14, "A Direct Computer Solution for Plane Frames" by William P. Dawkins and John R. Ruser, Jr., presents a direct method of solution for the computer analysis of plane frame structures.

Report No. 56-15, "Experimental Verification of Discrete-Element Solutions for Plates and Slabs" by Sohan L. Agarwal and W. Ronald Hudson, presents a comparison of discrete-element solutions with the small-dimension test results for plates and slabs, along with some cyclic data on the slab.

Report No. 56-16, "Experimental Evaluation of Subgrade Modulus and Its Application in Model Slab Studies" by Qaiser S. Siddiqi and W. Ronald Hudson, describes an experimental program developed in the laboratory for the evaluation of the coefficient of subgrade reaction for use in the solution of small dimension slabs on layered foundations based on the discrete-element method.

Report No. 56-17, 'Dynamic Analysis of Discrete-Element Plates on Nonlinear Foundations" by Allen E. Kelly and Hudson Matlock, presents a numerical method for the dynamic analysis of plates on nonlinear foundations.

Report No. 56-18, "Discrete-Element Analysis for Anisotropic Skew Plates and Grids" by Mahendrakumar R. Vora and Hudson Matlock, describes a tridirectional model and a computer program for the analysis of anisotropic skew plates or slabs with grid-beams.

Report No. 56-19, "An Algebraic Equation Solution Process Formulated in Anticipation of Banded Linear Equations" by Frank L. Endres and Hudson Matlock, describes a system of equation-solving routines that may be applied to a wide variety of problems by utilizing them within appropriate programs.

Report No. 56-20, "Finite-Element Method of Analysis for Plane Curved Girders" by William P. Dawkins, presents a method of analysis that may be applied to plane-curved highway bridge girders and other structural members composed of straight and curved sections.

Report No. 56-21, "Linearly Elastic Analysis of Plane Frames Subjected to Complex Loading Conditions" by Clifford O. Hays and Hudson Matlock, presents a design-oriented computer solution of plane frame structures that has the capability to economically analyze skewed frames and trusses with variable eross-section members randomly loaded and supported for a large number of loading conditions.

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ABSTRACT

A linearly elastic solution for the computer-aided analysis of plane frames is presented. The computer program which is developed features input formats which greatly reduce the manual preparation of data.

The solution uses a variation of the basic discrete-element beam-column model for the evaluation of member stiffness and fixed-end-force properties. The new discrete-element model allows flexural and axial rigidity as well as lateral, axial, and rotational values of loading and elastic restraint to vary randomly along the length of the member. Input is not restricted to values lumped at certain discrete stations but may be input in normal engineering values at any point on the member. In addition, options provided do not require the transferring of loads and dimensions from one axis to another by the user.

Frame displacements are obtained by standard matrix techniques modified to utilize the time and storage reductions possible for linearly elastic plane frames. The frame geometry may vary randomly and still be input in a simple and straightforward manner.

Options are provided to permit the analysis of a structure for several loading cases and combinations of cases with a minimum of new input and computer time.

KEY WORDS: structural engineering, frame analysis, plane frames, computer program, discrete element, soil-structure interaction, matrix analysis.

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SUMMARY

A computer program for the direct linearly elastic analysis of complex bridge bents and other highway structures has been developed and is reported herein. Rigid frames, trusses, continuous beams, and other planar structures may be analyzed using the program.

The beam-column model previously reported has been modified so that loads and restraints may act both normal and parallel to the members of the frame. This allows the designer to consider vertical or inclined piles as an integral part of the frame, even if the pile is supported by lateral and axial soil restraints.

The description of loads, cross-sectional properties, and soil supports is completely general as in previous beam-column models. In addition, the loads and changes in cross-sectional properties and soil supports may be specified at any point along the member.

The geometry of the frame and the directions of the loads may be input in a manner both natural and convenient to the designer.

Options are provided that permit the designer to analyze structures for the multitude of loading cases required by the AASHO code. These options allow the designer to consider a large number of loading conditions economically. This page replaces an intentionally blank page in the original. -- CTR Library Digitization Team

IMPLEMENTATION STATEMENT

An extremely useful tool for the analysis of highway bridge structures has been developed in this study. The computer program described in the report is capable of handling large, skewed, randomly loaded plane-frame structures, and smaller and more regular structures may be input quickly for an economical solution. Rigid frames, beams, and trusses are analyzed by the same program.

In developing the program, emphasis was placed on maintaining complete generality of input. A skewed bridge bent with piles on lateral and axial soil supports can be easily input. At the same time, it was recognized that many frames are more regular and have simpler support conditions. These simpler problems can also be solved efficiently by the designer using the program.

One outstanding design-oriented feature of the program is its ability to superimpose the effects of a large number of loading conditions. A designer may consecutively run a dead-load analysis, a live-load analysis, a wind-load analysis, etc.; a program option then allows him to ask for any linear combination of these loadings he desires. Designers who have manually checked all the group loadings required by the AASHO specifications at their various unit stresses will appreciate this feature.

Further research in the area of linear analysis of planar structures does not appear warranted at this time. Future areas of research will be in nonlinear analysis and extensions to three-dimensional structures.

It is recommended that designers who have need for this program code some simple example problems in order to become familiar with its use. In addition, informal training sessions conducted by the research personnel would be extremely useful in implementing this work for immediate use by the Texas Highway Department.

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NOMENCLATURE

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<u>Symbol</u>	<u>Typical Units</u>	Definition
A	in ²	Cross-sectional area of member
AE	1Ъ	Axial rigidity of continuous element at any point
AE i	1Ь	Axial rigidity of continuous element i at midpoint, used for discrete- element i
ĀĒ, AE ₁ , AE ₂	1b	Effective value of AE and values of AE over partial lengths of elements
α		Cosine of angle between the x' and x-axes
β		Cosine of angle between the x' and y-axes
c	inches	Distance from nearest station to left of concentrated load to the load
°1, °2	inches	Distance on element over which AE_1 , AE_2 , EI_1 , and EI_2 are acting
c ₁ , c ₂		Constants of integration
E	lb/in ²	Modulus of elasticity
EI	lb-in ²	Flexural rigidity of continuous element at any point
EI	lb-in ²	Flexural rigidity of continuous element i at midpoint, used for discrete-element i
EI, EI ₁ , EI ₂	lb-in ²	Effective values of EI and values of EI over partial lengths of element
ε	inches	Diameter of circle which contains loads which are being astatically equivalenced

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<u>Symbol</u>	<u>Typical Units</u>	Definition
ε	inches and radians	Error term which represents the difference in displacements for a member composed of discrete-elements versus continuous-line elements
€*	inches and radians	Error term which represents the difference in displacements for one discrete element versus one continuous element
{f} _i	lb and lb-in	(6 \times 1) matrix of end-forces on element i
{F} _k	lb and lb-in	(6 × 1) matrix of member-end-forces for member k measured in member coordinates
$\{\mathbf{F}_{\mathbf{i}}\}_{\mathbf{k}}, \{\mathbf{F}_{\mathbf{j}}\}_{\mathbf{k}}$	lb and lb-in	(3 × 1) matrix of member-end-forces at joint i , j for member k measured in member coordinates
$F_{i}^{1}, F_{i}^{2}, F_{i}^{3},$ $F_{j}^{1}, F_{j}^{2}, F_{j}^{3}$	lb and lb-in	Member-end-forces at joint i , j measured in member coordinates (x'- force, y'-force, and moment about z'-axis, respectively)
$\{\overline{F}_i\}_k$	1b and 1b-in	(3 × 1) matrix of member-end-forces at joint i for member k measured in structure coordinates
{F}	lb and lb-in	(3N \times 1) matrix of frame joint loads measured in structure coordinates
{ F _i }	lb and lb-in	(3 × 1) matrix of frame joint loads for joint i measured in structure coordinates
${FF}_{k}$	lb and lb-in	(6 \times 1) matrix of member fixed-end- forces measured in member coordinates
${FF_i}_k, {FF_j}_k$	lb and lb-in	(3×1) matrix of member fixed-end- forces at joint i , j for member k measured in member coordinates
$\{\overline{\mathbf{FF}}_{\mathbf{i}}\}_{\mathbf{k}}$	lb and lb-in	(3 × 1) matrix of member fixed-end- forces at joint i for member k measured in structure coordinates
h	inches	Distance between concentrated springs in discrete-element model, one-half of element's length

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Symbol	Typical Units	Definition
i		Integer index
I	in ⁴	Moment of inertia of cross-section about member's z'-axis
j		Integer index
k		Integer index
[k] _i	lb/in and lb-in/rad	(6 × 6) element stiffness matrix for element i of member
[k _{i-1.i-1}] _i ,	lb/in and lb-in/rad	(3×3) submatrices of $[k]_i$ which
[k _{i-1,i}] _i ,		relate forces at station of first inner subscript to displacements at station of second inner subscript
Lk i,i-1 ¹ i'		
[k _{i,i}] _i		-
k pq	lb/in and lb-in/rad	Element of stiffness matrix [k] _i
		which represents the force corresponding to the p th displacement due to a unit value of the q th displacement
[ĸ] _k	lb/in and lb-in/rad	(6 × 6) member stiffness matrix for member k measured in member coor- dinates
K	lb/in and lb-in/rad	Element of stiffness matrix '[K]
		which represents the force correspond-
		ing to the p th displacement due to
		a unit value of the q displacement
[K _{ii}] _k , [K _{jj}] _k	lb/in and lb-in/rad	(3×3) member stiffness matrix for member k measured in member coor- dinates which represents forces at i , j due to unit displacements at i , j
[\overline{k}_{ii}] _k	lb/in and lb-in/rad	(3 × 3) member stiffness matrix for member k measured in structure coordinates which represents forces at i due to unit displacement at i

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Symbol	<u>Typical Units</u>	Definition
<pre>[K_{ij}]_k, [K_{ji}]_k</pre>	lb/in and lb-in/rad	(3 x 3) member stiffness matrix for member k measured in member coor- dinates which represents the forces at i , j due to unit displacements at j , i
$[\overline{\kappa}_{ij}]_k$	lb/in and lb-in/rad	(3×3) member stiffness matrix for member k measured in structure coordinates which represents the forces at i due to unit displacements at j
[X]	lb/in and lb-in/rad	(3N × 3N) structure stiffness matrix measured in structure coordinates
[ĩ _{ii}]	lb/in and lb-in/rad	(3×3) diagonal submatrix of $[\widetilde{K}]$ which represents the forces at i due to the loads at i measured in structure coordinates
[ữ _{ij}]	lb/in and lb-in/rad	(3 × 3) off-diagonal submatrix of [K] which represents the forces at i due to the loads at j measured in structure coordinates
Y	1/in	Slope of EI line divided by EI
L	inches	Length of member
m		Number of discrete-elements in frame member
M		Number of members intersecting at a joint
M	lb-in	Bending moment at any point in contin- uous element
M ₁ , M ₂	lb-in	Bending moments at location of first and second rotational springs in discrete-element model
N		Number of joints in frame
Р		Integer index
$\{\widetilde{p}_i\}$	lb and lb-in	(3 × 1) matrix of forces acting at station i on member measured in member coordinates

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Symbol	Typical Units	Definition
$\tilde{p}_{i}^{1}, \tilde{p}_{i}^{2}, \tilde{p}_{i}^{3}$	lb and lb-in	Concentrated forces acting at station i on a member, measured in member coordinates (x'-force, y'-force, and moment about z'-axis, respectively)
$\{\tilde{P}_i\}$	lb and lb-in	(3 \times 1) matrix of applied forces at joint i measured in structure coordinates
$\tilde{\mathbf{p}}_{i}^{1}, \tilde{\mathbf{p}}_{i}^{2}, \tilde{\mathbf{p}}_{i}^{3}$	lb and lb-in	Applied forces at joint i measured in structure coordinates (x-force, y-force, and moment about z-axis, respectively)
Ψ ₁ , Ψ ₂	radians	Concentrated curvature (discrete angle changes) at first and second rotational springs in discrete-element model
q		Integer index
^q ab	lb/in and lb-in/in	Distributed load in the direction of the a-axis with its intensity per unit of length referenced to the b-axis, as $q_{x'x'}$, $q_{y'x'}$, $q_{z'x'}$, $q_{xx'}$, $q_{yx'}$, $q_{z'x'}$, q_{xy} , q_{yx} , and $q_{z'x'}$
Q _a	lb and lb-in	Concentrated load in the direction of the a-axis, as Q_x , Q_x' , Q_y , Q_y' , and Q_z' , and Q_z'
RM, RO	<u>·</u>	Recursion multipliers used in recursion- inversion solution of simultaneous equations
s', s', s' x' y', z'	lb/in ² and lb/rad	Distributed elastic spring restraints parallel to members x' -axis, y' -axis, and acting about z' -axis
$\overset{\text{al}}{\overset{\text{s}}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}{\overset{\text{s}}}{\overset{\text{s}}{\overset{\text{s}}}{\overset{\text{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}}{\overset{s}}{}\overset{s}}{}\overset{s}}{}\overset{s}}{}\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}{}\overset{s}}{}\overset{s}}{}\overset{s}}{}\overset{s}}{}\overset{s}}{}\overset{s}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}{\overset{s}}}{\overset{s}}}{\overset{s}}}{}\overset{s}}}{}\overset{s}}}{}\overset{s}}{}\overset{s}}{}\overset{s}}{}}$	lb/in and lb-in/rad	Concentrated elastic spring restraints at station i on a member, measured in member coordinate (x'-restraint, y'-restraint, and rotational restraint about z'-axis, respectively)

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Symbol	Typical Units	Definition
\tilde{s}_i^1 , \tilde{s}_i^2 , \tilde{s}_i^3	lb/in and lb-in/rad	Concentrated elastic spring restraints acting at frame joint i expressed in structure coordinates (x-restraint, y-restraint, and rotational restraint about the z-axis, respectively)
SMMT	lb/in and lb-in/rad	(13 \times 1) storage matrix used by pro- gram to store 13 constants needed to generate $[K]_k$
[1] _k		(3×3) coordinate transformation matrix for member k
[t] ^t k		(3 \times 3) matrix which is the transpose of $[T]_k$
Т	16	Value of thrust at any point in continuous element
T _i	16	Axial thrust in discrete-element i
^v 1, ^v 2	16	Shear forces at locations of first and second rotational springs in discrete- element model
{w}_i	inches and radians	(6 × 1) matrix of end displacements for element i
$\{\widetilde{w}_i\}$	inches and radians	(3×1) matrix of element displacements at station i measured in member coordinates
\widetilde{w}_{i}^{1} , \widetilde{w}_{i}^{2} , \widetilde{w}_{i}^{3}	inch es and radians	Displacements of station i measured in member coordinates (distances along x', y' , and rotation about z' , respectively)
{w}_k	inches and radians	(6 \times 1) matrix of member-end-displace- ments for member k measured in mem- ber coordinates
$\{w_i\}_k, \{w_j\}_k$	inches and radians	(3×1) matrix of member-end-displace- ments at joint i , j for member k measured in member coordinates
$w_{i}^{1}, w_{i}^{2}, w_{i}^{3}, w_{j}^{1}, w_{j}^{2}, w_{j}^{3}$	inches and radians	Member-end displacements at joint i, j measured in member coordinates (distances along x' , y' , and rotation about z' -axis, respectively)

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Symbol	Typical Units	Definition
$\{\overline{w}_i\}_k$	inches and radians	(3 × 1) matrix of member-end-displace- ments at joint i for member k measured in structure coordinates
{ w }	inches and radians	(3N \times 1) matrix of frame joint displace- ment measured in structure coordinates
{w _i }	inches and radians	(3 x l) matrix of frame joint displace- ments at joint i measured in struc- ture coordinates
$\widetilde{\mathtt{W}}_{\mathtt{i}}^{\mathtt{l}}$, $\widetilde{\mathtt{W}}_{\mathtt{i}}^{\mathtt{2}}$, $\widetilde{\mathtt{W}}_{\mathtt{i}}^{\mathtt{3}}$	inches and radians	Displacements of joint i measured in structure coordinates (distance along x and y , and rotation about z-axis, respectively)
x, y, z	inches	Cartesian coordinate axes for frame structure coordinates
х, у	inches	Distance along structure coordinate axes to change in loading or stiffness (referenced from members "From" joint)
x', y', z'	inches	Cartesian coordinate axes for member
x ′	inches	Distance along member coordinate axis to change in loading or stiffness
x", y", x"	inches	Cartesian coordinate axes for element
^x i, ^y i, ^x j, ^y j	inches	Structural coordinates of joints i , j
x _o , y _o	inche s	x , y offset of joint j from joint i , projection of line going from joint i to joint j on the struc- ture x-axis , y-axis

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CHAPTER 1. INTRODUCTION

Statement of Problem

Many highway structures such as bridge bents and freeway overpasses are designed as plane frames. These structures may be composed of nonprismatic elastically restrained members and may be subjected to several complicated loading conditions. A thorough elastic analysis is economically feasible only with the aid of a digital computer program that is both versatile and convenient.

Most existing frame analysis programs are difficult or impossible to use for such real problems. Three frame solutions (Refs 2, 5, and 7) which incorporate the versatility of the discrete-element beam-column model (Refs 8 and 9) have been reported previously. References 5 and 7 use an alternatingdirection iterative solution for the simultaneous equations which occur in the analysis. Recent developments in the direct solution of simultaneous equations (Ref 3) have made ADI solutions relatively less attractive on the present generation of computers. In addition, the solutions found in Refs 5 and 7 are restricted to rectangular frames.

Reference 2 gives a direct solution for linearly elastic frames and also permits an iterative investigation of the interaction of axial loads and lateral displacements. This solution while more versatile than previous ones still does not provide the designer with the convenience needed for a routine linear analysis, i.e., it allows members of the frame to be at any angle relative to the frame coordinate system, but it requires an orthogonal grid with intersections at all joints.

Purpose of Study

The primary purpose of this study is to develop a computer solution for plane frames that has the maximum convenience for the user consistent with generality of member arrangement and loading. The program is intended for routine use in a design office and has the following distinguishable features:

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- (1) Input of both regular and irregular frame geometries is simple and quick.
- (2) Members may be either rigidly connected or pinned to joints.
- (3) Loads and elastic restraints may act both normal and parallel to members and may be input in the most convenient coordinate system.
- (4) Member stiffness properties and loadings may be input in normal engineering terms rather than as concentrated values at discrete stations.
- (5) Solutions of dead, live, wind, and other loads may be multiplied by appropriate load factors and superimposed to satisfy code loading requirements.

A secondary purpose of this report is to develop a solution of the frame members by the direct stiffness method (Ref 6) using a modification of the discrete-element model previously reported.

Assumptions and Limitations of the Proposed Solution

The solution developed is for the linearly elastic analysis of plane frames subjected to static inplane loads and displacements and has the following restrictions of conventional plane frame analysis:

- (1) Members are represented as straight-line elements intersecting at joints of infinitesimal size and are either rigidly connected or pinned to the joints.
- (2) Members are made of a linearly elastic material.
- (3) Displacements and deformations are small enough that the equilibrium equations can be formulated on the undeformed structure. Thus, the interaction of axial loads and lateral displacements is neglected.
- (4) Shearing deformations are neglected.

Outline of Report

The conventional theory of the direct stiffness method is presented in Chapter 2, and the method is applied to develop the joint equilibrium equations for the frame solution. Chapter 3 develops the equilibrium equations for the frame members by the direct stiffness method and discusses how they are used to obtain the member properties required for the frame solution and the member results. In Chapter 4 the equations needed to internally transform the engineering data into discretized station values are given.

The organization of and the input for the computer program are discussed in Chapter 5. Several example problems are presented in Chapter 6 to illustrate the features of the program. The results of this study are given in Chapter 7.

Appendix 1 gives a theoretical justification of the discrete-element model developed in the report. The remaining appendices have the input guides, flow charts, FORTRAN notation, FORTRAN listing of the program, and input and selected output for the example problems. This page replaces an intentionally blank page in the original. -- CTR Library Digitization Team

CHAPTER 2. LINEAR MATRIX ANALYSIS OF STATICALLY LOADED PLANE FRAMES

General Theory

Most methods of structural analysis can be classified as either displacement or force methods. The classification is based on whether the basic unknowns are displacements^{*} or forces^{**}. The force or flexibility method has advantages for certain structures but is not as easy to formulate in general terms as the displacement method. Hence, the displacement or the stiffness method is the only one considered in this report.

For the purpose of a stiffness analysis, a structure may be visualized as a group of elements connected at a finite number of nodal points. Each nodal point can undergo one or more pertinent displacements. For each of these displacements, there is a corresponding force. A force and a displacement are said to correspond if they act at the same nodal point, have the same line of action, and their product has the units of work. The total number of nodal point displacements for a structure is said to be the degree of kinematic indeterminacy or the number of degrees of freedom of the structure.

The elastic analysis of a statically loaded structure is basically a problem in satisfying simultaneously four sets of conditions. The governing conditions are the equations of nodal point equilibrium, compatibility of nodal point displacement, any boundary conditions applied at the nodal points, and the elements force-displacement relations. It is assumed that the forcedisplacement relations used for the elements insure that equilibrium, compatibility, any boundary conditions applied to the elements, and the constitutive laws for the element are satisfied continuously throughout the element.

* Throughout this report, the word "displacement" should be considered to mean either a translation or a rotation.

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^{**} Throughout this report, the word "force" implies either a translational force or a moment.

In many cases some approximation is actually made in developing the forcedisplacement relations as discussed in Chapter 3. The direct stiffness method, as described by Martin (Ref 6) is the most widely used technique for applying these four governing conditions to obtain the structures equilibrium equations.

A direct stiffness analysis of a structure can be separated somewhat arbitrarily into nine steps as outlined below. The general method is independent of the type of structure to which it is applied. Note that in the outline, the word matrix is not mentioned. This is done to emphasize that the basic ideas are not dependent on matrix algebra. However, matrix algebra is a powerful tool that enables the method to be developed concisely and implemented on a digital computer with ease.

Outline of the Direct Stiffness Method

- (1) Select nodal point displacements that insure nodal point compatibility is satisfied.
- (2) Calculate the force-displacement equations for all elements in their element coordinate systems.
- (3) Transform these equations into the structure coordinate system.
- (4) Sum up the nodal point forces corresponding to each nodal point displacement from the equations developed in Step 3. This gives the nodal point equilibrium equations in terms of element properties, nodal point forces, and nodal point displacements.
- (5) Modify the equations as necessary for support (displacement type boundary) conditions at the nodal points.
- (6) Solve the equations developed in Step 5 for the nodal point displacements. For the usual assumption of linearly elastic elements and small displacements, the equations are a set of linear simultaneous equations.
- (7) Transform the nodal point displacements into element displacements.
- (8) Solve for element forces from the force-displacement equations of Step 2.
- (9) Solve for nodal point reactions and check nodal point equilibrium.

The direct stiffness method, as outlined above, will be applied to a plane frame to obtain a solution for the joint (nodal point) displacements in the remainder of this chapter. The solutions of the individual frame members (elements) needed for the frame solution is accomplished by another application of the direct stiffness method to a general frame member in Chapter 3.

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Plane Frame Definition

Consider a plane frame as shown in Fig 1. It is assumed that the frame is composed of members that may be treated as straight-line elements. All of the elements lie in a plane and all loads and displacements occur in that plane, which for convenience is taken to be the x-y plane of a right-hand Cartesian coordinate system.

The end of a member or the intersection of two or more members forms a joint and this joint is assumed to be rigid and to have negligible dimensions. A member may be either rigidly connected or pinned to the joint. When a member is rigidly connected to a joint, it and all other members also rigidly connected to the joint rotate through the same angle and transmit moment to one another. When a member is pinned to a joint, it is free to rotate independently of the joint and other members intersecting at that joint. Thus, no moment is transferred from a pinned-end member to any member at the joint.

Joint (Nodal Point) Displacements

Each joint (i) will in general have three degrees of freedom, \widetilde{W}_{i}^{1} , \widetilde{W}_{i}^{2} , and \widetilde{W}_{i}^{3} as shown in Fig 1. Translational displacements \widetilde{W}_{i}^{1} and \widetilde{W}_{i}^{2} must be equal (compatible) for all members intersecting at a joint. The rotational displacement may not be the same for all members at a joint, since some or all of the members may be pinned to the joint. Hence \widetilde{W}_{i}^{3} is defined as being the rotation of the joint, and the pin is assumed to be a part of the member^{*} occurring at an infinitesimal distance inside the member. Thus, \widetilde{W}_{i}^{3} is equal (compatible) for all members intersecting at a joint. \widetilde{W}_{i}^{1} , \widetilde{W}_{i}^{2} , and \widetilde{W}_{i}^{3} compose a vector $\{\widetilde{W}_{i}\}$ where $\{\widetilde{W}_{i}\}$ is a (3×1) matrix of structure displacements measured in structure coordinates.

A frame with N joints has a structure displacement vector $\{\widetilde{W}\}$ where $\{\widetilde{W}\}$ is a (3N × 1) matrix of structure displacements measured in structure coordinates. $\{\widetilde{W}\}$ then is composed of N submatrices $\{\widetilde{W}_{\underline{i}}\}$. The basic equation of nodal point compatibility is

$$\left\{\widetilde{W}_{i}\right\} = \left\{\overline{W}_{i}\right\}_{k}$$
(2.1)

The special force-displacement equations needed for members with pinned ends are discussed in the next section.



Fig 1. Plane frame.



(a) Forces.

(b) Displacements.

Fig 2. Prismatic, uniformly loaded plane frame member.

where

 $\left\{ \overline{W}_{i} \right\}_{k}$ = (3 × 1) matrix of member-end-displacements measured in structure coordinates for member k which has one of its joints at joint i.

Member (Element) Force-Displacement Equations

Consider a prismatic member as shown in Fig 2. Member (k) has its own local right-hand Cartesian coordinate system x'-y'-z'. The members x'-axis is directed along the members centroidal axis. To satisfy the assumption of planar behavior, the members y'-axis and z'-axis must be the members principle axes and the y'-axis must lie in the structure x-y plane. All member loads and restraints must also act in the x-y plane.

The prismatic member is assumed to have only uniform loads $q_{y'x'}$ and $q_{x'x'}$ acting on its full length as shown in Fig 2. The reason for the double subscripting will be discussed in Chapter 4. Neglecting the effect of shear-ing deformations and finite displacements, the following force-displacement equation (Ref 4) is derivable.

$$\begin{bmatrix} F_{1}^{1} \\ F_{1}^{2} \\ F_{1}^{3} \\ \hline F_$$

- A = cross-sectional area of the member,
- E = modulus of elasticity,
- L = length of member, and
- I = moment of inertia of cross-section about z'-axis.

The forces F, loads q, and displacements W are defined in Fig 2. In matrix notation, Eq 2.2 may be expressed as

$$\left\{F\right\}_{k} = \left[K\right]_{k} \left\{W\right\}_{k} + \left\{FF\right\}_{k}$$
(2.3)

where

All of the above are for member k derived in the members coordinate system.

For nonprismatic members or nonuniform loads, the member-force-displacement equations can still be expressed in matrix form by Eq 2.3, but $\begin{bmatrix} K \end{bmatrix}_k$ and $\{FF\}$ will not be the same as in Eq 2.2.

In general, ${FF}$ is the matrix of fixed-end-forces for member k and k can be found by working a fixed-end-member problem.

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A typical element of $\begin{bmatrix} K \end{bmatrix}_k$ is K_{pq} . The p represents the pth row and q represents the qth column of $\begin{bmatrix} K \end{bmatrix}_k$. The range of p and q is from 1 to 6. For a linearly elastic member, K_p represents the force corresponding to the pth displacement due to a unit value of the qth displacement. Thus, the qth column of $\begin{bmatrix} K \end{bmatrix}_k$ is the collection of member-end-forces due to a unit value of the qth displacement. This is illustrated for $(q = 2 \text{ and } W_i^2 = 1)$ in Fig 3.

Chapter 3 presents the discrete-element technique for analyzing nonprismatic or nonuniformly loaded members and obtaining $\begin{bmatrix} K \end{bmatrix}$ and $\begin{cases} FF \\ FF \end{cases}$. In the rest of this chapter, it is assumed that they have been found correctly and no distinction is made between prismatic and nonprismatic members.

Members with pinned ends are treated as follows in order to maintain compatibility of rotational displacements at a joint. The pin is assumed to be located just inside the member at a negligible distance from the joint. Special stiffness matrices $\begin{bmatrix} K \end{bmatrix}_k$ and fixed-end-force matrices $\{FF\}_k$ will be used for the kth member. Reference 4 gives these matrices for prismatic members and a solution technique to develop them for other members is given in Chapter 3.

Since forces will be superimposed separately at each joint, it is convenient to partition $\begin{bmatrix} K \end{bmatrix}_k$, $\{F\}_k$, and $\{FF\}_k$ as suggested by the dashed k lines in Eq 2.2. This then gives

$$\begin{bmatrix} \bar{F}_{i} \\ - \\ F_{j} \end{bmatrix}_{k} = -\begin{bmatrix} K_{ii} & K_{ij} \\ - \\ K_{ji} & K_{jj} \end{bmatrix}_{k} \cdot \begin{bmatrix} W_{i} \\ - \\ W_{j} \end{bmatrix}_{k} + \begin{bmatrix} FF_{i} \\ - \\ FF_{j} \end{bmatrix}_{k}$$
(2.4)

where

$${F_i}_k = (3 \times 1)$$
 matrix of member-end-forces at joint i,
 $\begin{bmatrix} K_{ii} \end{bmatrix}_k = (3 \times 3)$ member stiffness matrix which represents the
forces at i due to unit displacements at i,





 $\begin{bmatrix} K_{ij} \end{bmatrix}_{k} = (3 \times 3)$ member stiffness matrix in member coordinates which represents the forces at i due to unit displacements at j,

$$\left\{ W_{i} \right\}_{k}$$
 = (3 × 1) matrix of member displacements at joint i, and
 $\left\{ FF_{i} \right\}_{k}$ = (3 × 1) matrix of member fixed-end-forces at joint i.

All of the above are for member k derived in the members coordinates. The matrices on the second row of Eq 2.4 are defined as above except i and j are interchanged.

Equation 2.4 represents two matrix equations, the first of which is

$$\left\{ F_{i} \right\}_{k} = \left[K_{ii} \right]_{k} \left\{ W_{i} \right\}_{k} + \left[K_{ij} \right]_{k} \left\{ W_{j} \right\}_{k} + \left\{ FF_{i} \right\}_{k}$$
 (2.5)

Equation 2.5 gives the member-end-forces acting at joint i in member coordinates. The forces and displacement in Eq 2.5 must be expressed in structure coordinates before $\{F_i\}$ can be added to other forces which are acting at the joint.

<u>Transformation of Member (Element) Force-Displacement</u> <u>Equations into Structure Coordinates</u>

The transformation at joint i, for member k , of member displacements in structure coordinates $\{\overline{W}_i\}_k$ to member displacement in member coordinates $\{W_i\}_k$ is given by

$$\left\{ W_{i} \right\}_{k} = \left[T \right]_{k} \left\{ \overline{W}_{i} \right\}_{k}$$
(2.6)

The transformation matrix for member k, $\begin{bmatrix} T \\ k \end{bmatrix}$, is given by Eq 2.7 (Ref 4).

$$\begin{bmatrix} T \end{bmatrix}_{k} = \begin{bmatrix} \alpha & \beta & 0 \\ -\beta & \alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
(2.7)
where

 α = cosine of angle between the x'-axis and x-axis, and β = cosine of angle between the x'-axis and y-axis.

Similarly, the transformation of member forces in structure coordinates $\{\widetilde{F}_i\}_k$ to member forces in member coordinates $\{F_i\}_k$ is given by Eq 2.8

$$\left\{\mathbf{F}_{i}\right\}_{k} = \left[\mathbf{T}\right]_{k} \left\{\overline{\mathbf{F}}_{i}\right\}_{k}$$
(2.8)

where for member k

 ${F_i}_k = (3 \times 1)$ matrix of member-end-forces at joint i in member coordinates,

 $\left\{ \overline{F}_{i} \right\}_{k}$ = (3 × 1) matrix of member-end-forces at joint i in structure coordinates, and

$$\begin{bmatrix} T \end{bmatrix}_k$$
 = the previously defined coordinate transformation matrix.

Since $\begin{bmatrix} T \end{bmatrix}_k$ is an orthogonal matrix, it possesses the special properties that its transpose $\begin{bmatrix} T \end{bmatrix}_k^t$ is also its inverse $\begin{bmatrix} T \end{bmatrix}_{k}^{-1}$ and that the product of $\begin{bmatrix} T \end{bmatrix}_k$ and $\begin{bmatrix} T \end{bmatrix}_{k}^t$ in any order is equal to the identity matrix $\begin{bmatrix} I \end{bmatrix}$. Therefore

$$\left\{ \overline{W}_{i} \right\}_{k} = \left[T \right]_{k}^{L} \left\{ W_{i} \right\}_{k}$$
(2.9)

and

$$\left\{\overline{F}_{i}\right\}_{k} = \left[T\right]_{k}^{t} \left\{F_{i}\right\}_{k}$$
(2.10)

Substituting Eq 2.6 into Eq 2.5 for $\{W_i\}_k$ and $\{W_j\}_k$, premultiplying both sides of Eq 2.5 by $[T]_k^t$ and using Eq 2.10 gives

$$\left\{ \overline{F}_{i} \right\}_{k} = \left[T \right]_{k}^{t} \left[K_{ii} \right]_{k} \left[T \right]_{k} \left\{ \overline{w}_{i} \right\}_{k} + \left[T \right]_{k}^{t} \left[K_{ij} \right]_{k} \left[T \right]_{k} \left\{ \overline{w}_{j} \right\}_{k}$$

$$+ \left[T \right]_{k}^{t} \left\{ FF \right\}_{k}$$

$$(2.11)$$

$$\begin{bmatrix} \overline{K}_{ii} \end{bmatrix}_{k} = \begin{bmatrix} T \end{bmatrix}_{k}^{t} \begin{bmatrix} K_{ii} \end{bmatrix}_{k} \begin{bmatrix} T \end{bmatrix}_{k}$$
(2.12)

$$\begin{bmatrix} \tilde{\mathbf{K}}_{ij} \end{bmatrix}_{\mathbf{k}} = \begin{bmatrix} \mathbf{T} \end{bmatrix}_{\mathbf{k}}^{\mathbf{t}} \begin{bmatrix} \mathbf{K}_{ij} \end{bmatrix}_{\mathbf{k}} \begin{bmatrix} \mathbf{T} \end{bmatrix}_{\mathbf{k}}$$
(2.13)

$$\left\{\overline{FF}_{i}\right\}_{k} = \left[T\right]_{k}^{t} \left\{FF_{i}\right\}_{k}$$

$$(2.14)$$

then for member k

- $\begin{bmatrix} \overline{K}_{ii} \end{bmatrix}_{k} = (3 \times 3)$ member stiffness matrix in structure coordinates which represent the forces at i due to unit displacements at i,
- $\begin{bmatrix} \overline{K}_{ij} \end{bmatrix}_{k} = (3 \times 3)$ member stiffness matrix in structure coordinates which represents the forces at i due to unit displacements at j, and

$$\left\{\overline{FF}_{i}\right\}_{k}$$
 = (3 × 1) matrix of member-fixed-end-forces in structure coordinates.

Then Eq 2.11 can be rewritten as

$$\left\{\overline{F}_{i}\right\}_{k} = \left[\overline{K}_{ii}\right]_{k} \left\{\overline{W}_{i}\right\}_{k} + \left[\overline{K}_{ij}\right]_{k} \left\{\overline{W}_{j}\right\}_{k} + \left\{\overline{FF}_{i}\right\}_{k}$$
(2.15)

To satisfy the compatibility requirement, Eq 2.1 can be substituted into Eq 2.15 for $\{\overline{w}_i\}_{k}$ and $\{\overline{w}_j\}_{k}$, to give

$$\left\{\overline{F}_{i}\right\}_{k} = \left[\overline{K}_{ii}\right]_{k} \left\{\widetilde{W}_{i}\right\} + \left[\overline{K}_{ij}\right] \left\{\widetilde{W}_{j}\right\} + \left\{\overline{FF}_{i}\right\}_{k}$$
(2.16)

Summation of Joint (Nodal Point) Forces

Each joint must be in static equilibrium due to the forces imparted to it by each of the M members acting there, any applied joint forces, and any support reactions. The effect of the support reactions will be considered in the next section. The applied joint forces \widetilde{P}_i^1 , \widetilde{P}_i^2 , and \widetilde{P}_i^3 at joint i represent a vector $\{\widetilde{P}_i\}$ (see Fig 1)

where

$$\left\{ \widetilde{P}_{i} \right\} = (3 \times 1)$$
 matrix of applied joint forces at joint i.

Thus, temporarily neglecting the support reactions at joint i, $\{\widetilde{P}_i\}$ is equal to the sum of $\{\widetilde{F}_i\}$ from Eq 2.16 for all M members.

$$\left\{ \widetilde{\mathbf{P}}_{i} \right\} = \left(\sum_{k=1}^{M} \left[\overline{\mathbf{K}}_{ii} \right]_{k} \right) \left\{ \widetilde{\mathbf{W}}_{i} \right\} + \sum_{k=1}^{M} \left(\left[\overline{\mathbf{K}}_{ij} \right]_{k} \left\{ \widetilde{\mathbf{W}}_{j} \right\} \right)$$

$$+ \sum_{k=1}^{M} \left\{ \overline{\mathbf{FF}}_{i} \right\}_{k} (2.17)$$

Equation 2.17 can be rearranged to have all loads on the right-hand side as follows:

$$\left(\begin{array}{c} M \\ \Sigma \\ k=1 \end{array} \left[\overline{K}_{ii} \right]_{k} \right) \left\{ \widetilde{W}_{i} \right\} + \begin{array}{c} M \\ k=1 \end{array} \left(\left[\overline{K}_{ij} \right]_{k} \cdot \left\{ \widetilde{W}_{j} \right\} \right)$$
$$= \left\{ \widetilde{P}_{i} \right\} - \begin{array}{c} M \\ \Sigma \\ k=1 \end{array} \left\{ \overline{FF}_{i} \right\}_{k}$$
(2.18)

Equation 2.18 can be applied now to all N joints (i = 1,N) to form the structure equilibrium equations which can be expressed as

$$\begin{bmatrix} \widetilde{K} \end{bmatrix} \cdot \{ \widetilde{W} \} = \{ \widetilde{F} \}$$
 (2.19)

where

 $\begin{bmatrix} \tilde{K} \end{bmatrix} = (3N \times 3N) \text{ structure stiffness matrix,} \\ \{ \widetilde{W} \} = (3N \times 1) \text{ structure displacement matrix,} \\ \{ \widetilde{F} \} = (3N \times 1) \text{ structure load matrix.} \\ \begin{bmatrix} \infty \end{bmatrix}$

Clearly $\begin{bmatrix} \widetilde{K} \end{bmatrix}$ can be partitioned into N²(3 x 3) submatrices $\begin{bmatrix} \widetilde{K}_{ij} \end{bmatrix}$ and from Eq 2.18.

$$\begin{bmatrix} \widetilde{K}_{ii} \end{bmatrix} = \sum_{k=1}^{M} \begin{bmatrix} \overline{K}_{ii} \end{bmatrix}_{k}$$
(2.20)

and

$$\begin{bmatrix} \tilde{K}_{ij} \end{bmatrix} = \begin{bmatrix} \bar{K}_{ij} \end{bmatrix}_{k} \qquad i \neq j \qquad (2.21)$$

Thus the structure stiffness matrix is easily composed from the individual member stiffness matrices expressed in structure coordinates. Similarly the (3×1) load matrix at the ith joint $\{\widetilde{F}\}$ is given by Eq 2.18 as,

$$\left\{\widetilde{\mathbf{F}}_{\mathbf{i}}\right\} = \left\{\widetilde{\mathbf{P}}_{\mathbf{i}}\right\} - \sum_{k=1}^{M} \left\{\overline{\mathbf{FF}}_{\mathbf{i}}\right\}_{k}$$
(2.22)

Joint Supports (Displacement Type Boundary Conditions)

Suppose that any joint i has three linearly elastic support springs, with spring constants \tilde{S}_{i}^{1} , \tilde{S}_{i}^{2} , and \tilde{S}_{i}^{3} , as shown in Fig 1. Any of these can be zero as a lower limit and approach infinity as an upper limit. If a joint undergoes displacement during the application of loads, then support reactions will be generated equal to the negative of the displacements times the corresponding spring constants. Clearly these reactions must be considered in writing the joint equilibrium equations. If these terms are added to equations, the effect on $\begin{bmatrix} \widetilde{K} \end{bmatrix}$ is to add the corresponding spring term to the diagonal of the matrix.

The effect of the other matrix terms becomes negligible as the spring term becomes very large compared to the other terms in any row of $\begin{bmatrix} \widetilde{K} \end{bmatrix}$. Similarly the load term for that row becomes negligible.

Thus, a zero displacement can be obtained by specifying a very large spring restraint. Likewise, a specified displacement may be obtained by specifying a large spring restraint and a correspondingly large joint force equal to the desired displacement times the spring restraint.

Handling specified displacements in this way allows both real problems where supports have some reasonable value of restraint and other problems with infinitely stiff supports to be solved by the same technique.

When all members at a joint are hinged to the joint, the rotational stiffness at the joint is zero. This causes a singular set of equations for which the solution process as discussed in the next section will either cause an arithmetic error on the computer due to the attempt to divide by zero or give extremely large displacements.

One method of solving structures with such pinned joints is to renumber the joint equilibrium equations allowing only two degrees of freedom at the pinned joints. This loses much of the generality built into the equations of this chapter. Instead, the present computer program places a unit value on the diagonal of $\begin{bmatrix} \tilde{K} \end{bmatrix}$ and a very large value in the load matrix. This gives, then, a very large displacement for the rotation of such a joint which indicates that it is undefined.

Similarly, when a joint is deleted in a series of problems by removing all the members intersecting at the joint, all three of the displacements of such a joint are undefined and the program handles such a joint the same way. Unit values are placed on the diagonal for all three of the zero stiffnesses and three large values are placed in the load matrix for the three undefined displacements.

Since for both the pinned joint and the joint with all members deleted setting the displacements equal to a large value has no physical effect on the structure, the rest of the solution is valid. However, the large displacements should occur only for the rotation of joints with all members pinned or a joint that is deleted. Any other large displacements are an indication that an unstable or nearly unstable structure has been described. The user will be aware that he has such a joint so no misunderstanding of the results should occur.

Solution of Joint (Nodal Point) Equilibrium Equations

The equations developed in the preceeding section are a system of linear-simultaneous equations which can be solved efficiently using a recursioninversion process previously developed (Ref 3).

The solution of Ref 3 considers the banding of the stiffness matrix inherent in structural problems. It also takes advantage of the symmetry of the structure stiffness matrix.

The second and succeeding solutions of a structure (for additional load cases) are obtained in far less time than the initial solution. This is possible since the stiffness matrix for a linearly-elastic structure is independent of the loading, therefore the elimination process need not be repeated after the first solution.

Member (Element) Displacements from Joint (Nodal Point) Displacements

Once joint displacements are found, the member displacements can be obtained from Eqs 2.6 and 2.1. Note that for a member with a pinned end this will give the displacement on the joint side of the pin (which is actually the joint displacement). However, as outlined in the next section, this will not affect the solution of member-end-forces.

Member (Element) Forces

For prismatic members with only uniform loads the member-end-forces can be found by using Eq 2.2 or for such members with pinned ends the special equations in Ref 4 can be used. For nonprismatic members or nonuniformly

loaded members, the member-end-forces can be found by the solution developed in Chapter 3. This solution can also be used for cases in which more complete output of forces and displacements throughout the member is desired.

Joint (Nodal Point) Reactions and Check of Joint Equilibrium Equations

Once the member-end-forces have been calculated, they can be converted to structure coordinates by Eq 2.10. With all supports specified as linearlyelastic springs the joint reactions can be found merely by multiplying the spring constants times the negative of the corresponding displacements. If the proper solution of the equilibrium equations has been found, the sum of the member-end-forces applied to the joint should equal the applied joint forces plus the joint reactions. Any difference between the joint forces and the member forces is an indication of the roundoff error developed in the solution of the equations. Generally this error (joint equilibrium error) will be a very small quantity.

There is one case in which the joint equilibrium error is not a valid indication of the accuracy of the solution. When a specified displacement is enforced at a joint by an artificially large restraint and a correspondingly large force the joint equilibrium error will be as many orders of magnitude less than the artificial load as the computer is inaccurate in subtracting two numbers. This is not an indication that the solution is in error but only that the estimate of the error is invalid. This occurs only when artificially large values are used to specify displacements and has never occurred on the CDC 6600 with approximately 15 significant digits for any physical values of restraint and load.

Superposition Solution

Under sufficiently small loads structures behave in a linear manner. Thus the results of several linear solutions may be stored and combined by simple superposition to form any linear combination of loadings desired. Naturally the designer must check the results to insure that the stresses in the structure are small enough for the superposition solution to be valid.

CHAPTER 3. NEW DISCRETE-ELEMENT TECHNIQUE FOR SOLUTIONS OF GENERAL FRAME MEMBERS

As previously discussed, solutions for the members stiffness matrix $\begin{bmatrix} K \\ k \end{bmatrix}_k$ and the members fixed-end-force matrix $\{FF\}_k$ are required for nonprismatic, elastically restrained, and nonuniformly loaded members. The discrete-element formulation from Ref 9 was used in Ref 2 to obtain $\begin{bmatrix} K \\ k \end{bmatrix}_k$ and $\{FF\}_k$. This discrete-element model does not provide for loads or restraints acting parallel to the member. This causes problems in coding frames with members that are not horizontal but have significant vertical (gravity) loads. Frames with friction piles are also difficult to input.

The basic element of the discrete-element beam column model (Ref 9) is a rigid bar with one degree of freedom at each end (lateral displacement). If the bar were made axially deformable it would have four degrees of freedom (a lateral and an axial displacement at each end). The stiffness or equilibrium equations for a member composed of a number of such elements connected by rota-tional springs could be formulated in the same manner as was done for the discrete-element in Ref 9. However, the member equilibrium equations are developed formally by the direct stiffness method (Ref 6) using a modification of the discrete-element technique proposed herein.

Frame Member with Discretized Effects

A general frame member is shown in Fig 4(a). The member is general in that at any station i, forces \tilde{p}_1^1 , \tilde{p}_1^2 , and \tilde{p}_1^3 may act, elastic restraints \tilde{s}_1^1 , \tilde{s}_1^2 , and \tilde{s}_1^3 may exist, and changes in cross-sectional properties may occur. Each continuous element i between stations i-1 and i is assumed to have a linear variation in cross-sectional properties. The term AE_i is the axial rigidity of the element at mid-element and EI_i is the flexural rigidity of the element at the midpoint. The terms A, E, and I are as previously defined. The member is further generalized in Chapter 4 to make it more convenient for the user by allowing loads, restraints, and changes in cross-section



(a) Frame member with discretized loads, restraints, and stiffness changes.



(b) Mechanical model of element i.

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Fig 4. Frame member and discrete-element representation of one of its continuous elements.

to occur at any point in the member. Distributed values of load and restraint are permitted and loads may be input in either frame or member coordinates. Chapter 4 presents the method of handling such effects, therefore, in this chapter the discrete station values are assumed to be available.

Application of the Direct Stiffness Method to Frame Members

The frame member may now be considered to be a structure composed of m elements, which for convenience are numbered from 2 to m+1 in Fig 4a. Each of the m+1 stations (nodal points) of the frame member has three displacements (axial displacement \widetilde{w}_1^1 , lateral displacement \widetilde{w}_i^2 , and rotational displacement \widetilde{w}_i^3). These displacements should be equal for both elements intersecting at a station. Thus, there is no difference between the frame analysis and the member analysis other than some simplifications because of the simplified geometry of the member. (The frame member's axes x'-y'-z' and the element's axes x"-y"-z" are parallel as shown in Fig 4a, hence no transformation of coordinates is required.) This means no distinction need be made between properties measured in element coordinates and properties measured in the frame member's coordinates. Therefore, the element stiffness matrix can be derived with reference to its own coodinates and used in Eq 2.18.

Discrete-Element Model

The stiffness matrix for a continuous element with linearly varying stiffness properties could be derived, but to work with it would be difficult. Instead, the stiffness matrix of the element will be derived for the discreteelement shown in Figs 4b and 4c, and in Appendix 1 it is shown that the discrete-element model is an adequate representation of the continuous element. That is to say that, as the number of elements used increases, the answers obtained by the discrete-element approaches as a limit the "exact" solution.

A mechanical model of the discrete-element whose length is 2h is shown in Fig 4b. It is composed of two rigid end blocks, two rotational springs with spring constants EI_i/h and a rigid piston with an axial spring whose spring constant is $\text{AE}_i/2h$. The term EI_i is the product of the modulus of elasticity and the moment of inertia at the center of the continuous element. The term AE_i is the product of the cross-sectional area and the modulus of elasticity at the center of the continuous element. The mechanical model of Fig 4b may be shown more conveniently as a discrete-line element model in Fig 4c. There the element is composed of three one-dimensional bars which are rigid in bending and connected by rotational springs with spring constants EI_i/h . The end bars are axially rigid but the center bar of length h is axially deformable and has an axial rigidity of $AE_i/2$. The two models are mathematically equivalent and hereafter the discrete-line element model will be shown for convenience and will be referred to as the discrete-element model.

Element Stiffness Matrix

The discrete-element i has three degrees of freedom at each station and will have a (6×6) element stiffness matrix $[k]_i$, which relates forces and displacement at stations i and i-1. As mentioned in Chapter 2, the qth column of a stiffness matrix is the set of reactions corresponding to the displacements due to a unit value of the qth displacement. This is illustrated in Fig 5 for element i, q = 4, 5, and 6.

For each of the six unit displacements, the discrete angle changes and changes in length of the deformable bar may be found geometrically. The internal spring moments and the axial force can then be computed. Next a freebody analysis can be made and the forces acting on the ends of the element can be found. These forces are the desired stiffness terms. Assuming negligible displacements, the freebody analysis can be made on the undeformed element, thus neglecting the effect of the secondary moment caused by axial forces acting on lateral displacements. This secondary moment could be included in the analysis but would then require a nonlinear solution since, in general, the effect of axial forces is not linear. Therefore, in the development of this design oriented linear analysis program it is not considered. However, in the future it probably will be incorporated in nonlinear studies.

In Fig 5a (q = 4 and \widetilde{w}_{i}^{1} = 1) the axially deformable bar extends one inch, thus the force T_{i} in the bar is given by Eq 3.1

$$T_{i} = \frac{AE_{i}(1)}{2h} = \frac{AE_{i}}{2h}$$
 (3.1)



(a) Fourth column of element stiffness matrix.



(b) Fifth column of element stiffness matrix.



(c) Sixth column of element stiffness matrix.

Fig 5. Unit displacements at station i on element i.

For equilibrium of forces parallel to x''

$$k_{44} = \frac{AE_i}{2h}$$
(3.2)

and

$$k_{14} = \frac{-AE_i}{2h}$$
(3.3)

All other forces are zero because of the assumed small displacements. In Fig 5b (q = 5 and \tilde{w}_i^2 = 1) concentrated curvatures ψ_1 and ψ_2 are developed at the spring locations. For the unit displacement shown in Fig 5b

$$\Psi_1 = \frac{1}{h} \tag{3.4}$$

$$\Psi_2 = \frac{-1}{h} \tag{3.5}$$

The internal moments corresponding to Ψ_1 and Ψ_2 are M_1 and M_2 where

$$M_{1} = \frac{EI_{i}\Psi_{1}}{h} = \frac{EI_{i}}{h^{2}}$$
(3.6)

$$M_{2} = \frac{EI_{i}\Psi_{2}}{h} = \frac{-EI_{i}}{h^{2}}$$
(3.7)

^{*} The sign of the curvature and corresponding moment is positive if it produces compression on the positive y'' side of the member.

Shears * V₁ and V₂ will be developed at the two spring locations and can be found from a freebody analysis of the axially deformable center bar.

$$V_1 = \frac{(M_2 - M_1)}{h} = -\frac{2EI_1}{h^3}$$
 (3.8)

$$V_2 = -V_1 = \frac{2EI_1}{h^3}$$
 (3.9)

Summing forces and moments on freebodies of the two end bars yields

$$\begin{vmatrix} k_{15} \\ k_{25} \\ k_{25} \\ k_{35} \\ k_{35} \\ k_{45} \\ k_{55} \\ k_{65} \\ \end{vmatrix} = \begin{vmatrix} \frac{2EI_{1}}{h^{3}} \\ -\frac{2EI_{1}}{h^{2}} \\ 0 \\ \frac{2EI_{1}}{h^{3}} \\ -\frac{2EI_{1}}{h^{2}} \\ -\frac{2EI_{1}}{h^{2}} \end{vmatrix}$$
(3.10)

In Fig 5c (q = 6 and \widetilde{w}_{i}^{3} = 1) concentrated curvatures Ψ_{1} and Ψ_{2} are developed where

$$\Psi_1 = -\frac{1}{2}$$
(3.11)

^{*} Positive shear acts in the direction of positive y' on the face of the freebody closest to the member axis.

$$\Psi_2 = \frac{3}{2}$$
 (3.12)

hence

$$M_1 = -\frac{EI_1}{2h}$$
 (3.13)

$$M_2 = \frac{3EI_i}{2h}$$
(3.14)

and

$$V_1 = \frac{2EI_1}{h^2}$$
 (3.15)

$$V_2 = -\frac{2EI_1}{h^2}$$
 (3.16)

Summing forces and moments on the end bars yields

$$\begin{bmatrix} k_{16} \\ k_{26} \\ k_{36} \\ k_{46} \\ k_{46} \\ k_{56} \\ k_{66} \end{bmatrix} = \begin{bmatrix} 0 \\ \frac{2EI_i}{h^2} \\ \frac{1.5EI_i}{h} \\ 0 \\ -\frac{2EI_i}{h^2} \\ \frac{2.5EI_i}{h} \end{bmatrix}$$

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(3.17)

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Similarly, by applying unit displacements at i-1 the first three columns of the element stiffness matrix may be obtained. Thus,

$$\begin{bmatrix} \mathbf{A} \frac{\mathbf{E}_{i}}{2\mathbf{h}} & 0 & 0 & -\frac{\mathbf{A} \frac{\mathbf{E}_{i}}{2\mathbf{h}}}{\mathbf{h}^{3}} & 0 & 0 \\ 0 & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{3}} & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} & 0 & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{3}} & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} \\ 0 & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} & \frac{2.5\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}} & 0 & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} & \frac{1.5\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}} \\ -\frac{\mathbf{A} \frac{\mathbf{E}_{i}}{2\mathbf{h}}}{\mathbf{h}} & 0 & 0 & \frac{\mathbf{A} \frac{\mathbf{E}_{i}}{2\mathbf{h}}}{\mathbf{h}} & 0 & 0 \\ 0 & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{3}} & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} & 0 & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{3}} & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} \\ 0 & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{3}} & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} & 0 & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{3}} & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} \\ 0 & \frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} & \frac{1.5\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}} & 0 & -\frac{2\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}^{2}} & \frac{2.5\mathbf{E}\mathbf{I}_{i}}{\mathbf{h}} \end{bmatrix}$$

The element end forces $\{f\}$ are related to the element end displacements $\{w\}_{i}$ as shown in Eq 3.19.

$$\left\{f\right\}_{i} = \left[k\right]_{i} \left\{w\right\}_{i} \tag{3.19}$$

The matrix $\begin{bmatrix} k \end{bmatrix}_i$ can be subdivided into four 3 by 3 submatrices as was done in Chapter 2 for $\begin{bmatrix} K \end{bmatrix}_k$:

Loads acting between the nodal points are transformed into equivalent nodal point loads, hence, no fixed-end-forces act as in Eq 2.3.

$$\begin{bmatrix} k \end{bmatrix}_{i} = \begin{bmatrix} k_{i-1,i-1} & | & k_{i-1,i} \\ \hline k_{i,i-1} & | & k_{i,i} \end{bmatrix}_{i}$$
(3.20)

where the submatrices are given by Eq 3.18.

Similarly, the element stiffness matrix for element i+1, which connects with element i at station i, can be divided into four 3 by 3 submatrices:

$$\begin{bmatrix} k \end{bmatrix}_{i+1} = \begin{bmatrix} \frac{k_{i,i} & | & k_{i,i+1} \\ \vdots & \vdots & \vdots \\ k_{i+1,i} & | & k_{i+1,i+1} \end{bmatrix}$$
(3.21)

The submatrices of Eq 3.21 are given by the terms in Eq 3.18 except AE_i is replaced by AE_{i+1} and EI_i is replaced by EI_{i+1} .

Substituting the appropriate submatrices from Eqs 3.20 and 3.21 into Eq 2.18 (M = 2) yields

$$\left(\begin{bmatrix} k_{i,i} \end{bmatrix}_{i} + \begin{bmatrix} k_{i,i} \end{bmatrix}_{i+1} \right) \left\{ \widetilde{w}_{i} \right\} + \begin{bmatrix} k_{i,i-1} \end{bmatrix}_{i-1} \left\{ \widetilde{w}_{i-1} \right\}$$
$$+ \begin{bmatrix} k_{i,i+1} \end{bmatrix}_{i+1} \left\{ \widetilde{w}_{i+1} \right\} = \left\{ \widetilde{p}_{i} \right\}$$
(3.22)

Substituting into Eq 3.22 the appropriate submatrices as given by Eq 3.18 and adding in the effect of the elastic restraints $\{\widetilde{s}_i\}$ gives

$$\left(\begin{bmatrix} \frac{AE_{i}}{2h} & 0 & 0 \\ 0 & \frac{2EI_{i}}{h^{3}} & -\frac{2EI_{i}}{h^{2}} \\ 0 & -\frac{2EI_{i}}{h^{3}} & \frac{2.5EI_{i}}{h} \end{bmatrix} + \begin{bmatrix} \frac{AE_{i+1}}{2h} & 0 & 0 \\ 0 & \frac{2EI_{i+1}}{h^{3}} & \frac{2EI_{i+1}}{h^{2}} \\ 0 & \frac{2EI_{i+1}}{h^{2}} & \frac{2.5EI_{i}}{h} \end{bmatrix} + \begin{bmatrix} 0 & \frac{2EI_{i+1}}{h^{3}} & \frac{2EI_{i+1}}{h^{2}} \\ 0 & \frac{2EI_{i+1}}{h^{2}} & \frac{2.5EI_{i+1}}{h} \end{bmatrix}$$



Summing up the matrices of Eq 3.23 and multiplying the first row by h and the second and the third rows by h^3 and rearranging yields

$$\begin{bmatrix} -\frac{AE_{i}}{2} & 0 & 0 \\ 0 & -2EI_{i} & -2hEI_{i} \\ 0 & 2hEI_{i} & 1.5h^{2}EI_{i} \end{bmatrix} \cdot \begin{bmatrix} \widetilde{w}_{i-1}^{2} \\ \widetilde{w}_{i-1}^{3} \\ \widetilde{w}_{i-1}^{3} \end{bmatrix}$$

$$+ \begin{bmatrix} \frac{AE_{i}+AE_{i+1}}{2} + \widetilde{s}^{1}h & 0 & 0 \\ 0 & 2(EI_{i}+EI_{i+1}) + \widetilde{s}^{2}_{i}h^{3} & 2h(EI_{i+1}-EI_{i}) \\ 0 & 2h(EI_{i+1}-EI_{i}) & 2.5h^{2}(EI_{i}+EI_{i+1}) + \widetilde{s}^{3}_{i}h^{3} \end{bmatrix} \cdot \begin{bmatrix} \widetilde{w}_{i}^{1} \\ \widetilde{w}_{i}^{2} \\ \widetilde{w}_{i}^{3} \end{bmatrix}$$

$$\begin{bmatrix} -\frac{AE_{i+1}}{2} & 0 & 0 \end{bmatrix} \begin{bmatrix} \widetilde{w}_{i+1}^{1} \end{bmatrix} \begin{bmatrix} \widetilde{p}_{i}^{1}h \end{bmatrix}$$

+ $\begin{bmatrix} 0 & -2EI_{i+1} & 2hEI_{i+1} \\ 0 & -2hEI_{i+1} & 1.5h^2EI_{i+1} \end{bmatrix}$ $\begin{bmatrix} \tilde{v}_{i+1}^2 \\ \tilde{v}_{i+1}^3 \end{bmatrix} = \begin{bmatrix} \tilde{p}_{i}^2h^3 \\ \tilde{p}_{i}^3h^3 \end{bmatrix}$ (3.24)

Equation 3.24 may be applied at the m+l nodal points to form the member equilibrium equation.* Since Eq 3.24 represents three scalar equations this will yield 3(m+l) simultaneous equations. These equations will be symmetric and have a band width of nine. Noting that the axial (\widetilde{w}^1) and lateral $(\widetilde{w}^2$ and $\widetilde{w}^3)$ displacements are uncoupled in Eq 3.24 the solution may be separated into m+l axial equations with a band width of three and 2(m+l) lateral equations with a band width of seven.

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^{*} In order to apply Eqs 3.24, 3.25, 3.26, and 3.27 at nodal points i = 1 and i = m+1, fictious elements i = 1, and i = m+2 must be assigned zero stiffness.

The axial equations are given by the m+1 application of Eq 3.25

$$-\frac{AE_{i}}{2}\widetilde{w}_{i-1} + \left(\frac{AE_{i}}{2} + \frac{AE_{i+1}}{2} + \widetilde{s}_{i}^{1}h\right)\widetilde{w}_{i}^{i} - \frac{AE_{i+1}}{2}\widetilde{w}_{i+1}$$
$$= \widetilde{p}_{i}^{1}h \qquad (3.25)$$

The lateral equations are generated by m+1 applications of Eqs 3.26 and 3.27.

$$-(2EI_{i}) \tilde{w}_{i-1}^{2} - (2hEI_{i}) \tilde{w}_{i-1}^{3} + [2(EI_{i}+EI_{i+1}) + \tilde{s}_{i}^{2}h^{3}] \tilde{w}_{i}^{2}$$

$$+ [2h(EI_{i+1}-EI_{i})] \tilde{w}_{i}^{3} - (2EI_{i+1}) \tilde{w}_{i+1}^{2} + (2hEI_{i+1}) \tilde{w}_{i+1}^{3}$$

$$= \tilde{p}_{i}^{2}h^{3} \qquad (3.26)$$

$$(2hEI_{i}) \tilde{w}_{i-1}^{2} + (1.5h^{2}EI_{i}) \tilde{w}_{i-1}^{3} + [2h(EI_{i+1} - EI_{i})] \tilde{w}_{i}^{2}$$

$$+ [2.5h^{2}(EI_{i} + EI_{i+1}) + \tilde{s}_{i}^{3}h] \tilde{w}_{i}^{3} - (2hEI_{i+1}) \tilde{w}_{i+1}^{2}$$

$$+ (1.5h^{2}EI_{i+1}) \tilde{w}_{i+1}^{3} = \tilde{p}_{i}^{3}h^{3} \qquad (3.27)$$

Both the axial and lateral equations are easily solvable by the method in Ref 3.

Once the nodal point displacements have been found they may be substituted into Eq 3.19 to find the member-end-forces. The elastic support forces may be found by multiplying the spring constants times the negative of the nodal point displacements. Then the nodal point equilibrium error (the nodal point forces minus the element forces) may be calculated. This should be a negligible quantity except for the cases where a specified displacement is enforced by a large spring value and a correspondingly large force as discussed in Chapter 2.

Calculation of Member Fixed-End-Force Vector

The fixed-end-forces ${FF}_k$ for each nonprismatic or nonuniformly loaded member in the frame may be obtained by a discrete-element solution of the member. The member is subjected to all its member loads and elastic restraints and the end displacements are set equal to zero by using three large spring values at stations 1 and m+1. The end forces acting on the member at stations 1 and m+1 are the desired fixed-end-forces. The member-end-forces are essentially equal to the forces acting on the end elements of the member. However, when the member has a discretized load or elastic restraint at the end of the member, the member-end-force is equal to [(the element-end-force) - (the discretized load) + (the spring restraint) x (the element-end-displacement)].

For members with pinned ends, the rotational spring restraint is not set equal to a large value, thus leaving it free to rotate.

Calculation of Member Stiffness Matrix

The stiffness matrix $\begin{bmatrix} K \\ k \end{bmatrix}$ for each nonprismatic member in the frame may be obtained by six discrete-element solutions of the member. The member is subject to all its member elastic restraints and in turn six unit displacements are introduced corresponding to the three degrees of freedom at station 1 and station m+1.

The unit displacements are obtained by using three large springs at stations 1 and m+1 and six correspondingly large forces. Two of the solutions will be axial solutions as generated by Eq 3.24 and four of the solutions will be lateral solutions as generated by Eqs 3.25 and 3.26. The stiffness of the member does not change, hence the second axial solution and the second, third, and fourth lateral solutions do not require an elimination of the stiffness matrix. This saves a relatively small amount of time when considering the generation of a single member stiffness matrix, but when multiplied by a large number of members represents a sizable saving.

The member-end-forces at stations 1 and m+1 for each of the six solutions are the six columns of the member stiffness matrix. Actually only 13 of these 36 forces need be calculated and stored. Since $\begin{bmatrix} K \\ k \end{bmatrix}$ is always symmetrical, only 21 of its coefficients need be known. For a plane frame member subject to small displacements, 8 of these 21 will always be zero. Thus, only 13 member-end-forces need be calculated and stored to generate $\begin{bmatrix} K \\ k \end{bmatrix}$. The savings in calculations are insignificant but the savings in storage are considerable. Further reductions can be made if the member is assumed to have no elastic restraints acting between its ends. This was not done here to maintain the generality of the solution.

For pinned-end members, the corresponding rotational spring is not set to a large value and no moment is applied at the pinned end to enforce the unit rotation.

Calculation of Member Results

Once the frame joint displacements have been found by the solution of Chapter 2, they can be transformed into member-end-displacements. Then any frame member may be analyzed as a member subject to the member-end-displacements, applied member loads, and elastic restraints. The solution is similar to the solutions for $\begin{bmatrix} K \end{bmatrix}_{L}$ and $\{FF\}_{L}$ just discussed.

The displacements of all the stations will be found from such a solution. Then the spring support reactions may be found by multiplying the spring constants times the negative of the appropriate displacement. The element-endforces may be found from Eq 3.19. Then the nodal point equilibrium error may be evaluated.

Shears, moments, and axial forces in the member can now be found by statics at any point desired. The output used in the program is the average value of shear, moment, and axial force at every other nodal point.

Comparison of Finite-Element and Discrete-Element Methods

For an "exact" solution of a member, nodal point equilibrium, compatibility, and boundary conditions must be satisfied at the m+l nodal points (stations) and the force-displacement equations for the m elements must be satisfied. The exact force-displacement equations may not be known and are often obtained by an approximate method. The difference between the finite-element method and the discrete-element method is the way in which the elements forcedisplacement equations are approximated.

The element force-displacement equations obtained by the finite-element method (Ref 13) satisfy the constitutive relations and compatibility throughout

the element and approximately satisfy equilibrium and the boundary conditions throughout the element. The discrete-element method satisfies the constitutive relations and equilibrium throughout the element but only approximates compatibility and the boundary conditions throughout the element. For certain special cases either method may give the "exact" force-displacement equations.

CHAPTER 4. CONVERSION OF ENGINEERING INPUT

Much of the data describing a plane frame readily available to an engineer is not in the form needed to solve the computer model of the frame. Thus either the engineer has to perform the tedious and repetitive calculations necessary to convert the data, or this conversion can be incorporated into the computer program. The equations needed for converting the engineering data into a form compatible with the theory presented in Chapters 2 and 3 are given here and are made internally in the computer program discussed in the next chapter.

Joint Coordinates

The coordinates of each joint in the frame are used to calculate the direction cosines of the frame members. The engineer is more likely to have the projections of the members on the coordinate axes than the actual coordinates of each joint. Thus the offsets or projections x_0 and y_0 as shown in Fig 6 are a more logical choice for the input of the frame geometry.

If the coordinates of one reference joint are given, then the coordinates of a second joint can be computed by adding the appropriate offsets to the coordinates of the first joint. A third joint can be referenced by offsets to either of the first two, etc. In general, if joint i has been located and has coordinates x_i and y_i then the coordinates of joint j, x_j and y_j are given by

$$\mathbf{x}_{\mathbf{j}} = \mathbf{x}_{\mathbf{i}} + \mathbf{x}_{\mathbf{0}} \tag{4.1}$$

and

$$\mathbf{y}_{\mathbf{i}} = \mathbf{y}_{\mathbf{i}} + \mathbf{y}_{\mathbf{o}} \tag{4.2}$$

The member's direction cosines α and β are given by



Fig 6. General frame member.

$$\alpha = (x_j - x_i)/L$$
 (4.3)

and

$$\beta = (y_{j} - y_{i})/L$$
 (4.3)

where the length of the member L is given by

L =
$$\sqrt{(x_j - x_i)^2 + (y_j - y_i)^2}$$
 (4.5)

Equations 4.3 and 4.4 assume that the member x'-axis is directed from joint i to joint j. The program directs the member x'-axis in the direction that the member stiffness and load types are input.

Member Stiffness and Load Types

Many frames have several members with the same stiffness properties and/or loadings. The terms "stiffness type" and "load type" are used in the program to avoid duplication of input for such members. Two or more members have the same stiffness type if they have the same stiffness properties (length, distribution of axial and flexural rigidities and distribution of elastic restraints) and have their member axes parallel and similarly directed. Two or more members have the same load type if they have the same loadings, length, and similarly directed parallel member axes.

Member Load Data

Consider a member subjected to a variety of loads as illustrated in Fig 6. In general, Q_a is a concentrated load in the direction of the a-axis. Thus Q_x , is a concentrated load in the direction of the member x'-axis, and Q_z is the concentrated moment about the z-axis. And in general, q_{ab} is a distributed loading in the direction of the a-axis and has its intensity per unit of length along the b-axis. Hence q_{yx} , is a load in the direction of the structure y-axis and has its intensity per unit of length along the member x'-axis. Such a load might be the member's own weight, if the structure y-axis is vertical.

A load is positive if directed in the positive sense of the direction axis or, in the case of a moment, if it is counterclockwise in the x-y plane.

Describing member loads in terms of Q_a and q_{ab} , giving the distance from a reference point to Q_a and the distance from a reference point to the starting and stopping points of q_{ab} is a convenient method of inputting member loads. However, the discrete-element model of Chapter 3 requires loads to be in the direction of the member axes and acting only at stations. Thus general member loads must be transformed into member coordinates and discretized to station values. The transformation of concentrated loads from the structure axes to member axes is accomplished by multiplying by the appropriate direction cosines α and β and summing as follows:

$$Q_{x'} = \alpha Q_{x} + \beta Q_{y}$$
(4.6)

$$Q_{y}' = -\beta Q_{x} + \alpha Q_{y}$$
(4.7)

and

$$Q_{z'} = Q_{z}$$
(4.8)

Distributed loads in the direction of the structure axes but with their intensity per unit of length along the member x'-axis transform in the same manner:

$$q_{x'x'} = \alpha q_{xx} + \beta q_{yx}$$
(4.9)

$$q_{y'x'} = -\beta q_{xx} + \alpha q_{yx}$$
(4.10)

and

$$q_{z'x'} = q_{zx} \tag{4.11}$$

The term $q_{z'x'}$ (not shown in Fig 6) is a moment per unit of length and probably not useful for normal design but is included for generality.

Distributed loads directed in one structure direction per unit of length in the other structure direction are transformed by Eqs 4.9 and 4.10 and then multiplied by the absolute value of the direction cosine between the member axis and the axis to which the intensity is referenced to give

$$q_{x'x'} = \alpha q_{xy} \left| \beta \right| + \beta q_{yx} \left| \alpha \right|$$
(4.12)

and

$$q_{y'x'} = -\beta q_{xy} \left| \beta \right| + \alpha q_{yx} \left| \alpha \right|$$
(4.13)

Distances to concentrated loads, etc., may be input in structure coordinates, x and y, and then divided by the appropriate direction cosine to give the distance along the member axis, x', as follows:

$$\mathbf{x'} = \frac{\mathbf{x}}{\alpha} \tag{4.14}$$

or

$$\mathbf{x'} = \frac{\mathbf{y}}{\mathbf{\beta}} \tag{4.15}$$

Discretizing Member Loads

The idea of replacing a complicated loading system with a simpler statically equivalent system is not new. Newmark's classic paper (Ref 12) gives a good practical discussion of the concept and a theoretical treatment is given in a paper by Mises (Ref 11). Mises points out the lack of generality of St. Venant's principle and gives a better criteria for the replacement of one load system by another.

Using Mises criteria a system of loads may be replaced by an equivalent system if the static difference of the two systems is zero and remains zero when the two systems are rotated through an arbitrary angle. Such systems are said to be astatically equivalent. Then, if the real loading system and the astatically equivalent loading system are contained within a circle of diameter ϵ , the error in replacing the original system with the equivalent system will be of order ϵ^2 .

Consider a concentrated load $Q_{y'}$ as shown in Fig 7(a). The load may be imagined to be applied to a simple stringer supported at stations i and i+1. Such a stringer would give reactions at i and i+1 as follows:

$$\hat{p}_{i}^{2} = Q_{y'}(2h - c)/2h$$
 (4.16)

and

$$\hat{p}_{i+1}^2 = Q_{y'}c/2h$$
 (4.17)

The terms \hat{p}_i^2 and \hat{p}_{i+1}^2 are the concentrated station loads required for the member analysis of Chapter 3 and are astatically equivalent to the actual load Q_y , . Both loading systems are contained within a circle of diameter 2h thus the error is of the order $(2h)^2$.

A load parallel to the member Q_{χ} , could be arbitrarily transferred to either station i or i+l and it would still be statically equivalent to the original load but it would violate the principle of astatic equivalence. However, if formulas similar to Eqs 4.16 and 4.17 are used, the desired results are obtained. That is:

$$\tilde{p}_{i}^{1} = Q_{x'}(2h - c)/2h$$
 (4.18)

$$\tilde{p}_{i+1}^{1} = Q_{x'}c/2h$$
 (4.19)

A couple can be considered to be a system composed of two equal and oppositely directed forces a small distance apart. The forces may be transferred by Eqs 4.16 and 4.17 which has the effect of transferring the couple by Eqs 4.20 and 4.21.



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Fig 7(a). Concentrated loads.



Fig 7(b). Distributed Loads.

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Fig 7. Member loads in member coordinates.

$$\tilde{p}_{i}^{3} = Q_{z'}(2h - c)/2h$$
 (4.20)

$$\tilde{p}_{i+1}^3 = Q_z r^{c/2h}$$
 (4.21)

Linearly distributed loads such as $q_{y'x'}$ (shown in Fig 7(b)) may be first transformed into equivalent concentrated loads as suggested in the figure. A concentrated load is calculated for each element of the member that has any of the distributed loading acting on it. The formulae for the resultant of a linear load and its location may be found in any standard handbook. The concentrated loads thus found may be distributed by formulas 4.16 and 4.17. Higher ordered load distributions may be represented by the user as a series of linear loadings.

Distributed axial loadings $q_{x'x'}$ and distributed rotation loadings $q_{z'x'}$ may be handled in a similar manner. The similarity of the techniques is such that the computer program developed uses the same subroutines for all three types of loads (lateral, axial, and rotational).

Discretizing Member Stiffness Data

All member stiffness data are assumed to be given with respect to the member axes, as shown in Fig 6. That is, the cross-sectional area A is normal to the member x'-axis, the moment of inertia I is about the member z'-axis, $s_{x'}$ is a distributed elastic spring restraint acting parallel to the member x'-axis, $s_{y'}$, is a distributed elastic restraint acting parallel to the member y'-axis, and $s_{z'}$, is a distributed rotational elastic restraint acting about the member z'-axis. Concentrated values of elastic restraint are not permitted.

It is shown in Appendix 1 that using the average values of EI and AE for a linear variation of these properties over an element gives a solution with second order converging properties. A second order converging solution is one in which the error decreases in proportion to the square of the element size. This is compatible with the astatic equivalencing of loads just described. Higher order variations in EI and AE may be specified by the user as a series of linear variations to achieve any desired degree of accuracy.

A jump in EI or AE in an element, as occurs at a cover plate, could for all practical purposes be handled by using the average values of EI and AE for the element. However, this does not give second order convergence. To achieve this the M/EI and T/AE diagrams for an element may be balanced by choosing appropriate effective values of EI and AE to be used for the element. The term M is the bending moment at any point in the element and T is the axial thrust at any point in the element. Thus the M/EI diagram is the curvature diagram and the T/AE diagram is the axial strain diagram. These effective values should be chosen such that the errors in the positive area of the curvature and strain diagrams are balanced or offset by equal negative areas. This criteria gives

$$\overline{EI} = \frac{2hEI_1EI_2}{c_2EI_1 + c_1EI_2}$$
(4.22)

and

$$\overline{AE} = \frac{2hAE_1AE_2}{c_2AE_1 + c_1AE_2}$$
(4.23)

The terms $\overline{\text{EI}}$ and $\overline{\text{AE}}$ are the effective values to be used for the element of length 2h. The terms $\overline{\text{EI}}_1$ and $\overline{\text{AE}}_1$ are the actual values of $\overline{\text{EI}}$ and $\overline{\text{AE}}$ for a distance c_1 , and $\overline{\text{EI}}_2$ and $\overline{\text{AE}}_2$ are the actual values for a distance c_2 .

Positive values of EI and AE throughout the element are assumed in obtaining Eqs 4.22 and 4.23. A zero value of EI which corresponds to an idealized pinned connection is not allowed interior to a member. However, this is not a practical limitation as a hinge can occur at any structural joint. Hence a structural joint may be defined at the location of the hinge and a member specified on both sides of the hinge.

A more realistic way of handling a reduction in moment resistance, which can only approach an idealized hinge, is to put in a reduced value of EI for a short distance around the hinge.

The discretizing of elastic spring restraints can be done in a fairly complicated manner. However, if the restraints are restricted to distributed values, then a second order converging solution can be obtained by handling the springs exactly as distributed loads. That is by first obtaining equivalent concentrated values and then distributing these to the stations. The same formulae as used for loads can be used here. Concentrated elastic restraints, particularly very large values which might be used to set a displacement, cannot be handled in this manner without introducing unacceptable errors. Hence, the program accepts concentrated spring restraints only at structural joints where they are handled "exactly."

CHAPTER 5. COMPUTER PROGRAM

The computer program FRAME 11 has been written for the linearly elastic analysis of plane frames subjected to static inplane loads and has the restrictions outlined in the Introduction (Chapter 1).

The frame, its supports and loads are specified in input Tables 1 through 7. The results are given in output Tables 8, 9, and 10. These tables will be described after a short discussion of the four problem types the program works. A description of the internal workings of the program concludes this chapter. Chapter 6 gives the example problems of the report and additional details on the program are given in the appendices.

The program solves four distinct types of problems. The distinction of problem types is necessary both to increase computer efficiency and decrease the volume of input the user must supply. All problem types are related to the definition of a structure and its loads. For the purpose of defining the problem types, a structure should be considered to include the members of the frame, the member supports, and the joint supports. Any change in the members, their arrangement, or the supports creates a new structure.

Problem Type 1 - Regular Problem

When a structure is to be analyzed for only one loading it should be input as a problem Type 1 for the most efficient solution.

Problem Type 2 - Parent Problem

When a structure is to be analyzed for more than one loading condition, economics in computer time and man hours may be made by making the first solution a Type 2 problem.

Problem Type 3 - Offspring Problem

A structure previously analyzed as a Type 2 problem may be analyzed more economically for another loading condition by running it as a Type 3 problem.

Up to 20 Type 3 problems may follow a Type 2 problem. Type 3 problems must follow a Type 2 or a Type 3 problem. Only loads can be changed in a Type 3 problem. A computer diagnostic will appear if an attempt is made to change the structure in a Type 3 problem.

Problem Type 4 - Family Problem

When one structure is solved for several load conditions starting with a Type 2 problem the results are stored. This allows the designer to solve a structure for several basic load cases and then combine the results in a linear manner. (Exp. 1.5 dead load + 1.8 live load, etc.) Type 4 problems require only input Tables 1 and 7 and may not follow a Type 1 problem.

Input Tables

A detailed input guide is provided in Appendix 2.

<u>Table 1. Program Control Data</u> - consists of two cards which are required for all problems. The first card specifies the problem type, the tables for which data are held and allows the user to suppress output. The second card specifies the number of data cards in Tables 2 through 7. Data may be held for all types of problems but cannot be held on the first problem of a computer run. Data is generally held from the previous problem but after a Type 4 problem the data from the last problem other than a Type 4 problem may be held.

<u>Table 2. Frame Geometry Data</u> - defines the location of the structural joints of the frame. Joints are required at the intersections of two or more members and at the ends of members. Joints need not be input at concentrated loads but are required at locations of supports (concentrated linearly elastic springs) and at hinges (points of zero flexural stiffness).

The first card of Table 2 gives the total number of frame joints, the reference joint, its coordinates, and the joint location tolerance. The reference joint may be any joint and it may have any coordinates except all joints must have coordinates less than 1.0E + 50. As many additional cards as necessary follow to specify the location of the remaining joints and check the location of as many joints as desired. When joints are located more than once the program compares the old and new coordinates. If the difference in either

coordinate (x or y) is greater than the joint-location tolerance a computer diagnostic appears, otherwise the program averages the old and new coordinates and continues.

The second and succeeding cards give the offsets of new joints with reference to previously defined joints. For example, if joint 3 is the reference joint the second card could locate joint 7 with respect to joint 3. The next card could then locate joint 1 with respect to either joint 3 or joint 7. When several joints are in a straight line and have identical offsets, they may be located with only one card. Joint offsets need not be given where members are, but all joints must be located at least once. The input data is echo-printed in Table 2 and in addition the computed joint coordinates are given.

<u>Table 3. Member-Type Location</u> - locates the members of the frame between the joints defined in Table 2. The use of member stiffness and load types reduces the volume of input required for large frames with repeated members. Two or more members have the same stiffness type if they have the same stiffness properties (length, distribution of axial and flexural rigidities, and distribution of elastic restraints) and have their member axes parallel and similarly directed. Two or more members have the same load type if they have the same loadings, length and similarly directed parallel member axes.

The first card of Table 3 contains the total number of stiffness types and load types in the frame. The second and succeeding cards give the location of the members in the frame and their stiffness and load types.

The members are input going "From" one joint "To" another joint. This orients the member x'-axis in the direction of the "To" joint. The orientation is given with the member output for interpreting results.

When several members with the same stiffness and load type are connected in a straight line, they may be input with only one card.

The stiffness and load types on a data card replace the old values for a member if old values exist. Thus if only one member's stiffness and load type change from the previous problem the data may be held in Table 3 and only the new values of stiffness type and load types given. And obviously, both the stiffness and load types must be given even if only one of them changes.

The input data is echo-printed and in addition the computed member numbers, lengths, and offsets are printed in Table 3.
<u>Table 4.</u> Joint Loads and Restraints - gives joint loads and restraints in the structure x-y-z axes. Frame supports are specified as linearly elastic restraints (springs). Realistic values may be used where available or fictitiously large values may be used to simulate unyielding supports.

A completely fixed support is obtained by specifying large horizontal (x), vertical (y), and rotational (z) springs at a joint. A pinned support would omit the rotational restraint and the free end of a cantilever would have no restraints.

A specified displacement may be enforced by inputting a large spring and a correspondingly large force equal to the spring restraint times the desired displacement.

Each card of Table 4 contains joint loads and restraints for one joint. Only joints with nonzero values need have a data card. No special order of the joints is required in Table 4. The table is accumulative and in addition to the echo-print of the data the accumulated joint data is printed.

Loads are positive if in the direction of the structure axes, thus counterclockwise couples are positive loads. Springs corresponding to stable supports will always be positive.

Table 5. Member Stiffness Data - specifies the stiffness data for the various stiffness types in the frame. One or more data cards are required to define each new stiffness type. Stiffness types must be input in ascending order and when Table 5 is held from a prior problem the first new stiffness type must be one more than the last stiffness type in the prior problem.

Prismatic members without elastic spring restraints require only one data card. Members with variable cross-sections or elastic-spring restraints require two or more data cards and the first card indicates how many additional cards follow.

Connections of members to the joint may be either pinned or rigid and are indicated on the first card for each stiffness type. This option either pins or rigidly attaches the member to the joint but does not in any way serve as a support for the frame (i.e., when a member has a pinned support at its end it must be specified in Table 4 even if a pinned connection to the joint is provided in Table 5).

Distances to locations of changes in stiffness are given from the members "From" joint and may be in either member or structure coordinates

depending upon the axis option chosen. Positive distances are in the direction of the chosen axis.

Either partial or complete member output may be requested in Table 5 for each stiffness type and all members with that stiffness type will have the specified output.

<u>Table 6. Member Load Data</u> - specifies the loadings for the various load types. One or more data cards are required to define each new load type. Load types must be input in ascending order and when Table 6 is held from a prior problem the first new load type must be one more than the last load type in the prior problem.

Members with only uniform loads over their full lengths may be input with only one data card. Other loadings require two or more cards and the first card indicates how many additional cards follow. Four axis options are provided which permit the user to describe the member loads in the most convenient manner. Loads are positive if they are in the direction of the chosen axes, thus, counterclockwise couples are always positive. Distances to concentrated loads and changes in distributed loads are given from the members "From" joint and are positive in the direction of the chosen axes.

Table 7. Compilation Table - specifies the problem numbers of previous problems and their appropriate load factor for a superposition solution. Table 7 has one data card for each previous problem which has a multiplier. No cards are input in Table 7 except for Type 4 problems.

A multiple of a Type 4 problem is not allowed but the data from the previous Type 4 problem may be held and combined with new multipliers. In addition to an echo-print of the data the accumulated multipliers are printed.

Output Tables

<u>Table 8. Joint Displacements and Reactions</u> - gives displacements and reactions for all frame joints. Only supported joints (those with elastic spring restraints) will have nonzero reactions.

Undefined displacements, such as the rotation of a joint to which all members are pinned, or all three displacements of a joint to which no members are connected, are indicated in the output by extremely large displacements. (Refer to example problem 1101.) Joint displacements and reactions are in structure coordinates and positive in the positive coordinate directions. Thus positive rotations are counterclockwise.

<u>Table 9. Member Results</u> - gives, for all members, either member-endforces or detailed output, as requested in Table 5. Member-end-force output consists of the axial forces, shears and bending moments at the ends of the member; complete member output lists the axial, lateral, and rotational displacements as well as the axial force, shear and bending moments at 21 equally spaced points along the member.

For either choice of output, the axial forces, shears, and bending moments are in normal member-sign convention (not a joint-sign convention). Positive axial force produces tension in the member, positive shear tends to raise the end of the member nearest the origin of the member's x'-axis, and positive bending moment produces tension on the bottom side of the member. Positive displacements are in the positive member axes directions, thus, positive rotations are counterclockwise. The direction of the member's x'-axis is as input in Table 3 and is given with the member output for convenience.

Distances to the 21 output points are given along the axis used to specify the members stiffness data and are positive if in the positive axis direction. Regardless of the input options used, the axial force is parallel to and the shear force is normal to the member's x'-axis.

The values of axial force, shear and bending moment are the normal engineering values except that average values are given when there is a double value at an interior point due to a concentrated load or couple.

The maximum equilibrium error in the member is also output with the member's results and should always be a negligible quantity.

<u>Table 10.</u> Joint-Equilibrium Errors - give the errors in equilibrium at the frame joints and should always be negligible except at a joint for which specified displacements are enforced. A valid check of such joints is not possible.

The equilibrium errors at other joints should be scanned by the designer to see that the program is working properly. In considering the relevance of an error the designer might ask what effect the error would have if applied to the joint as a load. Example problem 1201 has one of the largest joint equilibrium errors of the report, an error of 1.2 kip-inches. If this were applied to the joint as a load it would scarcely change the distribution of moments in the members of 8,539 and 8,540 kip-inches respectively.

Program Description

FRAME 11 is written in FORTRAN IV and conforms to the requirements of "American Standard FORTRAN" (Ref 1). The program has been implemented and thoroughly checked on the CDC 6600 computer at the Computation Center of The University of Texas at Austin. Only minor modifications are necessary to convert the program to other machines.

Program flow charts, the glossary of notation, and the FORTRAN listing of programs are in Appendices 3, 4, and 5 respectively. The reader interested in developing a full understanding of the program may wish to refer to these appendices as he reads the remainder of this chapter. In particular, the flow diagram for subroutine FRAM11 should prove helpful.

There are four more or less distinct paths through the program taken by the four problem types. The program will be explained by examining these paths.

Regular Problem

A Type 1 or regular problem is the analysis of a structure for one single loading condition. Type 1 problems, as all problems after the first problem of a run, start by reading in the problem number and problem identification card. The first problem of a run also contains two run identification cards. Then unless the problem number is equal to "CEASE" the program inputs Table 1.

For Type 1 problems, calls are then made successively to JTCORD, MEMLOC, JNTDAT, RDMST, and RDMLD which input Tables 2 through 6, echo-print the data, and after making preliminary computations, print the additional data described earlier in the chapter.

Subroutine RDMST and RDMLD convert the member stiffness and load data from the input coordinates to member coordinates and from that point on all member data is expressed in member coordinates. The transformation to discrete station values is not made at this time, in order to conserve storage.

Subroutine COMP is then called which prints out the table heading for input Table 7 and indicates that there is no data in the table.

In each of the routines which inputs data, checks are made for inconsistencies. If a data error is found the program stops processing that problem, prints out an appropriate error message and searches the remaining data cards for an independent problem. All intermediate cards are listed in the output.

The next step is the calculation of the member's stiffness and fixed-endforce matrices in member coordinates. Members with the same stiffness type will have the same member stiffness matrix; thus, member-stiffness matrices are computed and stored by stiffness type. Members with the same load type need not necessarily have the same stiffness type; hence, the member fixed-endforce matrices are computed and stored for each individual member.

Subroutine FORMST is called to calculate the member's stiffness matrix. FORMST calculates the stiffness matrix using known formulae for prismatic members not elastically restrained. Other members have their stiffness matrix generated by applying the appropriate unit displacements as discussed in Chapter 3.

Members which require the unit-displacement technique first have their stiffness data discretized to station values by subroutine DISCST. Then axial and lateral solutions are performed by subroutine AXIAL and GRIP2A.

Subroutine AXIAL is a short routine for solving the members axial equilibrium equations. The routine, which is a slight modification of previous beam-column solution routines (Ref 9), takes advantage of the fact that the band width of the axial equations are only three terms wide.

Subroutine GRIP2A is the general-simultaneous equations routine of the program and is used to solve the member-equilibrium equations for lateral displacements and rotations and also the joint-equilibrium equations for the joint displacements (vertical, horizontal, and rotational).

GRIP2A calls FSUB1 which calls FSUB12 to generate the member stiffness and load matrix one row at a time. (In the frame solution, GRIP2A calls FSUB1 which in turn calls FSUB11 for the appropriate frame coefficients.)

GRIP2A is a modification of the general recursion-inversion routine GRIP2 reported in Ref 3. The modification reduces the storage required for an incore solution which proves to be the most economical for small and medium sized frames. Only 13 of the 36-member stiffness coefficients need be calculated and stored. SMMT is the storage vector used and the relation of SMMT to the member-stiffness matrix $[K]_k$ is given in Eq 5.1.

$$\begin{bmatrix} K \end{bmatrix}_{k} = \begin{bmatrix} SMMT(1) & & & & & & & & \\ 0 & SMMT(3) & & & & & & \\ 0 & SMMT(4) & SMMT(7) & (SYMMETRIC) & & & & \\ 0 & SMMT(2) & 0 & 0 & SMMT(10) & & & & \\ 0 & SMMT(5) & SMMT(8) & 0 & SMMT(11) & & \\ 0 & SMMT(6) & SMMT(9) & 0 & SMMT(12) & SMMT(13) \end{bmatrix}$$
(5.1)

Subroutine FORMLD is called to calculate the member fixed-end-force matrices. Prismatic members not elastically restrained have their fixed-endforce matrices calculated directly using known formulae. For other members, FORMLD does a member solution for the member subject to its member loads and zero-end displacements.

The member solutions are similar to those discussed in FORMST. Loads are discretized to concentrated station values by subroutine DISCLD.

The frame equilibrium equations are set up and solved by GRIP2A which calls FSUB1 which in turn calls FSUB1 to furnish the appropriate stiffness and load coefficients. FSUB11 is called for each row of equations but forms three rows of equations on every third call from GRIP2A in (3×3) and (3×1) submatrices following the procedure outlined in Chapter 3.

After the frame displacements are found, the corresponding reactions are then computed and the joint displacements and reactions are printed in Table 8.

The sum of the joint loads and reactions are then computed. (When the member-end-forces are subtracted away from these values, the remnants are the equilibrium errors at the joints.)

The member results are then found for each member in the frame by a call to MEMRES. Subroutine MEMRES solves each member for its member loads and the member-end displacements which are compatible with the joint displacements of the frame solution. Loads and stiffnesses are discretized in the same way as previously discussed. Subroutines AXIAL and GRIP2A are then called to solve for the member's axial, lateral, and rotational displacements at each station. The end forces on the ends of the member elements are then computed and an equilibrium check made at each station. The average value of axial force, shear, and bending moment is then computed at alternate stations. (Output is at every other station.)

Subroutine ADJNTER is then called to subtract the member's-end-forces from the partially computed joint equilibrium error. The remnant after all members have had their forces subtracted away should be extremely small and is an indication of how accurately the frame-joint displacements have been computed. It should be noted that some error is introduced due to using the standard stiffness matrices for prismatic members and then evaluating the member-end-forces by the discrete-element solution. This could be avoided by calculating memberend-forces in a different manner (matrix techniques of Chapter 2) for prismatic member. But this would needlessly complicate the program.

As now programmed, the joint equilibrium errors thus serve to indicate the errors both in the solution process and in the two different models (continuous line element versus discrete line element). As shown in the example problems, the errors are negligible.

The member results are printed in Table 9 by subroutine PRINT9. Either complete or partial output is printed, depending on which is requested in Table 3.

The joint equilibrium errors are then printed in Table 10 and the program returns for a new problem.

Parent Problem

A Type 2 or Parent Problem differs from a Type 1 problem only in the tape operations required for a Type 2 problem.

Subroutine COMP forms a list of problem numbers for which the results are saved for future Family Problems. The first problem of the list is the Parent Problem.

After the solution of the frame equilibrium equations by GRIP2A, the recursion multipliers RM and RO are stored on Tape 2 for a Parent Problem so they will be available for future Offspring (Type 2) Problems. Note that since RM and RO are kept in core, they would be available for future solutions except that the routine GRIP2A is used for solving both frame equations and member equations.

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Then the frame displacements, reactions and joint loads are stored on Tape 1 for future Family (Type 4) problems. The tape is rewound prior to writing data on it since the Parent Problem is the first of a series for which the results are stored.

Similarly, Tape 4 is rewound and the results for six members are written on it at one time. The member results are grouped in order to decrease the number of records written, thus reducing the time for tape operations.

Offspring Problem

A Type 3 or Offspring Problem skips the formation of the member stiffness matrices, since the stiffness data must be identical to the last problem. However, the member-end-forces matrices must be formed as was done for regular and Parent Problems.

Prior to calling GRIP2A for the solution of frame equilibrium equations, RM and RO are retrieved from Tape 2. Then RM and RO need not be calculated again by GRIP2A, thus greatly reducing the solution time for the equations. After the solution, RM and RO are again stored on Tape 2 for additional Offspring Problems.

The frame-joint displacements, reactions, and loads are stored on Tape 1 as was done for the Parent Problem. And member results are stored on Tape 4.

Family Problem

A Type 4 or Family Problem has a completely different path through the program. Input Tables 2 through 6 are not read in. In subroutine COMP, the problem numbers and multipliers are read in and a check is made to see that the problem numbers are in the list of problems (parent and their offspring) for which the results have been saved.

A Family Problem then calls subroutine SUM1 for a superposition solution of frame displacements, reactions, and joint loads, and outputs the displacements and reactions in Table 8.

The preliminary computation of joint equilibrium error is made by adding reactions and loads, as was done for the other problem types, and subroutine SUM2 is called for a superposition solution of the members. SUM2 also calls ADJNTER to complete the joint equilibrium error calculations and PRINT9 to print the member results requested. The joint equilibrium errors are printed in Table 10, and the program returns for a new problem.

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CHAPTER 6. EXAMPLE PROBLEMS

A number of examples have been solved to check the accuracy and usefulness of the program. The results for the truss analyzed in problems 1101-1103 are found to be almost identical to an analysis by statics and virtual work found in Ref 10. Numerous other examples not reported were worked to check the accuracy of the computer solution. Example problems 1201-1207 illustrate the use of the program in a meaningful series of problems for a two-story, twoway bent similar to certain highway structures. The results of this series were compared with independent solutions where feasible, and agreement was obtained in all cases.

The units used for all example problems are kips and inches, though any consistent set of units may be used.

Problems 1101-1103 - Simple Truss

The truss of Fig 8 is analyzed in problems 1101-1103. This simple problem illustrates the savings in input possible when members are repeated in a structure.

In problem 1101, the joints are numbered 1 through 12 across the short direction of the truss. This numbering technique will generally give the most efficient computer solution. However, the program will accept any order of numbering as long as the difference between connected joints does not exceed nine and no joint numbers are omitted. The joints are located in Table 2, taking advantage of the uniform geometry of the problem.

All members are assumed unloaded in accordance with normal truss analysis techniques. Thus, all members are assigned zero load type. However, any member loads which might actually exist could be easily accommodated in a manner similar to the member loads of the bent problem.

All chord members have the same cross-section, modulus of elasticity, length, and orientation and hence are assigned a single-stiffness type, Type 1. Stiffness Type 1 is specified for all bottom chord members with a single card. The top chord is specified in a similar manner. All of the members with

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Stiff Type	(KSL)	Prismatic I(in ⁴)	Prismatic A(in ²)
1	30,000	40	4.0
2	30,000	2,25	3.0
3	30,000	2.25	3.0
4	30,000	1,0	2.0

.



Joint Number
Stiffness Type

1

All Members Have Load Type O

Fig 8. Truss with unsymmetrical loads.

stiffness Type 1 have their member x'-axis going from left to right because of the manner in which the stiffness types are input in Table 3.

All diagonal members have the same cross-section, modulus of elasticity, and length but they have two different orientations. Hence, two stiffness types are required. All vertical members are identical and thus have the same stiffness type.

Joint loads and restraints are input in Table 4. The restraints used are unrealistically large to mimic the idealized pin and roller supports shown.

The data describing the member stiffness types are input in Table 5 and the pinned-end connections are indicated here. Since the members are prismatic, only one card is required per stiffness type. The minimum output is selected for all members. Axis option 1 is used for all members but does not affect the input for prismatic members.

No cards are input for Tables 6 and 7.

Table 8 gives the joint reactions and displacements. The reactions are identical to the reactions of Ref 12 and the displacement of joint 9 of 1.399 inches compares favorably with the displacement of 1.4 inches found in Ref 10. The joint rotations are undefined since all members were specified as pinnedended and the rotations of 1.0 E+99 indicate this. As anticipated, all shears and bending moments for the members are trivial. The axial forces can be easily verified by statics.

Table 10 gives the joint equilibrium errors and confirms that the solution is valid.

In problem 1102, the effects of rigid connections on the truss' behavior are examined. The stiffness types are modified to indicate rigid connections rather than pinned ones. The results are very similar to 1101 except for small bending moments and shears to which the members are subjected due to the continuity.

In problem 1103, the effects of the roller freezing on the truss of 1102 are investigated. As expected, the displacements and axial forces in the bottom chord are reduced but a large horizontal reaction is developed, which the foundation must resist.

Problems 1102 and 1103 required only a few additional data cards since most of the information could be held from problem 1101. Note, however, that

neither 1102 or 1103 could be worked as an Offspring Problem, since the stiffness of the structure changed in both cases.

Problems 1201-1207 - Two-Story Bent

A two-story bent is analyzed in problem 1201 for the live loads shown in Fig 9. The two columns on the left side of the frame have the same length and cross-sectional properties and are input as the same stiffness type. In order to do this, the pin at joint 1 must be specified as a joint property in Table 4 rather than as a member property in Table 3.

The pinned support is specified in Table 4 by using large vertical and horizontal restraints and no rotational restraint. The fixed support at joint 6 requires all three restraints.

The girders are the only members loaded in problem 1201 and are assigned load Types 1 and 2, as shown in Fig 9(b). All other members are assigned zero load type.

The first five stiffness types are prismatic and require only one card in Table 5 to specify their stiffness data. Stiffness Type 6 requires additional data cards to specify its data. Axis option 2 is used for stiffness Type 6. Therefore, horizontal distances are given to the locations of changes in stiffness. The distances are referenced to the "From" joint as defined by the input of Table 3.

The concentrated live loads are input in Table 6 for load Types 1 and 2. Axis option 3 is used for both members so loads are input in the structure axes and distances are horizontal.

Table 8 gives the joint displacements and reactions. The reactions can be seen to be in equilibrium with the applied loads.

The member results are given in Table 9. Some of the members have only member-end-forces while others have complete output at the twentieth points, as requested in Table 3.

Table 10 gives the joint equilibrium errors, that is, the error in equilibrium of forces and moments at each joint. The maximum error is -1.2 kip-inches, which is negligible when compared with the moment in the members at the joint of 8,340 kip-inch.

In problem 1202, the frame of problem 1201 is modified by adding a column below joint 4, as shown in Fig 10. The resulting structure is analyzed for the live loads of problem 1201.





(a) Geometry and stiffness types.



Legend ○ - Joint Number □ - Stiffness Type △ - Load Type

Stiff Type	E (K/m ²)	Prismotic 1 (in 4)	Prismatic A (in 2)	Variable Stiffness
I	29,600	1050	28	
2	29,600	1800	20	
3	29,600	1050	28	
4	29,600	1050	28	
5	29,600	1800	24	
6	29,600			
			l (in ⁴) A (in ²)	= 9000 3400 5000 = 70 72 50

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Fig 9. Two-story bent without interior column.



(a) Geometr	y and	stiffness	types.
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(b) Wind load.



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Only one additional joint has to be located in Table 2 and one additional member has to be located in Table 3. The member going from joint 9 to joint 4 is assigned stiffness Type 7 and load Type 0. Stiffness Type 7 is defined in Table 5. The end restraint on the column at joint 9 is input in Table 4.

The results of problem 1202 show that the displacements and bending moments are reduced by the addition of the column. The member results for the added member 10 show the variation in axial force, shear, and bending moment, as well as displacements, and could be extremely useful for design.

Problem 1202 was run as a Parent Problem since it was intended to be the first of a series in which the same structure (no change in stiffness properties) was analyzed for a group of loads. Problem 1203 is then an Offspring solution for the wind loads shown in Fig 10(b).

Four new load types are defined in problem 1203, as shown in Fig 10(b). To save the previous load types for future problems, hold Table 6 and define the new load types as 3-6. Note that in locating a new load type in Table 3, the corresponding stiffness type must also be input. And since problem 1203 is an Offspring Problem, the stiffness types must be identical to problem 1202 or a diagnostic message will occur.

Since all the wind loads shown in Fig 10(b) are normal to the members, axis option 1 is used for all load types. Only one data card is required for each load type since all loads are uniform over the full length of the members.

Problem 1204 is an Offspring solution of the frame defined in problem 1202 for the dead loads indicated in Fig 10. All of the members have a uniform gravity load (dead weight) and, in addition, the girders have concentrated gravity loads located at the same place as the live loads shown in Fig 9(b). Since all members are loaded, for convenience they are assigned a load type equal to their stiffness type. The load types are located in Table 3 and defined in Table 6 with all other data held.

All load types are input using axis option 2 which provides for loads acting in the direction of the structure axis. However, distributed loads have their intensity per unit of length along the member axis. The vertical and horizontal members could be defined using axis option 1 since their member axis coincides with one of the structure axes. If axis option 1 were used for the vertical members, the load would be $q_{x'x'}$ and be input in columns 31-40 instead of 41-50. Problem 1205 is a superposition solution (Family Problem). A factor of 1.25 is applied to the dead load, live load, and wind load acting on the structure defined in 1202. The results could be obtained by hand from the results of 1202-1204, but the cost in man-hours would be far more than the computer costs for the Family Problem. Problem 1206 is a similar solution for 1.5 times the dead load plus 1.8 times the live load.

The column (pile) going from joint 9 to joint 4 is subdivided into two members at the point where the soil restraints start in problem 1207. The frame is then reanalyzed for the dead load and the results compared with problem 1204 (the previous dead-load solution). Subdividing the member into two elements gives a more accurate solution and an idea of the accuracy of the original solution in which the column with soil restraints over part of its length was input as one member.

Joint 10 is input at the ground line and all other joint coordinates are held. Stiffness Type 7 is deleted between joints 9 and 4 by specifying zero stiffness and stiffness Type 8 is input going from joint 10 to joint 4. Stiffness Types 9 and 10 are defined in Table 5.

The results of problems 1204 and 1207 agree within approximately one percent, except for a few locations where very small forces exist such as the tip reaction on the column-pile. Here most of the force has been removed by the axial restraints and the error is about 7 percent or approximately 1 kip. For normal design work, the original solution would certainly be accurate enough.

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CHAPTER 7. CONCLUSIONS AND RECOMMENDATIONS

A direct matrix solution for plane frames has been developed that allows a designer to quickly solve problems that previously were difficult or impossible to solve.

A revision of the previous discrete element model was made to allow loads and restraints to act both parallel and normal to the members.

A computer program, FRAME 11, has been developed and is documented herein. The program has all the linear analysis capabilities of the program developed in Ref 2 and in addition to having the five features discussed in Chapter 1, on page 2, can work larger problems using the same amount of core storage. The program as presently dimensioned will work a frame with up to 75 joints and 150 members.

In order to satisfy the linear assumptions required for the superposition solutions, the beam-column effect of axial forces on lateral displacements was neglected as in normal practice under existing codes. However, various forms of nonlinear analysis are being more widely recognized by codes and the designer will soon need a more general nonlinear analysis program.

Preliminary studies indicate that the discrete-element model reported herein can be extended to include not only the beam-column effect, but other geometric and large displacement effects as well as nonlinear material properties.

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ERROR ANALYSIS OF DISCRETE-ELEMENT MODEL

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APPENDIX 1. ERROR ANALYSIS OF DISCRETE-ELEMENT MODEL

The error in a model (either physical or mathematical) may be estimated in several ways. One widely used method is to compare the results of the model analysis with the results of another model analysis, the other model being generally accepted as an adequate model of the prototype. An accepted mathematical model of a frame member is a continuous line element.

In this appendix, the discrete-element model is shown to give results that agree with the continuous line element to within a predictably small error. The difference in resulting displacements between the two models is shown to be a function of the square of the element's length, i.e., of the order $(2h)^2$. This error is compatible with the method of discretizing loads and elastic restraints discussed in Chapter 4. Thus, as the element size decreases, the difference in the results of the two models rapidly approaches zero.

Consider the discrete element shown in Fig 4 (Chapter 3). Assume that the element is fixed at its left end, i.e., *

$$w_{i-1}^{1} = w_{i-1}^{2} = w_{i-1}^{3} = 0$$
 (A1.1)

Now consider the effect of load f_i^2 only, the moment in the two springs M_1 and M_2 will be found by statics to be

$$M_{1} = \frac{3f_{1}^{2}h}{2}$$
(A1.2)

$$M_2 = \frac{f_1^2 h}{2}$$
 (A1.3)

The results of the derivation concern the change in displacements from one end of an element to the other; hence the actual starting values are immaterial.

These will produce corresponding angle changes Ψ_1 and Ψ_2

$$\Psi_1 = \frac{3f_1^2h^2}{2EI_1}$$
 (A1.4)

$$\Psi_2 = \frac{f_1^2 h^2}{2EI_1}$$
(A1.5)

where EI is the flexural rigidity of the element at midpoint. From the geometry of the model

$$w_i^3 = \psi_1 + \psi_2 = \frac{2f_i^2h^2}{EI_i}$$
 (A1.6)

and

$$w_i^2 = \frac{3h\Psi_1}{2} + \frac{h\Psi_2}{2} = \frac{2.5f_i^2h^3}{EI_i}$$
 (A1.7)

The corresponding displacements will now be derived for a continuous element. The governing flexural differential equation for a continuous line is

$$\frac{d^2 y}{dx^2} = \frac{M}{EI}$$
(A1.8)

where y is the lateral displacement and x is the distance along the element measured from station i-1. Note that actually y'' and x'' are the element coordinates as given in Chapter 3 but are not used here in order to avoid confusion with the prime notation for derivatives.

The terms M and EI are the values of bending moment and flexural rigidity at any point along the element. The moment is easily found by statics to be

$$M = f_{i}^{2}(2h - x)$$
 (A1.9)

For a linear variation in stiffness, EI may be expressed in terms of EI as i

$$EI = EI_{i}(1 - \gamma h + \gamma x)$$
 (A1.10)

where γ is the slope of the EI line divided by EI $_{\mbox{i}}$ Thus, Eq Al.8 gives

$$\frac{d^{2}y}{dx^{2}} = \frac{f_{i}^{2}(2h - x)}{EI_{i}(1 - yh + yx)}$$
(A1.11)

Integrating Eq Al.11 gives

$$\frac{dy}{dx} = \frac{f_i^2}{EI_i} \left(\int \frac{2hdx}{1 - \gamma h + \gamma x} - \int \frac{xdx}{1 - \gamma h + \gamma x} \right)$$
(A1.12)

$$\frac{EI_{i}}{f_{i}^{2}}\left(\frac{dy}{dx}\right) = \frac{-x}{\gamma} + \frac{(1+\gamma h)}{\gamma^{2}} \ln (1-\gamma h+\gamma x) + C_{1}$$
(A1.13)

 C_1 is constant which can be evaluated by using the boundary condition that at the left end the slope (dy/dx) is zero. Solving for C_1 and substituting in Eq Al.13 gives

$$\frac{\text{EI}_{i}}{f_{i}^{2}} = \left(\frac{\text{dy}}{\text{dx}}\right) = \frac{-x}{\gamma} + \frac{(1+\gamma h)}{\gamma^{2}} \ln\left(\frac{1-\gamma h+\gamma x}{1-\gamma h}\right)$$
(A1.14)

Integrating Eq Al.14 and evaluating the constant of integration C_2 yields

$$\frac{EIv}{f_{1}^{2}} = \frac{-x^{2}}{2v} + \frac{(1 + vh)(1 - vh + vx)}{v^{3}} \left[\ln\left(\frac{1 - vh + vx}{1 - vh}\right) \right] + \frac{(1 - vh)(1 + vh)}{v^{3}}$$
(A1.15)

At the right end of the element (x = 2h), Eq A1.14 gives

$$\frac{dy}{dx} = \frac{f_i^2}{EI_i} \left[\frac{-2h}{\gamma} + \frac{(1+\gamma h)}{\gamma h} \ln \left(\frac{1+\gamma h}{1-\gamma h} \right) \right]$$
(A1.16)

Expanding the natural logarithm function in a Taylor series gives

$$\frac{dy}{dx} = \frac{f_i^2}{EI_i} \left(2h^2 + \frac{2\gamma h^3}{3} + higher-order terms \right)$$
(A1.17)

This differs from the slope at the left end of the element in the discrete-element model as given in Eq Al.6 by the error term ϵ^* ,

$$\epsilon \star = \frac{2f_i^2 \gamma h^3}{3EI_i}$$
(A1.18)

and this can be expressed in terms of the elements length 2h as

$$\epsilon \star = \frac{f_i^2 \gamma(2h)^3}{4EI_i}$$
(A1.19)

When m of these elements are connected end to end where

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 $m = L/2h \tag{A1.20}$

the total error ϵ will be the sum of the m errors given by Eq A1.19 or Eq A1.21

$$\epsilon = \frac{Lf_{i}^{2}\gamma(2h)^{2}}{4EI_{i}}$$
(A1.21)

Thus, the difference in the slope between the two ends of the element is a function of the square of the element size or of the second order.

Then evaluating the difference between the discrete element's displacement as given by Eq Al.7 and the continuous element's displacement at the right end of the element as given by Eq Al.15, yields an error term of

$$\epsilon = \frac{Lf_i^2(2h)^2}{48EI_i}$$
(A1.22)

Similarly, the lateral displacement and rotation due to a moment, and the axial displacement due to a force parallel to the member, may be shown to give a second-order error term. Thus, as the number of elements increase, the difference between the discrete element and the continuous element rapidly approaches zero. This theory was checked for a large number of examples and confirmed. This page replaces an intentionally blank page in the original. -- CTR Library Digitization Team APPENDIX 2

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GUIDE FOR DATA INPUT

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FRAME 11 GUIDE FOR DATA INPUT - Card Forms

Units of force (f) and distance (d) are indicated below all dimensional input.

IDENTIFICATION OF RUN (2 alphanumeric cards per run)



IDENTIFICATION OF PROBLEM (one alphanumeric card for each problem; program stops if problem number = CEASE)

Problem Number

		Descriptio	n of pr	oblem					
5									
ABLE 1.	PROGRAM	1 CONTROL DAT	A (2 ca	rds per	problem	n)		Output Options for	
Hold Options for Tables ? through 7				h 7	Tables 8 Through 10				
	PROB	nor	u opero Enter	1 to He	old Pric	r Data		Enter 1 to Suppress Output	
	TYPE	TABLE 2	3	4	5	6	7	8 9 10	
[(1st card)
	6 10	K 2	0	25	30	35	40 45	5 55 60 65	
		Num	ber of	Cards ac	lded in	Tables	2 through	7 for this problem	
		TABLE 2	3	4	5	6	7		
									(2nd card)
			<u> </u>	<u>_</u>					

PROB TYPE 1 - Regular Problem - single solution of structure.

PROB TYPE 2 - Parent Problem - first of a series of solutions of one structure in which the stiffness properties of the structure do not change.

PROB TYPE 3 - Offspring Problem - a solution of a structure previously solved as a Parent Problem (PROB TYPE 2).

PROB TYPE 4 - Family Problem - a combination of multiples of Offspring Problems (PROB TYPE 3) and possibly their Parent Problem (PROB TYPE 2). A multiple of a Family Problem is not permitted but the previous Family Problem may be held. 80

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TABLE 3. MEMBER TYPE LOCATION (number of cards per Table 1)



TABLE 4. JOINT LOADS AND RESTRAINTS IN STRUCTURE x, y, z-AXES (number of cards per Table 1)



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+ If equal to 1, distances are measured along the member x'-axis; if equal to 2, distances are measured along the structure x-axis; if equal to 3, distances are measured along the structure y-axis. Member output distances for shear diagram, etc. are controlled by this option. In all cases the restraints are with reference to the local member (primed) axis. See page 10 of this appendix for an example using the various axis options.

± If blank, detailed output is given; if equal to 1, only member-end-forces are given.

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‡ If blank, the member is assumed rigidly connected to joint at "From" end. If equal to 1, the member is assumed pinned to joint at "From" end.

If blank, the member is assumed rigidly connected to joint at "To" end. If equal to 1, the member is assumed pinned to joint at "To" end.
TABLE 6. MEMBER LOAD DATA (number of cards per Table 1; number of sets of cards equal to the number of load types defined in this problem)

Member loads may be input by any one of the four axis options outlined below. Q is the concentrated load in the direction of the a-axis. q is the distributed load in the direction of the a-axis and has its intensity per unit of length along the b-axis. Note: Concentrated loads may not be input at a distance of 0.0.



-"From" Joint





Axis Option 4 is identical to Axis Option 3 except distances are in structure y-axis and 4 is input in column 65 of first card.

See page 11 of this appendix for an example using the various axis options.

The member x'-axis goes from the "From" joint to the "To" joint. The "From" and "To" joints are determined by input of Table 3.

TABLE 7. COMPILATION TABLE (number of cards per Table 1; no cards unless PROB TYPE 4)



GENERAL PROGRAM NOTES

The data cards must be stacked in proper order for the program to run.

All numbers must be right justified.

The problem number may contain alphanumeric characters.

TABLE 1. PROGRAM CONTROL DATA

- Type 4 (Family) Problems require only the problem type on the first card and the number of cards in Table 7 on the second card.
- Data are accumulated in Tables 2 through 7 until the corresponding Hold Option is left blank.
- When a nonfamily problem follows a Family Problem the data in Tables 2 through 6 may be held from the last nonfamily problem worked.
- The maximum number of cards accumulated in Table 5 is 75 plus the number of stiffness types.

The maximum number of cards accumulated in Table 6 is 150 plus the number of load types.

Type 1 (Regular) and Type 2 (Parent) Problems may appear at any location in a run. However, Type 3 (Offspring) Problems must follow either their Parent or a related Offspring. Type 4 (Family) Problems must follow either their Parent, a related Offspring, or another Family Problem.

TABLE 2. FRAME GEOMETRY DATA

The first card gives the total number of joints in the frame, which must not exceed 75.

- The reference joint, its coordinates, and the joint location tolerance are given only if the Hold Option for Table 2 is not exercised.
- A joint number may not be deleted in a series until the Hold Option is not used. However, the joint may be structurally deleted by removing all members intersecting at the joint.

Blank fields on data cards, except the first five columns, may be used as desired to aid in coding problems. Information in these fields is ignored by the program.

The maximum difference in joint numbers, for joints that are connected by members is 9.

Joints are numbered from 1 to the total number of joints.

- The reference joint may be any joint and it may have any coordinates, except that it and all other joints must have coordinates less than 1.0E50.
- The second and succeeding cards in Table 2 specify the location of all additional joints in the frame at least once. If the Hold Option is used, only the new joints must be specified.
- All offsets must be "From" a previously located joint "To" another joint. The "To" joint may be a previously defined joint. This allows the user to check the locations of the joints. If the error in the location of the joint is within the joint location tolerance then the solution continues; otherwise, the solution terminates with an appropriate diagnostic.
- The joint location tolerance should allow for normal round-off error. If offsets are input to the nearest 0.01 foot them a joint location tolerance of 0.03 foot usually will be sufficient for a moderate sized frame.
- The repetition of the "To" joint allows the user to locate up to seven joints with one card, if the offsets between each new "To" joint are the same as between the "From" joint and the first "To" joint.
- It is not necessary for offsets to be given at locations where members are. However, the location of all joints must be specified at least once.

TABLE 3. MEMBER TYPE LOCATION

The first card in Table 3 gives the total number of stiffness types and the total number of load types.

- Stiffness and load types (other than zero) are numbered from one to their total number. The total number of stiffness types must not exceed 50. The total number of load types must not exceed 50.
- The total number of members in the frame must not exceed 150.
- Type zero stiffness is used to delete a previously defined stiffness. Type zero load is used to indicate no load on a member. The restrictions on length, orientation, etc., outlined below do not apply to members with type zero stiffness and type zero load.
- In order for two members to have the same stiffness type they must have the same length, the same angular orientation in the frame, and the same stiffness properties with respect to their "From" and "To" joints, i.e., they must have the same member stiffness matrix both in their member coordinate system and the global coordinate system.

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In order for two members to have the same load type they must have the same length, the same angular orientation in the frame and the same loading with respect to their "From" and "To" joints.

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- The member coordinate axes are defined by the "From" and "To" joints specified. The member x'-axis starts at the "From" joint and goes to the "To" joint. The member y'-axis and z'-axis are located from the member x'-axis by the right hand rule.
- All members in the frame must be assigned a stiffness type and a load type. This assignment is not accumulative for a member in the frame, i.e., the last values of stiffness type and load type specified replace the previous values.
- Stiffness and load types for a member must be specified on the same card.
- Up to ten members with the same stiffness and load type may be located with a single card if the "From" joint of each new member is the "To" joint of the previous one.

TABLE 4. JOINT LOADS AND RESTRAINTS

All joint loads and restraints are specified with respect to the structure axes.

Joint loads and restraints are accumulated in Table 4.

Structure supports are input as joint restraints (linearly elastic springs). Complete fixity of a joint may be achieved by putting in very large spring values. No round-off errors are encountered when extremely large values are used unless large values are input and then subtracted away.

Complete freedom of joint movements is obtained by not specifying any restraints at a joint.

A specified displacement may be obtained by specifying a very large restraint and a corresponding force equal to the specified displacement times the large restraint.

TABLE 5. MEMBER STIFFNESS DATA

- Stiffness types must be input in ascending order. If Table 5 is held from the previous problem then the first new stiffness type in Table 5 (if any) must equal the number of stiffness types in the last problem plus one.
- Prismatic members may be input with one card. Members with varying stiffness and/or elastic restraints along their length require two or more cards.
- If more than one card is used to describe a member stiffness type, the prismatic stiffness properties must be left blank.
- Variable stiffness properties must be input continuously in sections starting at the "From" joint and continuing uninterrupted to the "To" joint. This format is illustrated in page 10 of this appendix.

Distances are given from the "From" joint.

- Each section must describe all of the stiffness properties of the member for a length greater than 1/40 of the member's length.
- Constant values of stiffness require one card per section.
- A linear variation in stiffness requires two cards per section.
- Concentrated values of stiffness are not allowed. A point of zero flexural stiffness is input as a pin at a joint. A concentrated spring restraint must be input as a joint restraint.

TABLE 6. MEMBER LOAD DATA

- Load types must be input in ascending order. If Table 6 is held from the previous problem then the first new load type in Table 6 (if any) must equal the number of load types in the last problem plus one.
- Load types with only uniform loads over their full length may be input with only one card. Other loadings require two or more cards.
- If more than one card is used to describe a member load type, the uniform loads on the first card must be left blank.
- Variable, concentrated, and partial uniform loadings must be input in sections but need not be input consecutively and sections may overlap. This format is illustrated on page 11 of this appendix.
- Section lengths must exceed 1/40 of the member's length except for concentrated loads where the "From" and "To" distances are equal. Concentrated loads may not be specified at a distance of 0.0.
- All sections except concentrated loads must have their "To" distance larger in absolute value than their "From" distance.
- Concentrated loads and sections with constant loading require one card. A linear variation in loading requires two cards per section.

TABLE 7. COMPILATION TABLE

- Each Parent Problem starts a series where the Parent solution and succeeding Offspring solutions are stored. Each of these solutions may be multiplied by a multiplier (load factor) and accumulated. The maximum number of consecutive Offspring problems is 20.
- If the Hold Option is used the solution of the preceding Family Problem is added to the solutions of the additional load cases specified in the new Family Problem.

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Notes: Sections must be input in order.

Linear format is required even if only one of the stiffness properties varies linearly.

A new section must be started when a change in the variation of any of the stiffness properties occurs.

There is no restriction on the length of a section except it must exceed 1/40 of members length.

"From" and "To" joints are set by input in Table 3.

	From	То	1	A	\$ _{1'}	s _y ,	\$ _{2'}	
×	0.0		2.0	3.0	6,0	8.0]
•		5,0	スの	3.0	6.0	4.0]
	5.0		4.0	4.0	6.0	4,0		
•		10.0	4,0	4.0	b .Q	0.0		
•	10.0	16.0	4.0	4.0	6,D]_
•	16.0	26.0	4.0	4.0				<u>D</u>
ж	26.0		4.0	4.0] °
T		31.0	5,0	5.0				Axi:
	31.0		5.0	5.0				
×		36,5	8,0	7,0				
	0.0		2.0	3,0	6.0	6		
		-4.0	20	3.0	6.0	4.0		
	-4.0		40	40	6.0	4.0		~
		-80	4.0	40	6,0	0,0		8
•	-8.0	-12,8	4.0	4.0	6.0			ā
•	-12,8	-20.8	4.0	7.0				
*	-20.8		7.0	4.0				Ē.
		-748	20	50				
-#-	-24.8		5.0	5.0				-
		-24.2	8.0	1.0]
	0.0		2.0	3,0	60	8.0]
Ŧ		-3.0	20	<u>3.0</u>	6.0	40]
*	-3.0		4.0	40	6.0	4.0		m
-		-6.0	4.0	4.0	60	0.0		
•	-60	-7.6	4.0	40	6.0			, Š
•	-96	-/5.6	4.0	4,0				8
#	-5.6	- 10/	10	50				1_
		-/*.	50	3.0				E.
#	-18.6		0.0	0.0				 ▲
		-21.9	8,0	1.0				1

Variable Member Stiffness

* - Two Cards for Sections with Linearly Varying Stiffness

• - One Card for Sections with Constant Stiffness

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Variable Member Loading

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_	Axis Option I					Axi	s Option	n 2		Axis Option 3 Axis Option 4										
	From	То	Qajqaar	0,91	Q ₂ ,q2,1	From	То	Q.,q.,r	Qy, qya'	Qr'qr'	From	То	Q. q.,	Q, q,	Qr dr'r	From	To	Ququy	Q _{y,} q _{y3}	Q ₂ ,q _{7's'}
•	0.0	10.0		-5.0		0.0	10.0	3.0	-+.0		0.0	8.0	5.0	-5.0		0.0	6.0	5,0	-5.0	
	10,0	I	30	-5.0		10.0		5.4	-2,2		8.0		9.0	-2.95		6.0		9.0	-2.75	
		240	3.0	-120			20.0	8.4	-6.2			16.0	14.0	- 7.75			12.0	14.0	-7.75	
•	2,15	24.15	9.0	12,0	-6.0	24.15	24.15	-0.8	14.4	-6.0	19.32	19,32	-0.8	14.4	-6.0	14.52	14.52	-0.8	14.4	-6.0
. 2	0.0			-100		20.0		6.0	-8.0		16.0		10-0	-100		12.0		10.0	-10.0	
		30.0		0.0			30.0	0.0	0.0			24.0	0.0	0.0			18.0	0,0	0.0	

o - One Cord for Concentrated Loads

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• - One Card for Sections with Uniform Loads

*- Two Cards for Sections with Linearly Varying Loads

Notes:

Sections Need Not be Input in Order.

Concentrated Loads May Not be Input at a Distance of 0.0.

There is No Restriction on the Length of a Section Except that it Must Exceed 140 of the Member's Length. "From" and "To" Joints Set by Input in Table 3.

APPENDIX 3

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PROGRAM FLOW CHARTS





Program dimensions may be easily changed as indicated above. See the program listing and the notation.















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For each stiffness type

For each load type

SUBROUTINE JNTDAT

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SUBROUTINE DISCST





LINSTF called by Yes No DISCST XL = 0First section X2L =0.0 STT2 =of members 1.0 stiffness variation Yes No STR = STL Uniform stiffness Linear variation of stiffness Compute effective stiffness Compute slope of stiffness of first element in section variation (DS) considering jump in stiffness Compute effective stiffness of first element in section I1P1 = I1 + 1considering jump in stiffness I1PNQ = I1 + NQ11P1 = 11 + 1DO for I = I1P1, I1PNQ I1PNQ = I1 + NQDO for I = I1P1, I1PNQ Set stiffness equal to uniform value 1350 Compute stiffness at CONTINUE) midpoint of remaining NQ elements 1250 CONTINUE) 1800 (CONTINUE)

(RETURN)

SUBROUTINE LINSTF

SUBROUTINE LINLD . LINLD called by DISCLD, DISCST Compute slope DQ = (QR - QL)/(XR - XL)of linear variation DQ Q2 = QR $Q1 = QR - DQ \times X2$ Yes No ABS(Q1 + Q2) = 1.0E - 10Compute concentrated load or restraint Z = XL + (X1/3.0)*(2.0*Q2 +for element at right Q1)/(Q1 + Q2)end of section QI, $QI = 0.5 \times X2 \times (Q1 + Q2)$ distance to line of action Z and call CONLD to distribute CALL CONLD to adjacent stations 01 = 0LQ2 = QL + DQ*X1Yes No ABS(Q1 + Q2) < 1.0E-10Same as above for element at left end $Z = XL + (X1/3.0) \times (2.0 \times Q2 + Q2)$ of section Q1)/(Q1 + Q2) $QI = 0.5 \times X2 \times (Q1 + Q2)$ CALL CONLD Yes No NQ = 0DO for II = 1, NQ Q1 = Q2Q2 = Q1 + DQ*THSame as above for remaining NQ Yes No ABS(Q1 + Q2) < 1.0E - 10elements (XX is distance to Z = XX + (TH/3.0) * (2.0 * Q2 +left of element Q1)/(Q1 + Q2)from the "From" QI = 0.5*TH*(Q1 + Q2)joint) 1990 CONTINUE) (RETURN)

SUBROUTINE GRIP2A



GRIP2A called by FRAM11, FORMST, FORMLD, MEMRES

FSUB1 calls FSUB11 to furnish SU and F for frame solution or FSUB12 to furnish SU and F for member solutions







SUBROUTINE DISCLD









SUBROUTINE MEMRES







APPENDIX 4

GLOSSARY OF FORTRAN NOTATION

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C		02 8 0
c		280
č		280
Č 44 5	CONTINUES CORRECTING IN AVEN. COLUTION	
	ADEA TIMES MODIANE OF ELASTICISM	02500
	ANEN TIMES MODULUS OF ELASTICITY	02000
	VALUES OF AEL J AT EDGES OF SECTIONS	02.00
	VALUE OF AET) AT LEFT (START) OF SECTION	0250
	VALUE OF AEL I AT HIGHT LENDT OF SECTION	02 JL 0
C ALTIZ	VALUE OF ALL) AT HIDDLE OF PARTIAL	02.1.7
	ELEMENT ON RIGHT LENDI OF SECTION	OZJLO
	DUNNY MATRIX PUR MULTIPLICATION ROUTINES	02,00
C ANLE 1+ ANZE 1+	ALPHA-NUMERIC IDENTIFIERS	02.0.0
C AN3()	••••••••••••••••••••••••••••••••••••••	02,00
C A1()+ A2	PARTS OF CONTINUITY COEFFICIENT AL I USED	02JL0
C	FOR MULTIPLE LOAD OPTIONS	07,110
C B()	CONTINUITY COEFFICIENT IN AXIAL SOLUTION	02,110
C 86	STIFF COEFF IN AXIAL SOLUTION	02,11,0
C 84()	BENDING HOMENT OUTPUT VALUE	02,00
C BH(+) + BV()	DUMMY MATRICES IN MULTIPLICATION ROUTINES	02JL0
C C	DISTANCE FROM CONCENTRATED LOAD TO	02.00
C	STATION ON LEFT	02 JL 0
Č CC	STIFFNESS COEFFICIENT IN AXIAL SOLUTION	OZJLO
C CHL + 1 + CVI 1	DUNNY MATRICES IN MULTIPLICATION ROUTINES	02.0.0
C DEI	RECURSION MULTIPLIER IN AZIAL SOLUTION	02.0
C DC(+)	MATRIX OF DIRECTION COSINES	02.4.0
C DCT()	TRANSPOSE OF OC NATRIX	02.8.0
c 0C1+ 0C7	DIRECTION COSTNES	02.8.0
C DC11/ 1, DC21/)	DIRECTION COSTNES FOR LOAD TYPES	07.8.0
C DC157 1. DC257 1	DIRECTION COSINES FOR STIREMESS TYPES	02 8 0
	STIFFNESS COFFEICIENT IN AVIAL CONVENTION	02 8 0
C 0018	DISTANCES BETWEEN MEMBER PRIVAL SOCUTION	02,000
	AVIAN CHANCE IN A CHEVEN ON CONFUL STATIONS	02.40
	ANTAL CHARGE IN CENTRAL IN CEPTERI	02.00
	CENSING OF SECTION OF READER CONDING	
	Altraher Cach the rack form to anther	
	DISTANCE FROM INC FROM DOINT ID OUTFOIL	12.00
		0250
	STURNER MAININGS FUR SIX MEMORY RESULTS	02310
	MATHIA OF HENDER END DISPERCEMENTS	02.0.0
	IN MEMORY COUNDINATES	02.00
C DAS()	MATRIX OF PERGER END DIOPLACEMENTS	02,00
C	IN STRUCTURE COORDENATES	02.00
C pa	SLOPE OF LINEAR VARIATION IN LOADING OR	OZJLO
C	ELASTIC RESTRAINTS	02.0.0
C D8	SLOPE OF LINEAR STIFFNESS VARIATION	07.JL0
C DX()+ DY()+DZ()	MEMBER STATION DISPLACEMENTS	02,00
C DX+ DY	X AND Y OFFSETS	02,11,0
C DXL()+ DYL()	X AND Y OFFSETS FOR LOAD TYPES	02.0.0
C DXSt 3+ DYSt 3	X AND Y OFFSETS FOR STIFFNESS TYPES	02JL "
C DXTE 1+ DYTE)	DX()+ DY()+ DZ() AT OUTPUT STATIONS	02,11.0
C DZTE 3		02.1.0
C DXX(), DYY(),	JOINT DISPLACEMENTS	02.4.0
C DZZ()		02.36.0
C E	MODULUS OF ELASTICITY	02.4.0
C ERR	ABSOLUTE VALUE OF ERXI I+ ERVI I+ ERZI)	02.01.0
C ERKL J. ERYL J.	STATION EQUILIARIUM ERRORS	02.00
C ERZE)		02.00

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| ERX. ERY          | ERROR IN JOINT COORDINATES OR MEMBER      | 02.00    |
|-------------------|-------------------------------------------|----------|
| EBBIN             | FRAND IN LENCTH OF MENDED                 | 02 0 0   |
| FRYYA ). FRYYA ). | INT FOULT TARIUM FRANKS                   | 02 8 0   |
| F9274 1           |                                           | 02 8 0   |
| Fr 3              | NUMENT OF INFRITA TIMES MODULUS OF FLAS   | 02.00    |
| FF                | COFFEICIENT IN LOAD MATRIX                | 02 8 0   |
| FLEN              | VALUES OF FULL AT EDGES DE SECTIONS       | 02 8 0   |
| FLT               | VALUE OF FLC 1 AT LEFT ISTARTS OF SECTION | 02.00    |
| FHH ( )           | MEMBER END FORCES IN MEMBER COORDINATES   | 02.00    |
| FHS( )            | NEMBER FND FORCES IN STRUCTURE            | 02.00    |
|                   | COORDINATES                               | 02.10    |
| FUMAL + 1         | MEMBER FIXED END FORCES                   | 02.0.0   |
| FUNHTE 1          | MEMBER FIXED END FORCES FOR ONE MEMBER    | 02JL0    |
| FRT               | VALUE OF FI I AT RIGHT (END) OF SECTION   | 02.00    |
| F55( )            | STRUCTURE LOAD MATRIX                     | 02,00    |
| FTT2              | VALUE OF FI ) AT MIDDLE OF PARTIAL        | 02.0.0   |
|                   | ELEMENT ON RIGHT (END) OF SECTION         | 02.1.0   |
| F1M( )            | MEMBER END FORCES AT FROM JOINT IN        | 02 JL 0  |
|                   | MEMBER COORDINATES                        | 07.11.0  |
| F2H( )            | MEMBER END FORCES AT TO JOINT IN MEMBER   | 02.01.   |
|                   | COORDINATES                               | 02.0.0   |
| F15( )            | MEMBER END FORCES AT FROM JOINT IN        | 02.00    |
|                   | STRUCTURE COORDINATES                     | 02.10    |
| F25( )            | MEMBER END FORCES AT TO JOINT IN          | 02.1.0   |
|                   | STRUCTURE COORDINATES                     | 02.00    |
| н                 | ONE HALF OF ELEMENTS LENGTH               | 02.0     |
| HCU               | H#++#+                                    | 02.10    |
| NSU               | H4H                                       | 02JL0    |
| 1                 | INTEGER INDEX                             | 02,10    |
| IABAN             | FATAL ERROR FLAG                          | 02.4.0   |
| LAXOPLE 1         | AXIS OPTIONS FOR LOAD TYPES               | 02.01.0  |
| LAXOPSE 3         | AXIS OPTIONS FOR STIFFNESS TYPES          | n2JLn    |
| LAXOPT            | "EMPORARY VALUE OF AXIS OPTION            | 02JL0    |
| IC                | PRINTER CONTROL                           | 02.1.0   |
| 18                | DECREMENTING INTEGER                      | 02.JL0   |
| ICOUNT            | CONTROL CONSTANT                          | 02.1.0   |
| 10-1              | MAXIMUM DIFFERENCE IN JOINT NUMBERS       | 02,10    |
|                   | CONNECTED BY MEMBERS                      | 02 JL 0  |
| IFORM             | CONTROL CONSTANT                          | 02 J L O |
| IM                | INTEGER INDEX FOR OUTPUT STATIONS         | OZULO    |
| 1 HB              | (BANDWIDTH OF EQ - 11/2                   | 02JL0    |
| INBPI             | IHB + 1                                   | 0270     |
| 1801              | 1HB - 1                                   | 02.JL0   |
| 11. 111. 1J. IJ.  | INTEGER INDICES                           | 02 JL 0  |
| 1J1+ 1J6          |                                           | 02 JL 0  |
| 1#1               | 1 - 1                                     | 77650    |
| IUPL              | PRINTER CONTROL                           | 02716    |
| IUPUPI 1. JOPOPT  | HEMBER OUTPUT OPTION                      | 05 Y O   |
| IPINL( }, IPINLT  | PIN AT LEFT (FROM) JOINT OPTION           | OZULO    |
| LPINRE 1, INPINRT | PIN AT RIGHT (TO) JOINT OPTION            | 02700    |
| 191               | 1 + 1                                     | 02710    |
| IP8+ 1P9+ 1P10    | PRINT UPTIONS FOR TABLES 8+ 9+ 10         | 05 JF 0  |
| IST ( )+ ISTT     | STIFFNESS TYPE                            | 027FG    |
| ISTP              | 3*J21 + 1                                 | 02.10    |
| ITEST( )          | ALPHANUMBERIC CONSTANTS                   | 02760    |

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|                             | Particle and Build                        |         |
|-----------------------------|-------------------------------------------|---------|
| LITTE                       | PRUBLER ITTE                              | 02.1.0  |
| ITYPEL                      | BEORFEN JABE OR BREATON? BROBFEN          | 02.0.0  |
| 11. 12                      | FIRST AND LAST STATION INSIDE SECTION     | 02.4.0  |
| 11000                       | 11 + 10                                   | 02.0.0  |
| 1101                        | 11 4 1                                    | 07 8 0  |
|                             | 1479-26 1001/100                          | 02.00   |
| 10 330 343                  | THIEREN THDICIEP                          | 0770    |
| 777                         | SWITCH TO ALTERNATE FORCE AND MOMENT      | 07 J.O  |
|                             | EQUATIONS                                 | 02 JL 0 |
|                             | J - 1                                     | 02.0.0  |
|                             | FROM PLAN FOR JOINT MINISTER TO LARGE     | 02 8 0  |
| 1998                        |                                           | 02 8 0  |
|                             |                                           | 02310   |
| <b>JUTE 14 DUTE 114 DI4</b> | LUCK TOTAL                                | OZJLO   |
| 711                         |                                           | 2,1.0   |
| J21                         | ABSOLUTE VALUE OF DIFFERENCE IN JOINT     | 02.8.0  |
| •••                         | MANAGES OF MEMOTES                        | 07.8.0  |
|                             | INTEGER INCH                              | 07 8 0  |
|                             |                                           | 02.300  |
| KEEPZ-KEEP7                 | HOLD OPTIONS FOR TABLES 2-7               | 02.10   |
| KEKE                        | CHECK FOR INDEPENDENT PROBLEM             | 07 J O  |
| KK                          | INTEGER INDEX                             | 02.1.0  |
| 1                           | INTEGER INCER                             | 07.8.0  |
|                             |                                           | A1 8 A  |
|                             |                                           | 07.000  |
| FI-105 F05 F1               | DINENSION FINITS                          | UZJLU   |
| 1.791                       | L7 - 1                                    | 02.1.0  |
| 1.7M2                       | L7 - 2                                    | 02.1.0  |
| 1.70(3                      | LT - 3                                    | 02.00   |
|                             | MUMBER OF ELEMENT IN NEMBER               | 02.4.0  |
| MR AT                       | NATING PERMITTER VALUE OF ID.             | 02.8.0  |
|                             | MAN SHIDE BERMETTERS WALLET OF THE        | 02 8 0  |
|                             | PARTING LENGILLED ANDE AL THE             |         |
| PH (B) 1                    | MB + 1                                    | 05760   |
| ML, MLT, MLA                | CONTROL FOR MULTIPLE LOAD OFTION          | 02.1.0  |
| 1911                        | N - 1                                     | 02,010  |
| MICS                        | MAXIMUM VALUE PERMITTED FOR NCS           | 02.4.0  |
| MMC A                       | NATING WALNE DEDUCTION FOR MES            | 02.8.9  |
|                             | MANTANIA WALLER OF MATTICE FOR A PT       | 03 8 6  |
|                             | PARTICUL AND C PENNITICA LAN MAL          | 02.20   |
| MALC                        | MAXIMUM VALUE PERMITTED FOR MLC           | 07.90   |
| PHILT                       | MAXIMUM VALUE PERMITTED FOR ALT           | 07.J.C  |
| 21021                       | MAXIMUM VALUE PERMITTED FOR NM            | 02.10   |
| MIST                        | MAXIMUM VALUE PERMITTED FOR HST           | 02.4.0  |
| MP1                         | M + 3                                     | 02.80   |
| 101                         |                                           | 02 8 0  |
|                             |                                           | 02.50   |
| M-22                        | IN + 21/2                                 | CZULU   |
| MP221                       | 19722 - 1                                 | 02 JL 0 |
| NCDL( ) + NCDLT             | NUMBER OF CARDS THAT FOLLOW FOR LOAD TYPE | 02-10   |
| NCDS( 1. HCDST              | NUMBER OF CARDS THAT FOLLOW FOR STIF TYPE | 02.4.0  |
| MCD2~MCD7                   | HUMBER OF CARDS IN TABLES 2-7             | 02.4.0  |
| ACRA, MCRA                  | MANER OF CARDS PEAD IN TABLES & AND A     | 07.8.0  |
|                             |                                           | 01      |
| MCPIC 14 MCP                | NUMBER OF CARDS IN LADLE 3 ANOTH THE      | 02.00   |
|                             | NUMBER OF STIPF TYPES (VARIABLE STIPFT    | 0570    |
| HC511. HC521                | FIRST AND LAST CARD NUMBER OF VARIABLE    | 07.0.0  |
|                             | STIFF DATA FOR MEMBER                     | 02.40   |
| NCALL 1. NCA                | NUMBER OF CARDS IN TABLE & ABOVE THE      | 02.JL0  |
|                             | MINARE OF LOADS TYPES EVARIABLE LOADST    | 02.0    |
| NCA17. NCA37                | EIRST AND LAST FADD MINAFE DE UADIADIE    | A2 8 A  |
|                             | TINGT AND GRAT GRAD AUTOLA OF VARIADLE    | ve0     |
|                             | LURD DATA FUR PERDER                      | 07.10   |
| 44 2 UB                     | SWITCH TO CHOOSE APPROPRIATE FSUR         | 02,11,0 |
| NI                          | INTEGER INDEX                             | 12.00   |
|                             |                                           |         |

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|------------------------------------------------------------------|-------------------------------------------|----------|
| MUNZ                                                             | NUMBER OF NON ZERO JOINTS ON DATA CARD IN | 02.10    |
|                                                                  | TABLES 2+3                                | 02JL0    |
| NUT                                                              | NUMBER OF FRAME JOINTS                    | 02.1.0   |
| HL +HL4                                                          | NUMBER OF STRUCTANEOUS EQUATIONS          | 02.1.0   |
| NLC                                                              | NUMBER OF LOAD CASES                      | 02.8.0   |
| MI T                                                             | NUMBER OF LOAD TYPES                      | 02.8 0   |
| ALL T                                                            | NT FOR LAST DOORLEN                       | 02 8 0   |
|                                                                  | NEI FOR CRAI FRUDEEN                      |          |
|                                                                  | NUMBER OF FRAME PERSENS                   | OZJLU    |
| 1014                                                             | NM/6                                      | 02360    |
| NP( , )                                                          | LIST OF PROBLEM NUMBERS RESULTS SAVED FOR | 02-1.0   |
| NPRUBE 1. NPTE 1                                                 | PROBLEM NUMBER (ALPHA NUMBERIC)           | 02.1.0   |
| NG                                                               | NUMBER OF ELEMENTS REMAINING IN SECTION   | 02.4.0   |
| NST                                                              | NUMBER OF STIFF TYPES                     | 07JL0    |
| MSTI                                                             | NST FOR LAST PROBLEM                      | 02.00    |
| In Sec 1                                                         |                                           | 07 8 0   |
|                                                                  |                                           | 01000    |
| N 3M L                                                           |                                           | 02300    |
| N123                                                             | CONTROL WHICH CICLES 1+2+3                | 02 JLO   |
| H2. N3                                                           | ALTERMATING SWITCHES FOR TAPES 2+3        | 02.JL0   |
| PRAEL 1. PRAET                                                   | PRISMATIC AEL 1                           | 02,01.0  |
| PRAT                                                             | PRISMATIC AREA                            | 02,00    |
| PRET 1. PRET                                                     | PRISMATIC FL 1                            | 07.1.0   |
| DOIT                                                             | PRISMATIC MOMENT OF INFRILA               | 02.4.0   |
| 00                                                               | CONCENTRATED STATION LOAD OF SPRING       | 02 8 0   |
|                                                                  | CONCENTRATED STATION CORD ON STATIO       | 07 8 0   |
| <b>~</b> 1                                                       | CONCENTRATED FORD ON SANTHO BCIRCON       |          |
|                                                                  | STATIONS                                  | 02.00    |
| QL. OR                                                           | INTENSITY OF LOADING OR RESTRAINT AT LEFT | 07.00    |
|                                                                  | (START) AND RIGHT (END) OF SECTION        | 02 JLO   |
| v11-016                                                          | LOADS ON MEMBER END STATIONS              | 07.JL0   |
| WELL . OVE 1. 974 1                                              | HEMBER STATION LOADS                      | 02-10    |
| WELL TO OVER TO                                                  | HEMBER LOADS AT FOGES OF SECTIONS         | 02.10    |
|                                                                  |                                           | 2.8.0    |
|                                                                  | HALLER OF OWL & LOWLA 1. AT LEFT LATARTS  | A2 # A   |
| UAL TOUTLES                                                      | TALUES OF GALL INGTLE IS AT LEFT TRIMET   | 01.00    |
| OZLT                                                             | OF SECTION                                | 02510    |
| WXRT. QYRT.                                                      | VALUES OF OXLE 1. OVLE 1. OZLE 1 AT RIGHT | OZJLO    |
| uzr t                                                            | (END) OF SECTION                          | 02.4.0   |
| WXX( ], OYY( ),                                                  | JOINT LOADS                               | 02.0.0   |
| 0774 1                                                           |                                           | #2JLA    |
| OVAT. OVAT. 0771                                                 | TEMPORARY VALUES OF GIVE 1. GVVI 1. 072   | 02.0     |
| WAATT WITTE WEET                                                 | INTERATE OF LOADING OF PESTBAINTS AT      | 02.00    |
| AT . AL                                                          | DECIMATING AND FAD OF ELFARMY             | 07 # 0   |
|                                                                  | BEGINNING AND END OF ELEMENT              | 02.500   |
| RM( . ), RO( )                                                   | RECORSION MOLTIPLIERS                     | OZJEO    |
| - RX( )+ RY) )+ RZ( )                                            | STATION REACTIONS                         | OZJLO    |
| RXXE ]+ RYYE }+                                                  | JOINT REACTIONS                           | 020      |
| RZZ ( )                                                          |                                           | 02.4.0   |
| 51.1 1                                                           | VECTOR OF STIFFNESS MATRIX                | 02JL 1   |
| SHCL . I                                                         | HEMBER STIFFNESS MATRICES IN COMPACT FORM | 02.8.0   |
| CMM4 - 1                                                         | MEMBER STIFFNESS MATRIX (313) IN MEMBER   | 02,11,0  |
| 20010 1 1                                                        |                                           | 03 B 0   |
|                                                                  | COMPENSION ATTERNET MATRIX 14             | 02 8 0   |
| 241()                                                            | STUDES WELGERS STELLESS MULLIN TH         |          |
|                                                                  | COMPACT VECTOR FORM                       | 02-11-6  |
| SMS                                                              | MEMBER STIFFNESS MATRIX (3x3) IN          | 07.4.0   |
|                                                                  | STRUCTURE COORDINATES                     | 12 JL0   |
| 5.5L                                                             | STRUCTURE STIFFNESS MATRIX                | 02JL0    |
| <t< td=""><td>STATION VALUE OF STIFFNESS</td><td>OZJLO</td></t<> | STATION VALUE OF STIFFNESS                | OZJLO    |
| CTAEPP                                                           | LARGEST STATION FOULD BRIM FRRDP IN       | 02.41.0  |
| <b>JIACKK</b>                                                    | PENDER STRITTLE CARTELOUIDE COMPANY       | 02 11 0  |
|                                                                  |                                           | 172 JULY |

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| TL+ STR                                 | STIFFNESS AT LEFT (START) AND RIGHT (END) | 02JL0    |
|-----------------------------------------|-------------------------------------------|----------|
|                                         | CTIERNESS AT MID COINTS OF DADTIAL        | 02310    |
| 1110 2112                               | SILLENESS AT MED POINTS OF PARITAL        | 0231.0   |
|                                         | ELEMENTS AT DEGIMATING AND END UP         | 02 31 0  |
| •• ••                                   | ADAJACENT SECTIONS                        | 02369    |
| 11. 3.0                                 | RESTRAINTS AT MEMHER END STATIONS         | USTEU    |
| 01 1. 50411                             | CORFF OF STIFF MAINIX (UNE NOW)           | OZULO    |
| XC 1+ SYC 1+ SZC 1                      | MEMBER STATION ELASTIC RESTRAINTS         | 02.0.0   |
| XL()+ SYL()+                            | VALUES OF SXI 1. SVI 1. SZI 1. AT EDGES   | 02 JL 0  |
| 21()                                    | OF SECTIONS                               | 02       |
| XLT, SYLT, SZLT                         | VALUES OF SXL( ), SYL( ), SZL( ) AT       | OZJLO    |
|                                         | LEFT (START) OF SECTION                   | 02766    |
| XRT. SYRT. SZRT                         | VALUES OF SXLI 1. SYLL 1. SZLL 1 AT       | 02 JL 0  |
|                                         | RIGHT LENDI OF SECTION                    | OZULO    |
| XX( ). SYY( ).                          | JOINT RESTRAINTS                          | 07JL0    |
| 22()                                    |                                           | 2JL0     |
| XXT. SYYT. SZZT                         | TEMPORARY VALUES OF SXXI 1. SYYL 1.       | 02JL0    |
|                                         | \$22()                                    | 02JL.1   |
| ()                                      | AXIAL THRUST OUTPUT VALUE                 | 02 JL 0  |
| AU1. TAU2                               | CONCENTRATED ANGLE CHANGES IN ELEMENT     | OZJLO    |
| EMP1. TEMP2                             | TENPORARY VALUES                          | 02, JL 0 |
| й — — — — — — — — — — — — — — — — — — — | ELELMENT LENGTH                           | 02 JL 0  |
| OL.                                     | JOINT LOCATION TOLERANCE                  | 02JL0    |
| TOL                                     | 2+10L                                     | 02.11.0  |
| 33                                      | TEMPORARY MATRIX USED TO OBTAIN TRIPLE    | 02310    |
|                                         | PRODUCT                                   | 02,11,0  |
| QX().UQY()                              | UNIFORM MEMBER LOADS                      | 02,11,0  |
| QKT. UQYT                               | TEMPORARY VALUES OF URX( ), URY( )        | 02.01.0  |
| 14 14 1124 1                            | AXIAL FORCES ON ENDS OF FLEMENT           | 02.8.0   |
|                                         | SHEAR EDRCE QUITPUT VALUE                 | 02.000   |
| 16 1. 121 1                             | SHEAR FORCES ON FNDS OF FIEMENT           | 02.01.0  |
|                                         | DISPLACEMENT VECTOR FROM GRIPZA           | 02 8 0   |
| 11 3. 121 3                             | NOMENTS ON ENDS OF FLEMENT                | 02 8 0   |
| ( ) • Y ( )                             | JOINT COORDINATES                         | 02.8.0   |
| 1                                       | DISTANCE TO LEET (START) OF SECTION       | 02 # 0   |
|                                         | DISTANCE TO LEFT (START) OF LOAD SECTION  | 02 0 0   |
| 15( )                                   | DISTANCE TO LEFT ISTANTS OF COND SECTION  | 02320    |
| <b>A</b>                                | DISTANCE TO BIGHT (SHALL OF SECTION       | 02020    |
|                                         | DISTANCE TO RIGHT (END) OF SECTION        | 02320    |
|                                         | DISTANCE TO RIGHT (END) OF CORD SECTION   | 02360    |
| -31 /<br>T. VT                          | TEMBORARY MINT COORDINATES                | 02,50    |
| *                                       | ALSTANCE TO CONCENTRATED LOAD EDON        | 02500    |
| A                                       | STATION                                   | 02560    |
| 1. #2                                   | STATION OF DARTIAL ELEMENTS AT ENDE OF    | 02 500   |
| 1                                       | CENTRAL CLENCHIS AT ENDS OF               | 0250     |
| **                                      | SCLINNS                                   | 02.00    |
| 1                                       | AZ FRUM LADI SECTION                      | UZJEJ    |
|                                         | FLOATING COINT 15 AND 15                  |          |
| 111 612                                 | PEUALING PULAT 11 AND 12                  | 02.0.0   |
|                                         | TERDERS LENGTH                            | 02JL0    |
|                                         | LENGTH OF MEMBERS BY LOAD TYPE            | OZJLO    |
|                                         | LENGTH OF MEMBERS BY STIFF TYPE           | 02 JL 0  |
|                                         | 21.421                                    | OZJLC    |
| L3                                      | ZLZ+ZL                                    | 02JL0    |
| MC P+ ZMT                               | LOAD MULTIPLIERS                          | 02360    |
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APPENDIX 5

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## FORTRAN LISTING OF PROGRAM

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PRUGRAM FRAMELL LINPUT.OUTPUT.TAPEL.TAPE2.TAPE3.TAPE4.
                                                                        16JE0
COMMENT - THIS DRIVER ONLY DIMENSIONS PROGRAM
                                                                        24 APO
COMMENT - TO CHANGE DIMENSIONS CHANGE ONLY THIS DRIVER AND DIMENSIONED
                                                                       244P0
CONNENT - CUNHUN BLOCKS IN APPROPRIATE SUBROUTINES
                                                                        24400
COMMENT - VARIABLE NAMES OU NOT CHANGE IN DIMENSIONED COMMON BLOCKS
                                                                        24AP0
CONVENT - DIMENSION GUIDE - DIMENSION GUIDE - DIMENSION GUIDE
                                                                        28420
CONVENT - RHILS. LAI
                        ROILAI WILS
                                            SL(L3) SU(L4)
                                                                        ZAAPO
CONNENT - DHELT. 6)
                         DH71L7. 61
                                                                        ZBAPO
CONNENT - CONMON /BLOCK1/
                              (HNUT)
                                        COMMON /BLOCK2/
                                                            (MNST)
                                                                        ZBAPO
COMMENT - CUMMON /BLOCKS/
                              (MILT)
                                        COMMON /DLOCKA/
                                                            ( MINH )
                                                                        284P0
CONVENT - CONMON /BLOCKS/
                              11000
                                        COMMON /RLOCKA/
                                                            I MINCA 1
                                                                        28 A PO
CONNENT - COMMON /BLOCKT/
                                        COMMON /BLOCKS/
                              1 MP21
                                                            (HNLC)
                                                                        28400
CONNENT - CUMMUN /BLOCK9/
                              (#22)
                                        COMMON /BLOCIO/
                                                         (10481)
                                                                        ZBAPO
     DIMENSION RH(29-225) + RO(225) + W(225) + SL(29) + SU(30)
                                                                        OBAPO
     DIMENSION DM(127.6). DMT(127.6)
                                                                        OBAPO
                                  YE 751-
                                                                        1 1550
      CONTUN /BLOCK1/ X1 751.
                                             OTT 1 751 .
                                                         OVY/ 751-
          WZZ ( 751. SXX( 751.
                                  SYY1 751.
                                             SZZ1 751+
                                                         DXX1 751.
                                                                        13FE0
          DYY1 751. DZZ( 751. RXx( 751.
                                                                        1 SF FO
                                              RYY1 751 .
                                                         R221 751.
          ERXX( 75). ERYY( 75). ER22( 75)
                                                                        1 MEEO
     .
      COMMUN /BLOCK2/ DISI 501.
                                  DYS( 50).
                                              2LS( 50).
                                                          DC15( 50).
                                                                        ZEJAO
          DC251 50). PRF1 50).
                                  PRAE ( 50).
                                             NCDS1 501.
                                                          EAKOPSI 507.
                                                                       Z6 JAO
          10POP( 50) + 1PINL( 50) + 1PINR( 50) + N(51( 50) +
                                                         SHC1 50+131
                                                                       ZONYO
     CUNNUN /BLOCKS/ DXL 1 501.
                                  DYL 1 501.
                                                         DC1L( 50).
                                                                        26.340
                                             ZLL1 501.
          OC2LI 501. UQXI 501.
                                  URY1 501.
                                                         IAXOPLE 501.
                                                                       24.140
                                             ACDL1 501.
     .
          AC61( 50)
                                                                        ZAJAO
     1
     CONNUN /BLOCKA/ JT1(150).
                                  JT2(150).
                                              1ST(150) .
                                                         LT(150)+
                                                                        ZAJAO
         FOM51150-61
                                                                        26.340
     2
                                              PL( 75).
      COMMUN /BLOCKS/ XLSI 751.
                                  X851 751.
                                                          AEL: 751.
                                                                        24.140
         SHL1 751. SYL1 751.
                                  SZLI 791
                                                                        Z6 JAO
     2
      CONNUM /BLOCKS/ XLL(150).
                                  XRL(150).
                                             QXL(150).
                                                         QYL (150) .
                                                                        26JAO
         92L (150)
     2
                                                                        26 JA0
     CONNUN /BLOCKT/ FI 421.
                                  AEL 421.
                                              SE( 42).
                                                          SY(42)+
                                                                        26 JA0
          SZ( 42).
                     QX( 42).
                                  QY( 42),
                                              QZ ( 421.
                                                          At 421.
                                                                        ZEJAR
          8( 42).
                      A1( 42).
                                  01 421.
                                              DX1 421+
                                                          DY( 42)+
                                                                        26 JA0
          D7 (421+
                      UL (42).
                                  VI1421.
                                              W11621.
                                                          121421-
                                                                        1 1480
     ٠
                                                                        13480
          ¥2(42).
                      W21421+
                                  ERX(42).
                                             ERY(42),
                                                         ER2 (42) .
         RX(42)+
                      RY (42).
                                  R2 (42)
                                                                        13480
     COMMUN /BLOCKS/ NP(21,2).
                                  ZH(21)
                                                                        09 JEO
     CONNUN /BLOCK9/ TI211+
                                  V(21)+
                                              BH(21)+
                                                         DXT(21).
                                                                        1 10000
         DYT (21) .
     2
                     DZT(21)
                                                                        13480
      COMMON / BLOCIO / SSL (3,30)
                                                                        OBAPO
     CONMUN /BLK1/ KEEP2, KEEP3, KEEP4, KEEP5, XEEP6, KEEP7,
                                                                        26 JAO
              ITYPE, NCD2, NCD3, NCD4, NCD5, NCD6, NCD7,
                                                                        74.140
              TABAN. IFORM. NH.
                                  NJT. NST. NLT. TOL.
                                                                        26 JAO
                   HP1. HP2. 1517.
IP8. 1P9. 1P10
              H.
                                  IST7. LTT. ITYPEL.IDJ.
                                                                        12FEO
              MLC .
                                                                        13550
     5
     CONNUN /BLK2/ XL.XR.X1.X2.11.12.NO.H.TH.HSQ.HCU.X2L
                                                                        ZEJAO
      COMMUN /BLKS/ HMJT, MIST, MILT, HNH, MACS, MACG, MDJT, MALC
                                                                        OTFEO
      CONNUN /BLK4/ $11.512.513.514.515.514
                                                                        26 JAO
      COMMUN /BLKS/ NFSUB
                                                                        OBAPO
     CONNUN / RI / NL, ML, J1
                                                                        ORAPO
    I FURMAT ( 47H ...... HUM HUST BE GREATER THAN OR EQUAL TO.
                                                                        OBJEO
          2
                                                                       OBJEO
    2 FORMAT I 46H ******* H MUST BE AN EVEN INTEGER LESS THAN.
                                                                        OBJEO
          ZOH 3-HALIT/2 - 1 ---- , /.. 25H REDIMENSION DRIVER
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                                                                       OBJEO
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CONNENT - SET DIMENSION LIMITS
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| COMMENT                                                                                                                                                                                   | - MAM HUST BE GI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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|                                                                                                                                                                                           | MNM = 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| COMMENT -                                                                                                                                                                                 | - COMPLITE CONST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| 2<br>C<br>C<br>C<br>C<br>C                                                                                                                                                                | SUBROUTINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>SUI<br>2                                                                                                                                         | L6+ L7 ]<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>S<br>U<br>2<br>COMMENT                                                                                                                                | L6+ L7 ]<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>SUBROUTINE<br>CRN. RO. W. SL. SU.<br>AMII IS THE MAIN SUBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SUBROUTIN<br>DN. DNT. L1. L<br>DUIINE OF PROGR                                                                                                                                                               | 8490<br>26340<br>E SUBROUTINE<br>2. L3. L4. 084P0<br>84P0<br>AM FRAME11 274P0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>SUI<br>2<br>COMMENT -<br>DI                                                                                                                           | L6+ L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>SUBROUTINE<br>( RM. RO. W. SL. SU.<br>AM11 IS THE MAIN SUBR<br>5), ROLL6). M(L6). SL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| Z<br>EM<br>C<br>C<br>C<br>C<br>C<br>SUI<br>Z<br>COMMENT<br>DI                                                                                                                             | LG. LT )<br>SUBROUTINE<br>SUBROUTINE<br>BRUUTINE FRAM11<br>LG. LT )<br>SUBROUTINE FR/<br>MENSION RM(L3.L0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>Amii is the main subr<br>6), RO(L6), W(L6), SL<br>6), DN(L6), 61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SUBROUTIN<br>DN, DNT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)                                                                                                                                               | 84P0<br>26JA0<br>E SUBROUTINE<br>2. L3. L4. 08AP0<br>840<br>AM FRAME11 29AP0<br>08AP0<br>14MR0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2<br>ENI<br>C<br>C<br>C<br>C<br>C<br>S<br>UI<br>2<br>COMMENT<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI                                                                                          | L6. L7 ]<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE FRAM]]<br>L6. L7 )<br>- SUBROUTINE FRAM]1<br>KENSION RM(L3.L(<br>KENSION DM(L3.L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SUBROUTINE<br>( RN. RO. W. SL. SU.<br>AMII IS THE MAIN SUBR<br>(). ROIL6). WIL6). SL<br>(). POIT(17.6)<br>). POUT(4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SUBROUTIN<br>ON, DHT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)                                                                                                                                               | 84P0<br>26JA0<br>E SUBROUTINE<br>2. L3. L4. 084P0<br>BAP0<br>AM FRAME11 254P0<br>084P0<br>164R0<br>24.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2<br>EM<br>C<br>C<br>C<br>C<br>S<br>UI<br>2<br>COMMENT<br>2<br>COMMENT<br>1<br>DI<br>DI<br>0<br>1<br>DI<br>0<br>1<br>UI                                                                   | LG. LT )<br>SUBROUTINE<br>SUBROUTINE<br>BROUTINE FRAM11<br>LG. LT )<br>- SUBROUTINE FR<br>NENSION RM(L3)L(<br>4ENSION SMHT(13)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SUBROUTINE<br>{ RN. RO. W. SL. SU.<br>AM11 IS THE MAIN SUBR<br>6). RO(L6). W(L6). SL<br>6).ONT(L7.6)<br>1.FOMM1(6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTIN<br>ON, DNT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)                                                                                                                                               | BAPO<br>26JAO<br>E SUBROUTINE<br>2. L3. L4. OBAPO<br>BAPO<br>AM FRAME11 29APO<br>08APO<br>164RO<br>26JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2<br>ENI<br>C<br>C<br>C<br>C<br>SUI<br>2<br>COMMENT<br>DI<br>DI<br>DI<br>DI<br>UI<br>UI<br>UI<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI                                                         | L6. L7 ]<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>AM11 IS THE MAIN SUBR<br>6), RO(L6), W(L6), SL<br>6), DT(L7,6)<br>1, FONHT(L7),<br>AM2(18), AM3(2), NP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SUBROUTIN<br>ON. DNT. L1. L<br>OUTINE OF PROGR<br>(L3). SU(L4)<br>ROB(2). LTEST(4                                                                                                                            | E SUBROUT I HE<br>CL3+ L4+ OBAPO<br>AM FRAME11 29APO<br>06APO<br>16MRO<br>26JAO<br>109JEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>S<br>UI<br>DI<br>DI<br>DI<br>DI<br>DI<br>C<br>C<br>C                                                                                                  | LG. LT )<br>SUBROUTINE<br>SUBROUTINE<br>BRUUTINE FRAM)1<br>LG. LT )<br>- SUBROUTINE FRAM)1<br>KASION RM(L3)LO<br>KENSION SUMT(13)<br>KENSION AMI(40)<br>MENSION AMI(40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>AM11 IS THE MAIN SUBR<br>6), RO(L6), W(L6), SL<br>6), RO(L7,6)<br>1, FOMMT(6)<br>0, AM2(18), AM3(2), NP<br>( 75), Y( 75),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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29APO<br>164RO<br>26JAO<br>1 09JEO<br>YY ( 75 ), 15FEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| 2<br>ENI<br>C<br>C<br>C<br>C<br>SUU<br>2<br>COMMENT<br>DI<br>DI<br>DI<br>DI<br>0<br>1<br>COM                                                                                              | L6. L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>AM11 IS THE MAIN SUBR<br>6), RO(L6), W(L6), SL<br>6), OMT(L7,6)<br>1, FOHMT(6)<br>4, AN2(10), AN3(2), NP<br>( 75), Y( 75),<br>SY( 75), SYY( 75),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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SUBROUTINE<br>26JAO<br>E SUBROUTINE<br>2.L3.L4.OBAPO<br>BAPO<br>AM FRAME11 25APO<br>08APO<br>16MRO<br>26JAO<br>1 09JEO<br>YY(75), 13FEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6+ L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN. RO. W. SL. SU.<br>AM11 IS THE MAIN SUBR<br>6). RO(16). W(16). SL<br>6).RO(16). W(16). SL<br>6).RO(16). W(15).<br>AN2(10). AN3(2). NP<br>( 75). Y( 75).<br>XX( 75). SXY( 75).<br>XX( 75). SXY( 75).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SUBROUTIN<br>ON, DHT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX(75), G<br>SZ2(75), O<br>RY(75), D                                                                                   | E SUBROUTINE<br>26 JAO<br>E SUBROUTINE<br>2. L3. L4. OBAPO<br>BAPO<br>AM FRAME11 29APO<br>06APO<br>16MRO<br>26 JAO<br>1 09 JEO<br>YY( 751. 13FEO<br>XX( 751. 13FEO<br>XX( 751. 13FEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2<br>ENI<br>C<br>C<br>C<br>C<br>SUI<br>2<br>COMMENT<br>DI<br>DI<br>DI<br>DI<br>COM                                                                                                        | L6. L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>AM11 IS THE MAIN SUBR<br>6).RO(L6).W(L6).SL<br>6).ON(L(7.6)<br>).FONMT(6)<br>.AN2(18).AN3(2).NP<br>(75).Y(75).<br>XX(75).SY(75).<br>ZZ(75).RXX(75).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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SUBROUTINE<br>26JAO<br>E SUBROUTINE<br>2.L3.L4.08APO<br>BAPO<br>AM FRAME11 29APO<br>16MRO<br>26JAO<br>1 09JEO<br>14FEO<br>XX1 751.13FEO<br>XX1 751.13FEO<br>XX1 751.13FEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6. L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN. RO, W. SL. SU,<br>AM11 IS THE MAIN SUBR<br>6). RO(L6). W(L6). SL<br>6).OMT(L7.6)<br>).FOMMT(6). AN3(2). NP<br>( 75). Y( 75).<br>XX( 75). SXX( 75).<br>XX( 75). RXX( 75).<br>RYY( 75). RXX( 75).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SUBROUTIN<br>DH, DHT, L], L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX(75), G<br>SZ2(75), D<br>RYY(75), R                                                                                  | E SUBROUTINE<br>E SUBROUTINE<br>2. L3. L4. OGAPO<br>BAPO<br>AM FRAME11 29APO<br>OGAPO<br>16MRO<br>26JAO<br>1 09JEO<br>YV(75). 13FEO<br>XX(75). 13FEO<br>XX(75). 13FEO<br>Z2(75). 13FEO<br>22(75). 13FEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>S<br>U<br>C<br>C<br>MHENT<br>D<br>I<br>D<br>I<br>D<br>I<br>D<br>I<br>D<br>I<br>D<br>I<br>D<br>I<br>D<br>I<br>D<br>I<br>D                              | L6. L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>{ RN. RO. W. SL. SU.<br>AM11 IS THE MAIN SUBR<br>6).ROIL6).W(L6).SL<br>6).DNI(L7.6)<br>).FONHT(6)<br>AN2(18).AN3(2).NP<br>(75).Y(75).<br>XX(75).SY(75).<br>XX(75).ER22(75)<br>XS(50).DYS(50).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SUBROUTIN<br>DN, DNT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>OXX( 75), G<br>SZZ( 75), D<br>RYY( 75), R<br>ZLS( 50), D                                                                | E SUBROUTINE<br>2. L3. L4. 08APO<br>BAPO<br>AM FRAME11 29APO<br>14MRO<br>26JAO<br>1 09JEO<br>14FEO<br>XX(75). 13FEO<br>XX(75). 13FEO<br>13FEO<br>C151 50. 26JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6+ L7 )<br>SUBROUTINE<br>SUBROUTINE<br>BRUUTINE FRAM)1<br>L6+ L7 )<br>- SUBROUTIME FRA<br>KNSION DHILT+<br>KENSION DHILT+<br>KENSION SHMT(1))<br>KENSION SHMT(1))<br>MUM /BLOCK1/ X<br>QZ( 75)+ SI<br>DYY( 75)+ DI<br>ERXX( 75)+ EI<br>WUM /BLOCK2/ DI<br>DC25( 50)+ FI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SUBROUTINE<br>( RN. RO. W. SL. SU.<br>AM11 IS THE MAIN SUBR<br>6). RO(L6). W(L6). SL<br>6).RONT(L7.6)<br>).FONMT(6).<br>AM2(18). AM3(2). NP<br>( 75). Y( 75).<br>XX( 75). SY( 75).<br>RYY( 75). RXX( 75).<br>RYY( 75). PX6( 50).<br>RY( 50). PX6( 50).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SUBROUTIN<br>OM, DMT, L], L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>OXX( 75), G<br>SZZ( 75), D<br>RYY( 75), R<br>ZLS( 50), D<br>RCDS( 50), D                                                | E SUBROUTINE<br>26 JAO<br>E SUBROUTINE<br>2. L3. L4. OBAPO<br>BAPO<br>AM FRAME11 27APO<br>06APO<br>16MRO<br>26 JAO<br>1 09 JEO<br>YY( 751. 13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13       |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>S<br>UI<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI<br>C<br>O<br>S<br>S<br>S<br>C<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S | L6. L7 )<br>SUBROUTINE<br>BROUTINE<br>BROUTINE<br>L6. L7 )<br>- SUBROUTINE FRAM11<br>L6. L7 )<br>- SUBROUTINE FRAM11<br>L6. L7 )<br>- SUBROUTINE FRAM11<br>KASION SMMT(15)<br>KENSION ANI(40)<br>WHAN /BLOCK1/ X<br>UZ2( 75). SI<br>DY1 75). DI<br>ERXX(75). PI<br>HUMM /BLOCK2/ DI<br>DC25( 50). PI<br>IOPOP(50).11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SUBROUTINE<br>{ RN. RO. W. SL. SU.<br>AMLI IS THE MAIN SUBR<br>6). ROIL6). WIL61. SL<br>6). ROIL61. WIL61. SL<br>6). ROIL61. M3(21. NP<br>(75). Y( 75).<br>XX( 75). SY( 75).<br>XX( 75). RXX( 75).<br>XX( 75). RXX( 75).<br>RY( 75). RXX( 75).<br>SY( 50). PRAE( 50).<br>RF( 50). IPIRR( 50).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SUBROUTIN<br>OM, DMT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX( 75), Q<br>SZZ( 75), D<br>RYY( 75), R<br>ZLS( 50), D<br>MCDS( 50), I<br>MCDS( 50), I                                | E SUBROUTINE<br>2, L3, L4, OBAPO<br>BAPO<br>AM FRAME11 29APO<br>16MRO<br>26JAO<br>19FEO<br>19FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13 |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6+ L7 )<br>SUBROUTINE<br>SUBROUTINE<br>BRUUTINE FRAM11<br>L6+ L7 )<br>- SUBROUTINE FRA<br>KILSION DMILT04<br>KENSION DMILT04<br>KENSION SAMT(13)<br>KENSION | SUBROUTINE<br>( RN. RO. W. SL. SU.<br>AM11 IS THE MAIN SUBR<br>b). RO(L6). M(L6). SL<br>b). RO(L6). M(L6). SL<br>b). RO(L6). M(L7).<br>k). (75). Y( 75).<br>RI( 75). SY( 75).<br>RY( 75). RXX( 75).<br>RY( 75). RXX( 75).<br>RY( 75). P(15).<br>RY( 75). P(15).<br>RY( 50). P(10). S0).<br>PINL( 50). DY(15).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SUGROUTIN<br>ON, DNT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX(75), G<br>SZ2(75), G<br>RYY(75), R<br>ZLS(50), G<br>NCDS(50), I<br>NCDS(50), S<br>NCDS(50), S                       | E SUBROUTINE<br>2. L3. L4. 08APO<br>8APO<br>2. L3. L4. 08APO<br>8APO<br>08APO<br>16ARO<br>26JAO<br>1 09JEO<br>14KT 751. 13FEO<br>221 751. 13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13F       |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6+ L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>AM11 IS THE MAIN SUBN<br>6), RO(L6), W(L61, SL<br>6), RO(L6), W(L61, SL<br>6), RO(L7, 6)<br>1, FOMMT(6)<br>0, AM2(18), AM3(2), NP<br>(75), SY(175),<br>ZZ(75), SY(175),<br>ZZ(75), SY(175),<br>ZZ(75), SY(175),<br>ZZ(75), SY(175),<br>ZZ(75), RXX(75),<br>ZZ(75), RXX(75),<br>SY(175), ERZZ(75),<br>SS(50), PRAE(50),<br>PINL(50), IPINR(50),<br>NL(50), UD(50),<br>SO(50), DY(50),<br>SO(50), UD(50),<br>SO(50), UD(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),<br>SO(50),                                                                         | SUBROUTIN<br>ON, DHT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX( 75), G<br>SZ2( 75), G<br>SZ2( 75), G<br>RYY( 75), R<br>ZLS( 50), G<br>MCDS( 50), I<br>, MC5( 50), S<br>ZLL( 50), S | E SUBROUTINE<br>2, L3, L4, OBAPO<br>BAPO<br>AM FRAME11 29APO<br>06APO<br>16MRO<br>26JAO<br>1 09JEO<br>171, 13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13FEO<br>13 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| 2<br>ENI<br>C<br>C<br>C<br>C<br>SUI<br>C<br>COMMENT<br>DI<br>DI<br>DI<br>DI<br>DI<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                             | L6. L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>AM11 [S THE MAIN SUBR<br>6), RO(L6), W(L6), SL<br>6), ONT(L6), V(L6), SL<br>6), ONT(L7,6)<br>), FOHMT(6)<br>, AN2(18), V(75),<br>RX(75), SY(175),<br>RX(75), SY(175),<br>RX(75), RXX(75),<br>RY(75), RXX(75),<br>RY(75), P(R2(50),<br>PINL(50), IPINR(50),<br>QX(50), UQY(50),<br>QX(50), UQY(50),                                                                                                                                                                                                                                                                                                                                                                                                                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SUBROUTINE<br>26JAO<br>E SUBROUTINE<br>2.L3.L4.08APO<br>BAPO<br>AM FRAME11 29APO<br>16MRO<br>26JAO<br>1 09JEO<br>YY( 75).13FEO<br>XX( 75).13FEO<br>XX( 75).13FEO<br>C15!50],26JAO<br>AXOPS( 50).26JAO<br>AXOPS( 50).26JAO<br>AXOPL( 50).26JAO<br>AXOPL( 50).26JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6+ L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN. RO. M. SL. SU.<br>AM11 IS THE MAIN SUBR<br>6). RO(16). W(16). SL<br>6). RO(16). W(16). SL<br>6).ONT(17.6)<br>1.FOMMT(6)<br>AN2(10). AN3(2). NP<br>( 75). Y( 75).<br>XX( 75). SXX( 75).<br>RYY( 75). SXX( 75).<br>SX( 50). PARE( 50).<br>PINL( 50). UQY( 50).<br>XX( 50). UQY( 50).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SUBROUTIN<br>ON, DHT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX(75), G<br>SZ2(75), G<br>RYY(75), R<br>ZLS(50), C<br>NCDS(50), I<br>, MC51(50), S<br>ZLL(50), D<br>NCDL(50), 1       | E SUBROUTINE<br>26 JAO<br>E SUBROUTINE<br>2, L3, L4, OBAPO<br>BAPO<br>AM FRAME11 29APO<br>06APO<br>16MRO<br>26 JAO<br>1 09 JEO<br>YY( 75), 13FEO<br>XX( 75), 13FEO<br>XX( 75), 13FEO<br>13FEO<br>C15( 50), 26 JAO<br>MC( 90, 13) 20MYO<br>C1L( 50), 26 JAO<br>AXOPL( 50), 26 JAO<br>AXOPL( 50), 26 JAO<br>26 JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6. L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN, RO, W, SL, SU,<br>AM11 IS THE MAIN SUBM<br>6), RO(L6), W(L6), SL<br>6), ONT(L7,6)<br>), FONHT(6)<br>, AN2(18), AN3(2), NP<br>( 75), Y( 75),<br>XX( 75), SY( 75),<br>ZZ( 75), RXX( 75),<br>ZZ( 75), RXX( 75),<br>RY( 75), ERZZ( 75)<br>XSI 50), DYNR( 50),<br>Rf( 50), PARE( 50),<br>Rf( 50), PARE( 50),<br>ZL( 50), DYNR( 50),<br>XL( 50), UQY( 50),<br>XL( 50), UQY( 50),<br>T1(150), JT2(150),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SUBROUTIN<br>ON, DMT, L1, L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX( 75), G<br>SZZ( 75), D<br>RYY( 75), R<br>ZLS( 50), D<br>MCDS( 50), I<br>SZLL( 50), D<br>MCDL( 50), L<br>IST(150), L | E SUBROUTINE<br>26JAO<br>E SUBROUTINE<br>2.L3.L4.08APO<br>BAPO<br>AM FRAME11 29APO<br>164RO<br>26JAO<br>1 09JEO<br>YY( 75).13FEO<br>XX( 75).13FEO<br>XX( 75).13FEO<br>C15!50.26JAO<br>AXOPS( 50).26JAO<br>AXOPS( 50).26JAO<br>AXOPS( 50).26JAO<br>7(150).26JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2<br>EM<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                                         | L6. L7 )<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBROUTINE<br>( RN. RO. W. SL. SU.<br>AM11 IS THE MAIN SUBR<br>6). RO(L6). W(L6). SL<br>6).RO(L6). W(L6). SL<br>6).OMT(L7.6)<br>).FOMMT(6)<br>AN2(10). AN3(2). NP<br>( 75). Y( 75).<br>XX( 75). SXX( 75).<br>XX( 75). RXX( 75).<br>RYY( 75). RXX( 75).<br>RYY( 75). RXX( 75).<br>RYY( 75). RXX( 75).<br>RYY( 75). CONTROL<br>RYY( 75). CONTROL<br>RYY( 75). CONTROL<br>SO(L).<br>RYY( 75). CONTROL<br>SO(L).<br>CONTROL<br>SO(L).<br>SO(L).<br>CONTROL<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L).<br>SO(L | SUBROUTIN<br>OM, DMT, L], L<br>OUTINE OF PROGR<br>(L3), SU(L4)<br>ROB(2), ITEST(4<br>GXX(75), G<br>SZ2(75), G<br>RYY(75), R<br>ZLS(50), C<br>MCDS(50), C<br>NC51(50), C<br>NCDL(50), L                       | E SUBROUTINE<br>2. L3. L4. OBAPO<br>BAPO<br>2. L3. L4. OBAPO<br>BAPO<br>00APO<br>00APO<br>00APO<br>16MRO<br>2. L3. L4. OBAPO<br>00APO<br>00APO<br>16MRO<br>2. L3. L4. OBAPO<br>00APO<br>00APO<br>16MRO<br>2. L3. L4. OBAPO<br>00APO<br>16MRO<br>2. L3. L4. OBAPO<br>00APO<br>16MRO<br>2. L3. L4. OBAPO<br>0. 00APO<br>16MRO<br>2. L3. L4. OBAPO<br>0. 00APO<br>16MRO<br>2. L3. L4. OBAPO<br>0. 00APO<br>16MRO<br>2. L3. L4. OBAPO<br>0. 00APO<br>16MRO<br>2. L3. L4. OBAPO<br>0. 00APO<br>0. 00APO<br>16MRO<br>2. L3. L4. OBAPO<br>0. 00APO<br>0. 00APO<br>0. 00APO<br>0. 00APO<br>16MRO<br>2. L3. L4. OBAPO<br>0. 00APO<br>16MRO<br>2. L3. L3. L3. L3. L3. L3. L3. L3. L3. L3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

CONNUM /BLOCKS/ XLSE 751+ XRSE 751+ FL( 751. AELE 751. 26.JA0 SHL( 751. SYL( 751. SEL1 751 26JA0 CONNON /BLOCKS/ XLL(150)+ XRL(1501. QKL(150). OYL (150). 26JA0 QZL (150) 76 JA0 . COMMUN /BLOCK7/ FI 421. AE( 421. ATI API. \$11421. 26.JA0 SZL 421+ QX1 42)+ QY1 421+ 921 421. AE 421+ 26.JA0 A11 421+ DI 421. OK( 42). 26JA0 8( 42)+ DY( 42). DZ(42). U1(42). ¥1(42). 1 3480 W1 (421 . 121421. ¥2(42). W2(42)+ ERX(42). ERY(42). ERZ (42) . RX(42)+ RY(42). RZ (42) 1 SMRO CONNON /BLOCKS/ TI21). V(21). 88(21). DXT(21). 13480 13480 DYT(21)+ DET(21) COMMUN /BLK1/ KEEP2, KEEP3, KEEP4, KEEP5, KEEP4, KEEP7, 26.310 ITYPE, NCD2, NCD3, NCD4, NCD5, NCD6, NCD7, 26 JAO MJT. NET. HLT. TOL. IABAN. IPORN. MI. 26.JA0 MP1.. MP2. ISTT. LTT. ITYPEL.IDJ. H+ -12FE0 MLC. 198. 199. 1010 13780 CONTRACT MUST JULT JULT JUNION MICS JUICE , NO. T JUNICE O7FED COMMON /BLKS/ NFSUB 08420 CONNON / RE / NL. ML. JL OBAPO 1 FORMAT & SON PROGRAM PRAME 11 - DEV DECK - MATLOCK-HAYS 26 JA0 26HREVISION DATE - 27 AUG 701 27AG0 2 10 FORMAT ( .BOX 10H1-TRIN 1 26.JA0 - 546 26,140 11 FORMAT & SHI \*00\* 12 FORMAT & 20AA 1 1 BHYO 13 FORMAT 4 5X. 2004 3 10070 14 FORMAT & AL. A4. SX. 17A4. A2 1 MITTO • 15 FORMAT 1///10H PROB + /SE+ A1+ A4+ SE+ 1784+ A2 ) 18470 16 FORMAT 1///1TH PROB (CONTD1. /SI. AL. A4. SX. 1744. A2. // ) 1 0470 IT FORMAT (AL.AA.AL.AA.17AA.AZ) **OBJED** SU FORMAT ( 924 SOLUTION ABANDONED IN SEANCH OF AN INDEPENDENT 26.340 26.340 10H PROBLEM +///+ 2 THE FOLLOWING CARDS WERE DISCARDED IN SEARCH. 26.340 4914 26.360 118 51 FORMAT 1//-50H NO HOLD OPTIONS MAY BE EXERCISED ON FIRST PRO-O7FEO 1SHOLEN OF RUN . O7FEO 2 SZ FORMAT PROBLEM MUST BE TYPE 1. 2. 3. OR 4 1 04HYO 406 53 FORMAT I 35H HOLD OPTIONS MUST BE 1 OR 0 ) OANTO. PRINT OPTIONS MUST BE 1 OR 0 1 OANYO 54 FORMAT ( 354 55 FORMAT ( NUMBER OF CARDS ADDED CAN NOT BE NEGATIVE! OVINO 444 100 FORMAT (58.15.58. 615.58.315./.158. 615) 13980 101 FORMAT (81/), 35H TABLE 1 - PROGRAM CONTROL DATA . / . 26 JAO PROBLEM TYPE. 15. ///.25X.12HINPUT TABLES. //. 30000 1 7H 2 ASH TABLE HOLD DATA FROM MIMBER OF CARDS . /. 26.JA0 10X. ADDED FOR THIS +/+ 10%. LAST PROBLEM 26.140 45H MUMBER 11 - YES.0 - NOI PROBLEM 26 JA0 108. 45H .//. 2+10X+15+15X+15+/+ 10X.5H 4+10X+15+15X+15+/+ 10X.5H 3.10X.15.15X.15./. 26 JA0 10X . SH 26 JAO 10X+5H 5.10X.15.15x.15./. 1 1 3480 6.10X.15.15X.15./. 10X.54 7.10X.15.15x.15.//. 10X.5H 25K+ 1SHOUTPUT TABLES+//+ 3 OHRO 25H TABLE SUPPRESS OUTPUT+/+ 25H NUMBER (1 = YES+0 = NO++/+ 1 39880 10X . 13980 10X. 8.10X.19./.10X.5H 9.10X.15./.10X.5H 10.10X.151 13480 10x.5H . 1 FORMAT ( SON TABLE & - JOINT DISPLACEMENTS AND REACTIONS . 10FE0 2 ///.20X. 15HDISPLACEMENTS .16X. 10H REACTIONS.//. 10FE0 151 FORMAT & SOH 3 SX. JOHJOINT DISP(X) DISP(Y) ROTATION(Z) . 30HR0

| 4 31HREACT(X) REACT(Y) REACT(Z) +// )                             | 10750          |
|-------------------------------------------------------------------|----------------|
| 152 FORMAT (5X+15+6E11+3)                                         | 10FE0          |
| 162 FORMAT ( 45H TABLE 10 - JOINT EQUILIBRIUM ERRORS +///+        | 25MR0          |
| 2 AGH JOINT ERR(X) ERR(Y) ERR(Z)++                                | 24AP0          |
| 3 AOH FORCE FORCE MOMENT+//}                                      | 24AP0          |
| DATA 17657(1)+ 17657(2)+ 17657(3)+ 17657(4) / 14C+ 446458+ 14 +   | TOPEO          |
| 2 44 /                                                            | 10760          |
| ITYPEL - O                                                        | 07FE0          |
| CONNENT - READ RUN 10, PRINT PROGRAM ID AND RUN ID                | 24 APO         |
| READ 12. (AN1(1)) + 11 + 1. 40)                                   | 09JE0          |
| PRINT 11                                                          | 26JA0          |
| PRINT 1                                                           | 26JA0          |
| PRINT 12. (AN1(11). 11 = 1. 40)                                   | 09,160         |
| COMMENT - RETURN HERE TO READ NEW PRUBLEM                         | 24AP0          |
| 1010 READ 14, NPROB, (AN2(11), 11 = 1, 18)                        | 09,760         |
| COMENT ~ IF NPROB = CEASE, TERMINATE RUN                          | 24 APQ         |
| IF (MPROB(1) .EQ. ITEST(1) .AND. MPROB(2) .EQ. ITEST(2))          | 09JE0          |
| 2 60 TO 9900                                                      | 09 <b>JE</b> O |
| COMMENT - IMPUT AND ECHO PRINT PROGRAM COMTROL DATA (TABLE 1)     | 24AP0          |
| READ 100, 11YPE,KEEP2,KEEP3,KEEP4,KEEP5,KEEP6,KEEP7,1P4,1P4,1P10, | 13480          |
| 2 HCD2+HCD3+HCD4+HCD5+HCD7                                        | 26 JAO         |
| 1050 PRINT 11                                                     | 26JA0          |
| PRINT 12. (AN1(11), 11 = 1, 40)                                   | 09JE0          |
| PRINT 15. NPROB. (AN2(11). 11 = 1. 18)                            | 09.JED         |
| PRINT 1u1+ 1TYPE+KEEP2+NCD2+KEEP3+NCD3+KEEP4+NCD4+KEEP5+NCD5+     | 26JA0          |
| 2 KEEP6+NCD6+KEEP7+NCD7+IP8+1P9+1P10                              | 1 9480         |
| COMMENT - CHECK FOR ILLEGAL DATA IN TABLE 1                       | 2 2MYO         |
| IF (ITYPE .LT. 1 .OR. ITYPE .GT, 4) GO TO 1210                    | DAMYO          |
| IF (KEEP2 .LT. 0 .OR. KEEP2 .GT. 1) GO TO 1220                    | DAMYO          |
| IF (KEEPS .LT. 0 .OR. KEEPS .GT. 1) GO TO 1220                    | DAMYO          |
| 1F (KEEP4 .LT. 0 .OR. KEEP4 .GT. 1) GO TO 1220                    | 04MYO          |
| 1F IKEEP5 .LT. 0 .OR. KEEP5 .6T. 1) GO TO 1220                    | O4MYO          |
| 17 (KEEP6 .LT. 0 .OR. KEEP6 .GT. 13 GO TO 1220                    | DAMY O         |
| 1F (KEEP7 .LT, 0 .OR, KEEP7 .GT. 1) GO TO 1220                    | DAMYO          |
| 1F (1P8 .LT. 0 .OR. 1P8 .GT. 13 GO TO 1230                        | 04MAD          |
| 1F (1P9 .LT. 0 .OR. 1P9 .GT. 1) GO TO 1230                        | 04490          |
| if (1P10 .LT, 0 .OR. 1P10 .GT. 1) GO TO 1230                      | G4MYO          |
| LF (NCO2 .LT. 0) GO TO 1240                                       | 04MYO          |
| IF (NCD3 .LT. 0) GO TO 1240                                       | 04/470         |
| IF (NCD4 .LT, 0) 60 TO 1240                                       | DAMYC          |
| IF (NCD5 .LT. 0) 60 TO 1240                                       | DAMYO          |
| 1F (MCD6 .LT, 0) GO TO 1240                                       | 04MYO          |
| LF INCD7 .LT, 01 GO TO 1240                                       | OAMYO          |
| KEKE = KEEP2 + KEEP3 + KEEP4 + KEEP5 + KEEP6 + KEEP7              | DTFEO          |
| IF ( ITYPEL .EG. O .AND. KEKE .NE, O I GO TO 1200                 | 07 <b>FEO</b>  |
| GO TO 1900                                                        | TFEO           |
| COMMENT - ABORT PRUBLEM,SEARCH FOR INDEPENDENT PROBLEM            | ZAAPO          |
| 1200 PRINT 51                                                     | TFEO           |
| GO TO 9800                                                        | OTFEO          |
| 1210 PRINT \$2                                                    | AMYO           |
| GQ TO 9800                                                        | 41170          |
| 1220 PRINT 33                                                     | AMYO           |
| GO TO 9800                                                        | CANYO          |
| 1230 PRINT 36                                                     | 04MYO          |
| GO TO 9800                                                        | 04MYO          |
| 1240 PRINT 55                                                     | ANYO           |
|                                                                   |                |

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|          | 60 TO 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 04MY0   |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1300     | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | OVFEO   |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ZEJAO   |
| COMMENT  | - INDAN - I INDICATES FATAL ERROR FOUND IN SUBROUTINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ZAAPO   |
| COMMENT  | - PROBLEM ABANDONED IN SEARCH OF AN INDEPENDENT PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 24400   |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26JA0   |
| COMPERT  | TRAIN PROGRAM STARTS HERE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 24400   |
| COMPENSI | - SKIP TABLES 2 * 6 FOR FARILY PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 24400   |
|          | IF I ITTE .EG. 4 / GO TO ADDO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 04150   |
|          | RINI II.<br>DINI II. MARAR (ANGALI) II. II. INI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26 340  |
| COMMENT  | - COMPANY INF LANZILLY II - IN ISI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 04750   |
| COMMENT  | - CHECKE SAD BAD DATA. COMPUTER MINT COMPLEXES, STAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 24450   |
| COMMENT  | - DATA AND DELATE COMPLETE COMPLIANTES TECHD FRINTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 24 400  |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 24 140  |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20340   |
| 0        | 17 1 1ABAN 2248 1 / 00 10 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 20JAV   |
|          | NINT 14. MORAD, FAMPELLL, 11 - 3, 161                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 20340   |
| COMMENT  | - LINDOUTINE NEW COLLEGE II - IT IS/<br>- LINDOUTINE NEW COLLEGE II - IT ATTOM OF STIFFASSE AND LOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 34 400  |
| COMMENT  | - SUCHASTING AGAIN TABLE INTUIS COLITION OF STIFFIESS AND LUND<br>- TVDER TH REAME (TABLE IN CUB COLITION OF STIFFIESS AND LUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 24484   |
| COMPENS  | - INCOMENTATION AND A CONTRACT AND A DEPARTMENT OF A CONTRACT OF A CONTR | 2 4 AFU |
| COMMENT  | - AND DELAST CHURCHER MERER MUNICELIST COSTESTED PATTS DATE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 34400   |
| CONTENT  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 74 140  |
|          | 15 ( FARM - CO- 1) CO TO 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 34 140  |
| Þ        | TI TINDAN SET ING NO PORT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 74 140  |
| 5        | NENT LA MORTA (ANTILLA IL » ), 161                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 00 160  |
| COMMENT  | - CIMERCIAL INTRA INDIAL CONTRACTOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 24400   |
| COMMENT  | - TARLE ALLOWFER FOR BAD DATA AFFINE ATE DINT LADE AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 24 400  |
| COMMENT  | - RESTRAINTE FOR DO INTE DATA AND DOINTE ACCIMUM ATED DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 24400   |
|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26.140  |
|          | 15 ( )AMAN _804 11 60 10 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26.140  |
| P        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26.340  |
| P        | 11MT 16. MPROM. (AN7/11). () = 1. (A)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 09,150  |
| COMMENT  | - SURROUTINE ROMST INPUTS NEMBER STIFFNESS DATA ITABLE 5).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ZAAPO   |
| COMMENT  | - CHECKS FOR BAD DATA.CONVERTS INPUT DISTANCES TO MEMNER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 24 APO  |
| COMMENT  | - COORDINATES AND ECHO PRINTS DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ZAAPO   |
| c        | ALL RDMST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26.140  |
| -        | IF I TABAN . EQ. 11 GO TO 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26 JA0  |
| P        | RINT 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26.JA0  |
| P        | RINT 16. MPROB. (AN2(11). [] = 1. 18)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 09,100  |
| COMMENT  | - FOR BAD DATA. CONVERTS LOADS AND DISTANCES TO HEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ZAAPO   |
| COMMENT  | - COORDINATES AND ECHO PRINTS DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ZAAPO   |
| C        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26 JA0  |
| -        | IF ( JABAN .EQ. 1) GO TO 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26 JA0  |
| 4000     | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 9FFO    |
| P        | RINT 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9FEO    |
| P        | RINT 16, NPROB, (AM2(11), 11 + 1, 18)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 09JEO   |
| COMMENT  | - SUBROUTINE COMP INPUTS SUPERPOSITION DATA (TABLE 7) FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ZAAPO   |
| COMMENT  | - FAMILY PROBLEMS . CHECKS FOR BAD DATA . SETS UP STORAGE FOR FAMIL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | YZAAPO  |
| COMMENT  | - SOLUTIONS, ACCUMULATES PROBLE MULTIPLIERS, ECHO PRINTS DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ZAAPO   |
| COMMENT  | - AND PRINTS ACCUMULATED PROBLEN MULTIPLIERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ZAAPO   |
| c        | ALL COMP (NPROB )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 09F E0  |
|          | IF & LABAN .EQ. 1 \$ 60 TO 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 09FE0   |
|          | ITYPEL - ITYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 09FE0   |
| COMMENT  | - SKIP FOR FAMILY PROBLEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Z4 APO  |
|          | IF ( ITYPE .EQ. 4 ) GO TO 6800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | O9FEO   |

| COMPLEMENT | FORT DEDER STIFFNESS MATRICES AND DEDDER FIRED-FURCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ZARU   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| COMMENT -  | MATRICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 24 APO |
|            | DO 5800 JJ = 1+NM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26JA0  |
|            | (LL)121 = 1721                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26JA0  |
|            | LTT + LTTJJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26JA0  |
| COMMENT -  | SKIP FOR NULL MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24AP0  |
|            | IF (15TT .EQ. 0) GO TO 5750                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 06AP0  |
| COMMENT -  | SKIP FOR OFFSPRING PROBLEMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 22MY0  |
|            | 1F (1TYPE .FO. 1) GO TO 5550                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 201410 |
| CONMENT -  | SKIP FOR STIFFNESS TYPES HELD FROM LAST PROBLEM - NOTE THAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 24AP0  |
| COM 4ENT - | IF TABLE 5 IS NOT KEPT NSTL + 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ZAAPO  |
|            | IF (ISTT .LE. MSTL) 60 TO 5550                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ZAAPO  |
|            | IF (JJ -FR- 1) 60 TO 5500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 244P0  |
| CONNENT -  | SKIP FOR STIFFNESS TYPE REPEATED IN THIS PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 24 APO |
|            | IF (15TT .FO. 15T(JJ - 11) 60 TD 5700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 26 JA0 |
| COMMENT -  | SUBROUTINE FORMST CALCULATES STIFFNESS MATRIX FOR BOTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 244P0  |
| COMMENT -  | PRISMATIC AND VARIABLE CROSS SECTION MEMBERS AND STORES IN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 244P0  |
| CONMENT -  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 24400  |
| SSUD CALL  | FORMET / BM. BO. M. CI. CH. CMMT. 11. 13. 14. 14.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ORAPO  |
| 3300 CAL   | $ \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & $ | 74 140 |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 11440  |
| 3310       | 30011311117 * 3001111<br>Co to tabo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 34 140 |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 20340  |
| 3330       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 20340  |
| 5700       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 20340  |
|            | 1P (LT1 .EG. 07 GO TO 5750                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 26JAU  |
| COMPENT -  | SUBROUTINE FORALD CALCULATES FIXED-FORCE MATRIX FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ZAAPO  |
| COMMENT -  | BOTH PRISMATIC UNIFORMLY LOADED MEMBERS AND ALL OTHERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ZAAPU  |
| CALL       | FURALD ( RM, RO, W, SL, SU, FURAT, LI, L3, L4, L6 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | OBAPO  |
|            | 00 5710 1 = 1.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ZEJAU  |
| 5/10       | FORMEUU,13 = FORMATCEE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 11460  |
|            | GO TO 5800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ZEJAO  |
| COMMENT -  | SET FIRED END-FORCE-MATRIX TO NULL MATRIX FOR NULL LOADING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ZAAPO  |
| 5750       | 00 5780 1 = 1.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 26 JA0 |
| 5780       | FOM1JJ+11 # 0+0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 11FE0  |
| 5800       | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26JA0  |
|            | NSTL = NST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 26JA0  |
| COMMENT -  | START SOLUTION OF FRAME JOINT EQUILIBRIUM EQUATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ZAAPO  |
| COMMENT -  | SET CONTROL CONSTANTS FOR FRAME SOLUTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 24APD  |
|            | 1HB = 3 + 1DJ + 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26JA0  |
|            | NL = 30NJT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DBAPO  |
|            | IF (ITYPE .EQ. 1) ML = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | OBAPO  |
|            | 1F (1TYPE .EQ. 21 ML = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | OGAPO  |
|            | IF (ITYPE .EQ. 3) ML = -1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | OSAPO  |
|            | NFSUB = 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OBAPO  |
| REW        | IND 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BAPO   |
| COMMENT -  | READ RM AND RO OFF TAPE FOR OFFSPRING PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24APO  |
|            | IF (ML .NE1) GO TO 6100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 09,160 |
| REAG       | ) (2) {{{RM{1,J};} = 1,{RMB},RO{J};,J = 1,NL}                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 01.4.0 |
| 6100       | CURTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 09JE0  |
| COMMENT -  | CALL GRIPZA FOR SOLUTION OF FRAME JOINT EQUILIBRIUM EQUATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24APO  |
| COMMENT -  | URIPZA SULVES BOTH FRAME JUINT EQUILIBRIUM EQUATIONS AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ZAAPO  |
| CUMMENT -  | HENBER EQUILIBRIUM EQUATIONS - GRIPZA CALLS FSUB1 WHICH CALLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ZAAPO  |
| COMMENT -  | FSUBIL TO SET UP FRAME EQUATIONS OR FSUBIZ TO SET UP MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 24400  |
| COMMENT -  | EQUATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 24400  |
| CALI       | GRIPZA ( RM. RO. W. SL. SU. L3. L4. L6. INA I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15NY0  |
| COMMENT -  | WRETE RM AND RO ON TAPE FOR PARENT PROBLEM - THEY WOULD BE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 24420  |
|            | with the second se                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |

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COMMENT - FURN MEMORY ATTENTS MARTERS AND MEMORY TIMES ON FORSE

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| CONVENT - DESTROYED BY REASER SOLUTIONS IF NOT STORED                                                                                       | ZAAPO   |
|---------------------------------------------------------------------------------------------------------------------------------------------|---------|
|                                                                                                                                             | 07.50   |
|                                                                                                                                             |         |
| szos continut                                                                                                                               | 7520    |
| J = 0 J = 0                                                                                                                                 | ZAAPU   |
| CONNERT - INARSPER JOINT DISPLACEMENTS FROM & TO DAXA DYTA DZZ                                                                              | 24470   |
|                                                                                                                                             | ZUJAU   |
|                                                                                                                                             | 06,440  |
| GLR([] = W(J)                                                                                                                               | UGAPO   |
|                                                                                                                                             | USPIKU  |
|                                                                                                                                             | OBAPO   |
|                                                                                                                                             | OPHIKO  |
| BLZ(I) = W(J)                                                                                                                               | OGAPO   |
|                                                                                                                                             | OFICE   |
| CONVENT - SOLVE FOR JOINT REACTIONS                                                                                                         | ZAAPO   |
| 00 6600 [ = 1.MJT                                                                                                                           | I OF EO |
| $RXX(I) = SXX(I) = DXX(I) = (-I_{+}O)$                                                                                                      | TOLEO   |
| RTY([] = STY([]=DTY([]=(-1.0)                                                                                                               | IOFEO   |
| 6600 RZZ([] = \$22([]=02Z([]=1-].0)                                                                                                         | 11FE0   |
| CONNENT - SKIP FOR REGULAR PROBLER                                                                                                          | ZAAPO   |
| IF ([TTPE .EG. 1] GO TO 7000                                                                                                                | 12760   |
| CONVENT - START NEW SERIES OF SUPERPOSITION SOLUTIONS                                                                                       | ZAAPO   |
| IF (ITYPE .EQ. 2) REWIND 1                                                                                                                  | 16.JE0  |
| COMMENT - STORE JOINT DISPLACEMENTS, REACTIONS, AND LOADS ON TAPE FOR                                                                       | ZAAPO   |
| COMPENT - PARENT AND OFFSPRING PROBLEMS                                                                                                     | ZAAPO   |
| WRITE (1) ( OXX([),DYY([),DZZ([),RXX([),RYY((),RZZ([),GXX([),                                                                               | 16.00   |
| $2 \qquad \qquad$    | 127 EQ  |
| <b>60 70 7000</b>                                                                                                                           | 10FED   |
| 6690 CONTINUE                                                                                                                               | 9FED    |
| CONNENT - SUBROUTINE BUNL DOES SUPERPOSITION SOLUTION FOR FRAME                                                                             | ZAAPO   |
| COMMENT - JOINT DISPLACEMENTS AND REACTIONS FOR FAMILY PROBLEMS                                                                             | ZANPO   |
| CALL SUM1                                                                                                                                   | 1 2FE0  |
|                                                                                                                                             | 10460   |
| CONVERT - PRINT TABLE & IF REQUESTED                                                                                                        | ZAAPO   |
| IF (1P6 .E0, 1) 60 TO 7200                                                                                                                  | 1 3HRO  |
| PRINT 11                                                                                                                                    | IOFEO   |
| PRINT 16, MPHOD, (AR2(1)), [[ = 1, 10)                                                                                                      | 07JE0   |
| PRINT 151                                                                                                                                   | 10FE0   |
| $00 \ 7100 \ f = 1_{7} \text{AJT}$                                                                                                          | 10FEO   |
| 7100 PRINT 152. [, DXX(1), DYT(1), DZZ(1), RXX(1), RYY(1), RZ(1)                                                                            | IOFEO   |
| 7200 CONTINUE                                                                                                                               | 1 34440 |
| CONNENT - COMPUTE FOR EACH JOINT - THE SUM OF APPLIED JOINT LOAD                                                                            | ZAAPO   |
| CONNENT - AND THE REACTION - WHEN THE APPROPRIATE NEMBER END FORCES ARE                                                                     | ZAAPO   |
| CONNERT - SUBTRACTED FROM THES SUM THE RESULT IS THE JOINT EQUILIBRIUM                                                                      | ZAAPO   |
| CONVENT - ERRORS                                                                                                                            | ZAAPO   |
|                                                                                                                                             | 2000    |
| ERXX(I) + GXX(I) + HXX(I)                                                                                                                   | ZOPERO  |
| EXAA(1) = GAA(1) + KAA(1)                                                                                                                   | ZCHINO  |
| $7250 \qquad \qquad$ | 20480   |
| CONNENT - START SOLUTION FOR MEMBER RESULTS                                                                                                 | ZAAPO   |
| 0 • 0                                                                                                                                       | 1640    |
| COMMENT - MEMBERS ARE PUT IN GROUPS OF SIX SO RESULTS CAN BE WRITTEN ON                                                                     | ZAAPO   |
| CONNENT - TAPE ON LONG BIMARY REGORD                                                                                                        | ZAAPO   |
| 1016 = (101 - 1)/6 + 1                                                                                                                      | 06APO   |
| COMMENT - START NEW SERIES OF SUPERSITION SOLUTIONS FOR PARENT PROBLEM                                                                      | ZAAPO   |
| lf (ITYPE .EQ. 2) REVIND 4                                                                                                                  | 16760   |

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| COMMENT - SKIP FOR FAMILY PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 24420          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| IF (ITYPE .EQ. 4) GO TO 7900                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 <b>3HR</b> 0 |
| COMMENT - DO IN GROUPS OF SIX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ZAAPO          |
| DO 7500 NI = 10 NM6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ZOHRO          |
| COMMENT - DO FOR EACH MEMBER OF GROUP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ZAAPO          |
| DO 7400 KK = 1+6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 OHRO         |
| 1 + لر = لر                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 16HR0          |
| CONMENT - SUBROUTINE MEMRES COMPUTES MEMBER RESULTS FOR ALL MEMBERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ZAAPO          |
| COMMENT - IN FRAME. SUBTRACTS APPROPRIATE MEMBER END FORCES TO COMPLETE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ZAAPO          |
| CONNENT - CALCULATION OF JOINT EQULIA ERRORS AND PRINTS OUT MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 24420          |
| COMMENT - REGINTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 24480          |
| CALL MEMORY ( DNA JJA KKA RMA ROA MA SIA SUA MORORA AND. ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -08480         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DEADO          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 SHIPO        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 2446         |
| CUMENT - SKIP FOR REGULAR PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ZAAPU          |
| IF (ITTPE .EG. 11 GO TO 7500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ZOHRO          |
| COPUENT - STORE RESULTS FOR SIX HEMBERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ZAAPO          |
| WRITE (4) ((DM(IJ,KK) , IJ = 1,L7 ), KK = 1,6 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 16JE0          |
| 7500 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 20MR0          |
| GO TO 8000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20HR0          |
| 7900 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 20HR0          |
| COMMENT - SUBROUTINE SUN2 DOES SUPERPOSITION SOLUTION FOR MEMBERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 24 APO         |
| COMMENT - FUR FAMILY PROBLEMS.SUBTRACT'S APPROPRIATE MEMBER END FORCES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 24APO          |
| CONNENT - TO CUMPLETE CALCULATION OF JOINT EQUILIBRIUM ERROR AND PRINTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 24APO          |
| CONVENT - NEWBER RESULTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 24AP0          |
| CALL SUM2 (DM-ONT-LT-MA-AN2-NPROR )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 254R0          |
| 8000 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 3480         |
| COMMENT - ADIAL F 10 / MINT FOUL (ADIAL FROMELIE FOUESTED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24400          |
| Company - Fring Fagle To to the start and the showship headested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 26480          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2 34400        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 23440          |
| PRINT 16. APROB. (AM2(11). 11 = 1. 10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DATED          |
| PRINT 162                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ZSMRO          |
| 00 = 100 = 1 + 1 + 1 = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2 I MRO        |
| 0140 PRINT 152. 1. ERXX()). ERYY(), ERZZ())                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ZIMRO          |
| 8500 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 3HR0         |
| COMMENT - RETURN FOR NEW PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24APO          |
| 9040 GO TO 1010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 26.JA0         |
| CONNENT - SULUTION ABANDONED - SEARCH FOR INDEPENDENT PROBLEM BEGINS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ZAAPO          |
| CONNENT - HERE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 24AP0          |
| SADD PRINT 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26,140         |
| 9810 READ 17. MPROB. AND. (AN2(11), 11 = 1, 18)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 09JEO          |
| IF (MPROB(1)) ANE, ITEST(3) OR, MPROB(2) ANE, ITEST(4))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10JEn          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 09.160         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 00 100         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 24.140         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20040          |
| The IP Inventity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 09.50          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19320          |
| REAN INVO ITTPESKELPZSKELPZSKELPSSKELPSSKELPSSKELPSSKELPSSKELPSSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSKELPZSK | 1 77870        |
| 2 ACD2+ACD3+ACD4+ACD5+ACD7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ZEJAD          |
| KERE = KEEP2 + KEEP3 + KEEP4 + KEEP5 + KEEP6 + KEEP7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ZEJAO          |
| IF (KEKE .EQ. 0 .AND. 114PE .LE. 21 60 10 1050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 09FE0          |
| PRINT 17. MPROB. AN3. (AM2(11). 11 = 1. 10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 09 <b>JEO</b>  |
| PRINT 140.1TYPE.KEEP2.KEEP3.KEEP4.KEEP5.KEEP4.KEEP5.KEEP4.KEEP7.IP0.IP9.IP10.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ZZAPO          |
| 2 MCD2 • NCD3 • NCD4 • NCD5 • MCD6 • NCD7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ZZAPO          |
| 60 TO 9010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Z6JA0          |
| 9940 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26.140         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 10000          |

1

| RETURN<br>END            |                        |                           | DAL45<br>DAL45 |
|--------------------------|------------------------|---------------------------|----------------|
| ( *************          |                        |                           |                |
|                          |                        |                           | COMPOSIT LA    |
| C SUBROUTINE             | SUBROUTINE             | SUBROQUINE                | SUBROUTIN      |
| C ***********            |                        |                           | *********      |
| C                        |                        |                           |                |
| SUBROUTINE JTCORD        |                        |                           | 0AL 45         |
| COMMENT - SUBROUTINE JTC | ORD INPUTS JOINT GEO   | METRY DATA (TABLE 2)      | ZAAPO          |
| CONNENT - CHECKS FOR BAD | DATA: COMPUTES JOIN    | T COORDINATESPECHO PRINT  | IS 24APO       |
| CONNENT - DATA AND PRINT | S COMPUTED JOINT COO   | RDINATES                  | 24AP0          |
| DIMENSION J2( 7 )        |                        |                           | 26 JAO         |
| COMMUN /BLUCK1/ XI       | 75). Y( 75).           | OXXI 751. OYYE 751.       | 13FE0          |
| 2 QZ2( 75). SX           | XI 751. SYYL 751.      | SZE( 751+ DXX( 75).       | LIFEO          |
| 3 DYY4 75)+ DZ           | 2( 75). #XX( 75).      | RYYL 751+ RZZ( 751+       | ISFED          |
| 4 ERXX( 75) + ER         | YY( 751+ ER22( 75)     |                           | 13FE0          |
| CONNUN /BLKI/ KEE        | P2, KEEP3, KEEP4, KE   | EPS, REEP4, REEP7,        | 26.JA0         |
| 2 ITYPE+ NCD             | 2. NCD3. NCD4. NC      | D5+ NCD6+ NCD7+           | ZEJAO          |
| 3 TABAN, 1FO             | RHS NHS NJIS NS        | T. NLT. TOL.              | ZEJAD          |
| 4 N. MP1                 | . HP2. ISTT. LT        | T. ITYPEL+IDJ.            | 12450          |
| 5 NLC+ 1P8               | • 1 <b>P</b> 9+ 1P10   |                           | 13460          |
| COMMON /BLK3/ HNJ        | Tomast one tomar one 5 | spence and JT spinil C    | 07FE0          |
|                          | H INDLE Z - FRAM       | E GEUMEINT DATA +7/71     | 28 340         |
| 10 FURNAL (10A+13+32)    |                        | 127<br>76 11 60416 - 18.4 | 20040          |
| 11 FORMAT U 32           | RECENCE WINT 15        | 15 IN FRAME *1134/4       | 26340          |
| 2 304                    | REFERENCE SUINT 13     | -F10-1-4 -5V-             | 26.540         |
|                          | THE TALEDANCE IS       | ·E10+3+/ +3++             | 20240          |
| 4 270 JV                 | 2510-2-88-7161         | *E10*3*//                 | 24 144         |
| 18 COMMAN ( 107.18.5)    |                        |                           | 26 340         |
| 14 COMMAN & 184. 334     | THE TOTAL OF STATIST   | RTR .//.                  | 24.140         |
| 2 108. 19                | N FROM X-OFFSF         | T V-OFFSFT ANT.           | 26,140         |
| 1 15                     | H TO TO TO TO          | TO TO TO ./.              | SOMRO          |
| 4 10K . 5H JOINT         | - 32X+ SHJOINT +/1     |                           | 30HRO          |
| 15 FORMAT 1 ATX. 7151    |                        |                           | 26JAO          |
| 16 FORMAT ( 10X-15)      |                        |                           | 26 JA0         |
| 17 FORMAT LABH           | HOLDING DATA FROM T    | HE PREVIOUS PROBLEM PLUS  | 5+ 26JAO       |
| 2 15H THE                | FOLLOWING + //}        |                           | SPTER          |
| 18 FORMAT ( 35H          | NUMBER OF JOINTS IN    | FRAME = + 15+///)         | 26JA0          |
| 19 FORMAT ( 31/)+10X+    | 26HCOMPUTED JOINT      | COORDINATES. //. 101.     | 30HR0          |
| 2                        | 25HJQINT X             | Y •/}                     | 26JA0          |
| 20 FORMAT E 45H          | JOINT NUMBERS MUST     | BE POSITIVE )             | 76 JAO         |
| 21 FORMAT 1 10X+15+28    | 11.31                  |                           | 26JA0          |
| 22 FORMAT 6 18H          | HINT NUMBERS, 15,1     | TH HOT I OCATED 1         | 10400          |
| 23 FORMAT ( 10H          | NONE 1                 |                           | 26 JAC         |
| 30 FORMAT & 40H          | NO DATA HELD OR REA    | D IN TABLE 2 1            | 26 JAO         |
| 31 FURMAT I SON          | NUMBER OF CARDS IN     | TABLE 2 MAY NOT EQUAL 1   | 1 09MYO        |
| 40 FORMAT I SIH          | TYPE 3 PROBLEM SHOL    | ND HAVE NO CHANGES IN J   | 21MT+26JA0     |
| Z 13H COC                | RUIRATES +/+           |                           | Z6JA0          |
| 3 33H                    | HU CARDS ALLOWED IN    | I TABLE Z ?               | 76 JAO         |
| SU FORMAT E 43H          | JUINT NUMBER ABOVE     | GREATER THAN NUMBER .     | 26 JA0         |
| Z ZOH OF                 | JUINTS IN PRAME !      | CRANE COCATED THEM        | ZGJAD          |
| OU FURMAT E 43H          | NUMBER OF JUINTS IN    | FRAME OREATER INANA       | 28JA0          |
| Z 15H STO                | MANE ALLOWS!           |                           | 26JA0          |

| RN        |                                                         |                                 | 26JA0                                        | 70 FORMAT ( 35H X AND Y OFFSETS FOR JOINT, 17,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26 JA0             |
|-----------|---------------------------------------------------------|---------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
|           |                                                         |                                 | 26JA0                                        | 2 15H ARE BOTH ZERO'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 26JA0              |
|           |                                                         |                                 |                                              | BU FORMAT ( 10H JOINT, 15, 30H HAS NOT PREVIOUSLY BEEN SPEC,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26JA0              |
| *******   | *****************************                           | ***********************         | ********                                     | 2 5HIFIED+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26JA0              |
|           |                                                         |                                 | _                                            | 90 FURMAT ( 32H ERRUR IN LOCATION OF JOINT + 15+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 26JA0              |
| SUBROUTII | NE SUBROUTINE                                           | SUBROUTINE E                    | SUBROUT I NE                                 | 2 40H EXCEEDS THE TOLERANCE SPECIFIED ABOVE +/+4X+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26JA0              |
|           |                                                         |                                 |                                              | 3 30H THE ERROR IN X DIRECTION IS +E10+3+/+4X+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26JA0              |
| *******   | ******************************                          | ***********************         | *********                                    | 4 30H THE ERROR IN Y DIRECTION IS +E10+31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26JA0              |
|           |                                                         |                                 |                                              | 140 FORMAT ( 40H TOLERANCE MUST BE A POSITIVE NUMBER)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 04MY0              |
| OUTINE J  | TCORD                                                   |                                 | Se no se | PRINT 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26JA0              |
| SUBROUT   | NE JTCORD INPUTS JOINT GEOM                             | ETRY DATA (TABLE 2)             | ZAAPO                                        | IF (NCD2 .EO. 1) GO TO 8100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 09MY0              |
| CHECKS F  | OR BAD DATA. COMPUTES JOINT                             | COORDINATESPECHO PRINTS         | 24AP0                                        | IF ( NCD2 .LE. O .AND. KEEP2 .LE. O ) GO TO 8300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 26JA0              |
| DATA AND  | PRINTS COMPUTED JOINT COOR                              | DINATES                         | 24AP0                                        | IF LITYPE .EQ. 3 .AND. NCO2 .NE. 01 GO TO 8400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26JAO              |
| NSION J2  | (7)                                                     |                                 | 26 JAO                                       | IFINCD2 .NE. 0) GO TO 1150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26JA0              |
| UN /BLUC  | K1/ X( 75)+ Y( 75)+                                     | OXXI 751. OYYE 751.             | 13FE0                                        | COMMENT - NO NEW DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 29AP0              |
| 022( 75)  | • SXXI 751. SYYL 751.                                   | SZZ( 75)+ DXX( 75)+             | LIFEO                                        | PRINT 1T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0              |
| DYY4 75)  | . DZ2( 75). RXX( 75).                                   | RYYI 751. RZZE 751.             | IBFEO                                        | PRINT 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0              |
| ERXXE 75  | ). ERYY( 751. ERZZ( 75)                                 |                                 | 13FE0                                        | GG TO 9800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 13FE0              |
| IN /BLKI  | / KEEP2, KEEP3, KEEP4, KEE                              | PS, REEP4, REEP7,               | ZEJAO                                        | 1150 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26JA0              |
| E TYP     | E+ HCD2+ HCD3+ HCD4+ HCD                                | 5+ MCD6+ MCD7+                  | ZEJAD                                        | JATL = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0              |
| 1484      | N <b>, IFORM, NH, NJI, NST</b>                          | NLT. TOL.                       | ZEJAD                                        | IF (KEEP2 .EO. 1) GO TO 1230                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26JA0              |
| и.        | MP1+ MP2+ ISTT+ LTT                                     | <ul> <li>ITYPEL+IDJ+</li> </ul> | 1566                                         | COMMENT - ALL NEW DATA ~ SET COORDINATES EQUAL TO 1+01E50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 29AP0              |
| NLC.      | 1 <b>P8</b> . 1 <b>P</b> 9. [P10                        |                                 | 13FE0                                        | DO 120-1 - 1-MAJT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 26JA0              |
| WH /BLK3  | / NNJT+MNST+MNLT+MNH+MNC5+                              | HNC4+HDJT+HNLC                  | OTFEO                                        | 1200 X(1) + Y(1) + 1.01E50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26JA0              |
| AT C      | 35H TABLE 2 - FRAME                                     | GEOMETRY DATA +///              | 26 JAD                                       | COMMENT - READ FIRST CARD OF TABLE 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 29AP0              |
| AT ELOX.  | 15.5x.15.5x.2E10.3.10×.E10.                             | 31                              | OAL 65                                       | READ 10+NJT+J1+DX+DY+TOL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0              |
| AT (      | 32H NUMBER OF JOINT                                     | S IN FRAME =+15+/+              | 26JA0                                        | PRINT 11+NJT+J1+QX+DY+TOL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26JA0              |
| 3         | OH REFERENCE JOINT IS J                                 | 01NT +15+ 5H AT +               | 26 JAO                                       | IF ( TOL +LE, 0+0) GO TO 9000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 04MYO              |
|           | SH K -+E12+3+10H AND Y -                                | •E10+3+/ +3X+                   | 26JA0                                        | IF IJI .LE. DI 60 TO 8260                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26 JA0             |
| 2         | SH JOINT TOLERANCE IS                                   | +E10+3+//)                      | ZEJAO                                        | IF [J] .GT. NJTI GO TO 8500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 26JA0              |
| AT LION.  | 15+5X+2E10+3+5X+7151                                    |                                 | ZEJAO                                        | COMMENT - CUMPUTE COORDINATES OF REFERENCE JDINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 29AP0              |
| IAT E 10X | +15,5X+2E11+3+5X+7151                                   |                                 | 26JA0                                        | X(J1) = DX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26JA0              |
| WLL I 52  | . 23H INPUT OF JOINT OFFSE                              | 15 +//+                         | 26JA0                                        | ACTE B DA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26JA0              |
| TOX       | . 35H FROM X-OFFSET                                     | Y-OFFSET +3X+                   | 26JAO                                        | GO TO 1240                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26JA0              |
|           | 35H TO TO TO TO                                         | TO TO TO +/+                    | SOMRO                                        | COMMENT - HOLDING DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 29AP0              |
| 108. 5    | HJOINT - 32X - SHJOINT -/)                              |                                 | 30MRQ                                        | COMMENT - READ FIRST CARD OF TABLE 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ZYAPO              |
| AT I ATX  | +715)                                                   |                                 | ZEJAO                                        | 1230 READ 16-NJT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 26JAU              |
| NA 4 TOX  | (1))                                                    |                                 | Zejao                                        | PRINT 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0              |
| MT 14     | AM HOLDING DATA FROM TH                                 | E PREATON? PROBLEM PLUST        | 26.340                                       | PKINI ISANI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 26,340             |
|           | SH THE FOLLOWING + 7/1                                  |                                 | ZAJAQ                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26JAU              |
| AT IJ     | THE MUNEER OF JOINTS IN                                 | FRAME # + 13+///1               | 26JAU                                        | TF INJT .G1. MUT) G0 TO 8600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26JAU              |
| WT 1 317  | SATORA SPACOMPUTED JOINT                                | COORDINATES 77. 101.            | 30000                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26 340             |
|           | ZSHJUINT X                                              | T 9/1                           | 26JAU                                        | $n_{2}n_{1} + n_{1}O_{2} + 1$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26 3 40            |
| LAT E A   | SH JOINT NUMBERS MUST B                                 | E POSITIVE I                    | 76 JAU                                       | COMMENT " DO FOR SECUND AND SUCCEEDING CARES OF TABLE 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ZYAPU              |
| WAL I TOX | +13+2E11+3'                                             |                                 | 76JA0                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26,340             |
|           | HIN HING A HING AND | W 401 10CA190 1                 | 10500                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 28 780             |
| MII 1     |                                                         |                                 | 76JAC                                        | ir iji 401. Njij jnil " I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20 JAU             |
|           |                                                         | ARES MAY NOT SOULS              | 20JAU<br>Admya                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20.041             |
| VAT 1 2   | THE THE SECONDER OF CARDS IN I                          | ABLE & PAT MUL EQUAL I          |                                              | 100 ACTU A1 8 ATT MITE MITE - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7 4 QUAU<br>34 140 |
| wr 1 2    | THE TIPE PRODUCT SHORE                                  | U MAVE NU CHANGES IN JOIN       | 140JAU                                       | if iddition of a material and the second sec | ZBJAU<br>14 IAO    |
| 1         |                                                         | TABLE 3 1                       | 20JAU                                        | 2014 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 70JAU<br>34 148    |
| 3         |                                                         | TABLE 2 -                       | 26 JAU                                       | THE ADDRESS OF THE ADDRESS ADDR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 34.140             |
| אונ א     | AN AN MUNICIPAL ADDRESS ADDRESS                         | NEATER IMAR RUNDER :            | 20JA0                                        | TE LUI LEL U JUNA JELL VI GUI U BZUU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 39400              |
|           | UN UP JUINIS IN PRAME F                                 | ERANE OFCATED THAN.             | 20JAU                                        | CONTRACT - CHECK IF FROM JUINT HAD DEEN LUCKIED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                  |
| -         | THE NUMBER OF JUINTS IN                                 | FRAME UNLAILS INANI             | 25 JAU                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 70-AU              |
| 1         | SH STURAGE ALLOWS!                                      |                                 | 76JAU                                        | IT I DX .EV. U.U. AND. DT .EV. U.U. F GU TO 8700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 20 JAU             |

,

|          | IF (JNTL .EQ. 1) 60 TO 8500                                            | ZGJAO  |
|----------|------------------------------------------------------------------------|--------|
| CONTRACT | T - OU FOR ALL JOINTS SPECIFIED ON THIS CARD                           | ZYAPO  |
|          | DO 4600 11- 1.4UN2                                                     | 26 JA0 |
| CONTRACT | AT - COMUTE TENPORARY VALUES OF COORDINATES                            | ZYAPO  |
| 3250     | XI = X(JI) + DX                                                        | 26 JAU |
|          | $\mathbf{T} = \mathbf{Y}(\mathbf{J}\mathbf{I}) + \mathbf{D}\mathbf{Y}$ | 26JA0  |
|          |                                                                        | 26JA0  |
|          | IF IJZII .LE. OI GO TO 8200                                            | 26JA0  |
|          | IF (X(J211) .6T, 1.00E50) GO TO 4000                                   | 26JA0  |
| COMMEN   | AT - JOINT PREVIOUSLY LOCATED COMPUTE DIFFERENCE BETWEEN OLD           | 29AP0  |
| COMMEN   | NT - LOCATION AND NEW LOCATION ERX AND ERY                             | 29APO  |
|          | ERX = ABS(X(J211) - XT)                                                | 26JA0  |
|          | ERY = ABS(Y(J211) - YT)                                                | 26JA0  |
|          | IF ( ERX .GT, TOL .OR, ERY .GT. TOL) GO TO 8900                        | 26JA0  |
| COMMEN   | NT - AVERAGE OLD AND NEW COORDINATES                                   | Z9APO  |
|          | $x(J2II) = 0.5^{\circ}(x(J2II) + xT)$                                  | ZGJAO  |
|          | Y(J2II) = 0.5 + (Y(J2II) + YI)                                         | 26JA0  |
|          | 60 TO 4500                                                             | 26JA0  |
| COMMEN   | NT - JOINT NOT PREVIOUSLY LOCATED                                      | 29AP0  |
| 4000     | TX = (115L1X                                                           | 26JA0  |
|          | TY = (115L)Y                                                           | 26JA0  |
| 4500     | CONTINUE                                                               | 26 JAO |
|          | 115L = 11                                                              | 26 JAO |
| 4600     | CONTINUE                                                               | 26JA0  |
| 4900     | CONTINUE                                                               | 26JA0  |
|          | 60 TO 9808                                                             | Z6JA0  |
| 8100     | PRINT 51                                                               | 99470  |
|          | 60 TO 9700                                                             | 9440   |
| 8200     | PRINT 20                                                               | 26JA0  |
|          | 60 TO 9700                                                             | 26.JA0 |
| 8 300    | PRINT 30                                                               | 26JA0  |
| ••       | 60 TG 9T00                                                             | 26 JAO |
| 8400     | PRINT 40                                                               | 26 JA0 |
|          | 60 TO 9TO0                                                             | ZGJAO  |
| 8500     | PRINT 50                                                               | ZGJAO  |
| ••••     | 60 TO 9TO0                                                             | 26 JA0 |
| 84.00    | PRINT AO                                                               | 26 JA0 |
|          | 50 TO 9TOP                                                             | 26.JA0 |
| 8700     | PRINT TO. JI                                                           | 26 JA0 |
|          | 60 10 9700                                                             | 26.JA0 |
| 6808     | PRINT BO.JA                                                            | 26 JA0 |
|          | 60 T0 9700                                                             | 26 JA0 |
| 8900     | PRINT 90. J211 ERX ERY                                                 | 26.JA0 |
| •••••    | 60 10 9700                                                             | 4840   |
| 0000     | PRINT 100                                                              | ANYO   |
| 0700     |                                                                        | 26.140 |
|          | G 10 9900                                                              | 26.JA0 |
|          | CONTINUE                                                               | 26.140 |
|          | PRINT 19                                                               | 76.140 |
| COMMEN   | T - PRINT JOINT COORDINATES AND CHECK FOR JOINT NOT SPECIFIED          | 29400  |
|          | NO 986 1 e 1.MJT                                                       | 26.140 |
|          | IF (X(1) .6T. 1.0F50 .0R. Y(1) .6T. 1.0F50) 60 TO MAD                  | 26.140 |
|          | POINT 21.1.111.111                                                     | 26.140 |
| 7030     | 60 TO 9849                                                             | 26.140 |
|          | 001NT 22.1                                                             | 26.140 |
| 70-0     | TABAN - 1                                                              | 74 140 |
|          | erment = 1                                                             | 20040  |

| 7845       | CONTINUE          |               |                                       |                        |                | 26JA0      |
|------------|-------------------|---------------|---------------------------------------|------------------------|----------------|------------|
| 9850       | CONTINUE          |               |                                       |                        |                | ZGJAO      |
| 9900       | CONTINUE          |               |                                       |                        |                | ZGJAO      |
|            | RETURN            |               |                                       |                        |                | ZGJAO      |
|            | ND                |               |                                       |                        |                | 26JA0      |
| c          |                   |               |                                       |                        |                |            |
| c          | *********         | **********    | **********                            | ***********            | ***********    | *********  |
| ç          |                   |               |                                       |                        |                |            |
| C          | SUBROUTINE        | SL            | BROUTINE                              | SUBROUT                | I NE           | SUBROUTENE |
| C          |                   |               |                                       |                        |                |            |
| C          | *********         |               | **********                            |                        | ***********    | *********  |
| C          |                   |               |                                       |                        |                |            |
|            | USHOUTINE MEM     |               |                                       |                        |                | ZEJAO      |
| COMPENSION | - SUBROUTINE      | HERLOC IN     | PUTS LOCATIO                          | N OF STIFFNES          | S AND LOAD     | ZAAPQ      |
| COMMENT    | - TYPES IN FI     | RAME ITABLE   | 3) CHECKS FO                          | R BAD DATA+CO          | MPUTES MEMBER  | ZAAPO      |
| COMMENT    | - NUMBERSILE      | NGTHS OFFSET  | S AND DIRECT                          | ON COSINES             | CHO PRENTS DA  | TAZAAPO    |
| COMMENT    | - AND PRINTS      | COMPUTED HE   | MBER NUMBERS                          | LENGTHS AND            | DFFSETS        | ZAAPO      |
| C          | IMENSION J21      | 10 1          |                                       |                        |                | 26 JA0     |
|            | ONNON /BLOCK1     | / X( 75).     | Y( 751.                               | QXX( 75).              | QYY1 751.      | 13FE0      |
| 2          | WZZ( 751,         | SRX( 75).     | SYY1 751.                             | 5221 751+              | DXX1 751.      | 13FE0      |
| 3          | DYY( 75).         | DZZ( 75).     | RXX( 75).                             | RYY1 75).              | RZZ( 75).      | 13FE0      |
| •          | ERXX( 751.        | ERTY1 7514    | ERZZ( 75)                             |                        |                | 13FE0      |
| , c        | OPPIUN /BLOCK2    | / DXS( 30).   | DY\$( 50).                            | ZLS1 501.              | DC151 501.     | ZGJAO      |
| 2          | DC251 501+        | PRF1 501,     | PRAE( 50).                            | NCD51 501+             | TAXOPSI 501    | ZEJAO      |
| 3          | 10POP( 50)        | . [PINL( 50]  | . IPINR( 50)                          | NC511 501+             | SHC1 50+131    | ZOMYO      |
| C          | ONNER /BLOCKS/    | / DXL( 30).   | DYL( \$0).                            | ZLL( 50),              | DC1L( 50)+     | 26JA0      |
| 2          | DC2L( 50).        | UQX( 50).     | UQY( 50),                             | NCDL1 501.             | 1AXOPL( 50).   | 26JA0      |
|            | NC611 501         |               | _                                     |                        |                | 26 JAO     |
| c          | (OMPILIE /BLOCK4/ | / JT1(150).   | JT2(150).                             | 151(150)+              | LT(150).       | 26JA0      |
| 2          | FOMM(150+6)       | •             |                                       |                        |                | 26 JAO     |
| c          | OMPKIN /BLK1/     | KEEP2. KEEP   | 3. KEEP4. KEI                         | E <b>PS. KEEP6.</b> KI | EEP7.          | 26JA0      |
| 2          | 1TYPE+            | NCD2+ NCD3    | <ul> <li>NCD4</li> <li>NCI</li> </ul> | 5. NCD6. N             | CD7.           | 26 JA0     |
| 3          | [ABAN.            | LFORM. NH.    | NJT MS1                               | to NLTo T(             | ж.             | 26 JAO     |
| •          | H.                | MP1, MP2,     | ISTT. LT                              | I I TYPEL.II           | DJ.            | 12FEO      |
| 5          | MLC.              | 3P8+ 1P9+     | IP10                                  |                        |                | 13FE0      |
| c          | OMMUN /BLK3/      | HILJT.HHIST.H | MLT.MMM.MNC5                          | MINC6 MDJT MINI        | .C             | 07FE0      |
| 6 F        | ORMAT (5X) 3      | (15+1%)+ 2%;  | 2151                                  |                        |                | 3 CMRO     |
| 7 F        | ORMAT (5X) 31     | (15+1×1+ 2×+  | 215. 3E11.3                           | )                      |                | 30HRO      |
| 8 F        | ORMAT 1 ///.      | 10X. 40H C    | OMPUTED HEHBI                         | R NUMBERS.LEI          | IGTHS, AND OFF | , SOMRO    |
| 2          | 4HSET5.//.46H     | MEMBER        | FROM TD                               | STIFF LOAD             | LENGTH .       | 30HR0      |
| 3          | 25H               | x-OFFSET      | Y-OFFSET                              | •/•                    |                | 30HR0      |
| 4          | 35M               | HUMB J        | OINT JOINT                            | TYPE TYPE, //          | 13             | 30MR0      |
| 9 F        | ORMAT & AOH       | TABLE 3       | - HEHBER LOO                          | ATEON DATA             | .///١          | ZGJAO      |
| 10 F       | ORMAT (10%-15)    | •3X • [5]     |                                       |                        |                | 26JA0      |
| 11 F       | ORMAT I AOH       | NUMBER        | OF MEMBER STI                         | FFNESS TYPES           | **15*/*        | 26 JAO     |
| 1          | 40H               | NUMBER        | OF MEMBER LOA                         | D TYPES .              | .(5.///)       | 26JA0      |
| 12 F       | UNMAT ( SX.15)    | 3X+215+5X+1   | 0151                                  |                        |                | 26JA0      |
| 13 F       | ORMAT ( SX.15     | 5X+215+5X+1   | 0151                                  |                        |                | 26JAO      |
| 14 F       | URMAT (25%.       | Z6H INPUT     | OF MEMBER LOC                         | ATIONS #//#            |                | ZGJAO      |
| 2          | 50H               | FROM          | STIFF LOAD                            | ) TO                   | TO TO TO       | +26 JA0    |
| 3          | 30H               | 10 70         | TO TO TO                              | TO . /.                |                | ZGJAO      |
|            | 35H               | JOINT         | TYPE TYPE                             | JOINT ./               | 1)             | JOHRO      |
| 17 F       | ORMAT (48H        | HOLDING       | DATA FROM TH                          | E PREVIOUS PI          | OBLEM PLUS.    | 26 JA0     |
| 2          | 15H               | THE FOLLOW    | NG . //)                              |                        |                | 26 JA0     |
| 18 F       | ORMAT 1//.47H     | COMPUTE       | D HEMBER NUM                          | ERS MAY NOT            | GREE WITH -    | 01MYO      |
| 2          | 20M               | LAST PROBLE   | M *** 1                               |                        |                | 01440      |
| •          |                   |               | -                                     |                        |                |            |

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19 FURNAT 1//.50H +++ CONPUTED HEMBER NUMBERS AGREE WITH LAST PROBL. DIMYO 10HEN .... 01MYO 2 20 FORMAT L JOINT NUMBERS MUST RE POSITIVE 45H 26 JA0 23 FURMAT ( 10H NONE 1 26 JA0 25 FURMAT L MEMBER WITH STIFFNESS TYPE +15. 9H AND LOAD. 26 JA0 32H 5H TYPE+15+/+32H WAS SPECIFIED AS GOING FROM, 26 JA0 7H JOINT .15. 9H TO JOINT.15./.17H PROGRAM DOFS. 26 JA0 36H NOT ALLOW THIS URDER TO BE REVERSED! 26 JA0 27 FORMAT L 51H TYPE 3 PROBLEM DOES NOT ALLOW ANY CHANGE IN ST.26JAO 31HIFFNESS TYPES FROM LAST PROBLEM./. 26 JA0 384 LAST PROBLEM DID NOT SPECIFY TYPE, 15. 26.340 20H STIFF BETWEEN JOINT, 15.10H AND JOINT, 15 ) 26 JA0 30 FORMAT E 40H NO GATA HELD OR READ IN TABLE 3 26JA0 31 FORMAT ( NUMBER OF CAROS IN TABLE 3 MAY NOT EQUAL 1 50H 09MY0 1 50 FORMAT I JOINT NUMBER ABOVE GREATER THAN NUMBER. 26 JA0 4 3H 20H OF JOINTS IN FRAME 1 26 JAO 61 FORMAT NUMBER OF STIFFNESS TYPES GREATER THAN STORAGE . 26 JAD 51H 26 JA0 TH ALLOWSI 2 62 FORMAT I NUMBER OF LOAD TYPES GREATER THAN STORAGE. 46H 26 JA0 TH ALLOWS! 26 JAO 71 FORMAT ( STIFFNESS AND LOAD TYPES MUST BE POSITIVE. 76JAP -26JA0 2 8 HUMBERST 72 FORMAT ( STIFFNESS OR LOAD TYPE ABOVE GREATER THAN TOTAL .26 JAD 51H SON NUMBER OF STIFFNESS OR LOAD TYPES SPECIFIED ABOVE 1 26JAD YOU CANNOT HOLD UP THE LOAD WITHOUT SOME STIFF . 26 JAG 73 FORMAT ( 518 SONNESS - IF STIFF TYPE = 0 - LOAD TYPE MUST = 0 1 26 JAO 2 74 FORMAT L SH. 741 26 JA0 #1 FORMAT E 50H ERROR IN OFFSETS FOR MEMBER OF STIFFNESS TYPE. 26JAD THE X AND Y OFFSETS FOR THE HEMBER BETWEEN. 15./.47H 26 JA0 2 TH JOINTS, 15. SH AND :15./. 26 JA0 DO NOT AGREE WITH PREVIOUSLY DEFINED OFFSETS. 49H 26 JA0 46H FOR A MEMBER OF THIS TYPE, WITHIN THE ALLOWED . /. 26 JAO ERROR OF TWO TIMES THE JOINT LOCATION TOLERANC. 26 JAO 51H 1HE) 26 JA0 ERROR IN OFFSETS FOR HEMBER OF LOAD TYPE. 92 FORMAT 1 45H 26 JAO THE X AND Y OFFSETS FOR THE HEMBER BETWEEN. 26 JA0 15./.474 7H JOINTS+15+ 5H AND +15+/+ 26JA0 DO NOT AGREE WITH PREVIOUSLY DEFINED OFFSETS. ..... 26.JA0 AGH FOR A MEMBER OF THIS TYPE, WITHIN THE ALLOWED. / . 26 JAO 51H ERROR OF TWO TIMES THE JOINT LOCATION TOLERANC . 26 JAO 26JA0 11461 COMMENT - PRINT TABLE HEADING 01MVO PRINT 9 26 JA1 IF INCDS .EQ. 11 GO TO \$100 09MYO IF INCOS .LE. O .AND. KEEPS .LE. O 1 GO TO 8300 26.JA0 TTO . 2.0\*TO. "E JAO CONNENT - SET OFFSETS FOR STIFF TYPES OTHYD DO 1100 1 - 1. MMST 03AP0 DX\$(1) = DY\$(1) = 1.01850 03420 1100 CONNENT - SET OFFSETS FOR LOAD TYPES O1MYO 03AP0 DO 1110 1 = 1, MNLT DEL(1) - DVL(1) = 1.01650 03AP0 1110 1F (KEEP3 .NE. 1) GO TO 1150 25 APO PRINT 17 26 JA0 1150 CONTINUE 26 JA0 CONNENT - NH IS NUMBER OF HEMBERS ACCUMULATED AND MUST NOT CHANGE 01MYD

| COMMENT - FROM PREVIOUS PROBLEM FOR OFFSPRING PROBLEMS      | 01MV    |
|-------------------------------------------------------------|---------|
| IF (KEEP3 .EQ. 1 .OR. 174PE .EQ. 3) GO TO 1160              | 25AP    |
| NM = 0                                                      | 25AP    |
| 1160 CONTINUE                                               | 25AP    |
| 1F INCOL .NE. 01 60 TO 1180                                 | 03AP    |
| DDINT 33                                                    | 74.14   |
|                                                             | 340     |
|                                                             | 2414    |
|                                                             | 2638    |
| 1250 CONTINUE                                               | 26JA    |
| COMMENT - READ FIRST CARD IN TABLE 3                        | 0144    |
| READ_10+NST+NLT                                             | 26.JA   |
| PRINT 11, MST.NLT                                           | 26JA    |
| IF (NST "GT" MNST) GD TO 8610                               | 26JA    |
| IF (NLT .GT. MNLT) GO TO 8620                               | 26JA    |
| PRINT 14                                                    | 26JA    |
| N3M1 = NCD3 - 1                                             | 26JA    |
| DO 5960 JJ = 1-N3M1                                         | 26 JA   |
| COMMENT - HEAD SHO AND SUCCEEDING CARDS IN TARLE 1          | 0184    |
| PEAR 15 ALLETT IT. 17111311 IL 100                          | 74 14   |
|                                                             | 20.04   |
| ir iji auto njit jnit + i                                   | 2004    |
| NJN2 = 0                                                    | 2634    |
| 00 1270 11 + 1.10                                           | 26JA    |
| 1F (J2(11) +GT, NJT) JNTL = 1                               | 26JA    |
| 3F (J2(11) .NE. 01 NJNZ = NJNZ + 1                          | 30AP    |
| 1270 CUNTINUE                                               | 30AP    |
| COMMENT - PRINT 2ND AND SUGCEEDING CARDS IN TABLE 3         | 0144    |
| PRINT IBAJIAISTTALTTA (JZ11I)AII — IANJNZ }                 | Z6JA    |
| 1F (J1 →LE= Q) GO TO 8200                                   | 30AP    |
| 1F (JMTL .EQ. 1) GO TO 8500                                 | 26.JA   |
| IF LISTT .LT. 0 .OR. LTT .LT. 01 GO TO 8710                 | 26JA    |
| IF LISTT .GT. NST .OR. LTT .GT. NLT) GO TO 8720             | 26JA    |
| IF LISTT .EQ. D .AND. LTT .NE. 0) GO TO 8730                | 26JA    |
| COMMENT - DO FOR MUMAER OF MEMBERS SPECIFIED ON ONE CARD    | 01 MY   |
| 00 6500 11 a 1 a NJM7                                       | 26.18   |
|                                                             | 26.14   |
|                                                             | 30AP    |
| IE THEFT WELL AND TYPE ME. 11 CO TO AA75                    | 25 AP   |
| T THEFT AND A THEFT THE STAR STAR THE THE                   | 75.4D   |
| RTL - RT<br>Comment - RD Each Member                        | 0184    |
|                                                             | 24.14   |
|                                                             |         |
| IF CJI .EG. JIJIKF .AND. JZII .EG. JIZKF F GO TO 44         | 10 2634 |
| IF (JI .Ed. JTZ(KI .AND. JZIT .Ed. JTIK) / GO TO 62         | 70 26JA |
| 4400 CONTINUE                                               | 20JA    |
| GO TO 4425                                                  | 26JA    |
| COMMENT - ULD MEMBER (PREVIOUSLY GIVEN STIFF AND LOAD TYPE) | 01MY    |
| COMMENT - CAN NOT CHANGE STIFF TYPE FOR OFFSPRING PROBLEM   | CIMY    |
| 4410 IF (ITYPE .EQ. 3 .AND. IST(K) .NE. 15TT) GO TO 8270    | 26.JA   |
| ISTIKI = ISTT                                               | , 26 JA |
| LTCKI = LTT                                                 | 26JA    |
| GU TO 4450                                                  | 76JA    |
| CONMENT - NEW MEMBER INCREASE NA                            | OIMY    |
| 6425 MPI + MPI + 1                                          | 26JA    |
| JT1 (NM) = J1                                               | 76.JA   |
| JT2 (NM) + J211                                             | 76.14   |
| 15T(NM) + 15TT                                              | 74.14   |
| LT(AM) = LTT                                                | 26.14   |

|           | IF (ITYPE .NE. 31 60 TO 4450                                   | 25AP0  |           |
|-----------|----------------------------------------------------------------|--------|-----------|
| COMMENT   | AN CAN NOT CHANGE FOR AN OFFSPRING PROBLEM                     | OIMIO  |           |
|           | IF THAT .NE. MALI GO TO 8270                                   | ZSAPO  | C04       |
| 4430      | CONTINUE                                                       | 26JA0  | CO        |
|           | 1124 - 10                                                      | ZGJAD  |           |
| 4500      |                                                                | ZOJA   |           |
| 4700      |                                                                | 26JA0  |           |
|           | IF (KEEPS - E0. 1 - UK. 1177E - E0. 37 40 TO 6000              | 01410  |           |
|           |                                                                | 26 JAU |           |
|           |                                                                | 26 JA0 |           |
| 3100      |                                                                | 26 JAU |           |
| COMPENT - | SOUT HENDERS BY STIFF TYPE IN ASCENDING ONDER                  | 01810  |           |
|           |                                                                | 26 JAU |           |
| COMENT -  | SOUL THROUGHT THE REST OF THE REMOCH LIST                      | OINTO  |           |
|           |                                                                | 26 JAU | 64        |
|           | IF (IST(JJ) .ME. KK) 40 TO \$200                               | 26 JAU |           |
|           | IF 133 -E04 [31: 00 10 \$110                                   | 26340  | CU        |
|           |                                                                | 26 JAU |           |
|           |                                                                | 26,740 | •         |
|           |                                                                | 20340  |           |
|           |                                                                | 24 140 | 6.00      |
|           |                                                                | 20340  |           |
|           |                                                                | 26380  |           |
|           |                                                                | 20040  |           |
|           |                                                                | 26380  | 12        |
|           |                                                                | 34 140 |           |
|           |                                                                | 20040  | <b>CO</b> |
|           |                                                                | 20.340 |           |
|           |                                                                | 20340  |           |
| 7110      |                                                                | 24.140 |           |
| 72.00     |                                                                | 20340  |           |
|           |                                                                | 20340  |           |
| 4 000     | IT THE PLES RETT BUT TO FILE                                   | 2450   |           |
|           |                                                                | 03490  |           |
|           |                                                                | 03450  |           |
|           |                                                                | 03480  |           |
|           |                                                                | 03490  |           |
|           |                                                                | 03490  |           |
|           |                                                                | 05440  |           |
| CONSCIL   |                                                                | 01420  |           |
|           | VA = AIJ(I) = AIJ(I)                                           | 03490  |           |
|           | 16 (1517 -FO. 0) 60 TO A100                                    | 03420  | -         |
|           | IF (DES(1STT) (614 140FS0) 60 TO 6050                          | 03420  |           |
| COMMENT - | - CHECK FOR THE MEMBERS WITH SAME STIFFHESS TYPE BUT DIFFERENT | OTHYO  |           |
|           | - (WIFNTATIONS                                                 | 01490  | 84        |
|           | FRE - ARSIDES(1STT) - DE 1                                     | 26 JAD |           |
|           | FRY - ABSIDYSIISTI - DY 1                                      | 26.140 | 8/        |
|           | AF (FAX AFTA TTOL ORA FRY AGTA TTOL) 60 TO 4910                | 76 JA0 |           |
|           | DESILATI = 0-SP(DES(ISTI) + DE)                                | 26.340 |           |
|           | DYS(ISTT) = 0.5*(DYS(ISTT) + DY)                               | 26JAO  | -         |
|           | 60 10 6100                                                     | 3APO   |           |
| 4050      | CONTINUE                                                       | 034P0  | •         |
|           | DXS(ISTT) . DX                                                 | 26.JA0 | . 1       |
|           | OYS(ISTT) . DY                                                 | 76JAO  | •         |
| 4100      | CONTINUE                                                       | 03APO  |           |
| 41-4      | A date & a sea of                                              |        | -         |

| 20       | IF ( LTT .EO, 0) GO TO 6300                                        | 03AF  |
|----------|--------------------------------------------------------------------|-------|
| 0        | IF (DXL(LTT) .GT. 1.08501 GO TO 6200                               | 03AF  |
| 20       | COMMENT - CHECK FOR TWO MEMBERS WITH SAME LOAD TYPE BUT DIFFERENT  | 0144  |
| 0        | COMMENT - URIENTATIONS                                             | 01HV  |
| 10       | ERK + ABSIDXL(LTT) - DX)                                           | 26 JA |
| NT.      | ERY + ABS(DYL(LTT) - DY)                                           | 26 JA |
| 10       | IF (ERR .GT, TTOL .OR. ERY .GT. TTOL) GO TO 8920                   | 26JA  |
| 0        | DAL[LTT] = 0.5 + (DLL(LTT) + UL)                                   | 26J/  |
| 10       |                                                                    | 2671  |
| 10       | GO 10 6300                                                         | JAP   |
|          |                                                                    | 345   |
|          |                                                                    | 20.0  |
|          |                                                                    | 2034  |
|          |                                                                    | 0345  |
|          |                                                                    | USAP  |
|          | 00 (00) I = [103]                                                  |       |
|          | CUMPENT - CUMPUTE LENGTHS AND DIRECTION COSTNES FOR STIFFNESS THES | 34.14 |
|          |                                                                    | 20.54 |
|          |                                                                    | 0340  |
|          |                                                                    | 0348  |
|          | COMMENT - COMPUTE LENGTHS AND DIRECTION COSTNES FOR LOAD TYPES     | 0187  |
| 6        |                                                                    | 26.18 |
| 10<br>10 |                                                                    | 26.14 |
|          |                                                                    | 0348  |
| 0        |                                                                    | 24.14 |
|          |                                                                    | 26.14 |
| 6        | COMPENT - COMPUTE HALE BAND WIDTH OF FRAME                         | 0111  |
|          | D(1,7)D(1,2,1)                                                     | OJAP  |
| 0        | 10,17 + 1485 (1111) - (1111)                                       | 29 JA |
| 10       | 17 (104T (6T, 104) 104 - 104T                                      | 26.34 |
| 0        | 7790 CONTAINS                                                      | 0 JAP |
| 0        | 1F (10J .GT. MDJT) GO TO 8740                                      | 26 JA |
| ю        | 60 TO \$800                                                        | 26.JA |
| NÖ .     | SIUG PRINT 31                                                      | 9144  |
| 10       | 60 TO 9700                                                         | 9947  |
| io i     | \$260 PRINT 20                                                     | 26JA  |
| 0        | GU TO 9700                                                         | AL 65 |
| 10       | #250 PRINT 25, 15TT+J211+J1                                        | 26JA  |
| 10       | GO TO 9700                                                         | 26.JA |
| 10       | #270 PRINT 27.15TT.J1.J211                                         | 26JA  |
| 10       | 4300 PRINT 30                                                      | 26JA  |
| 0        | GO TO 9700                                                         | 26JA  |
| 20       | asuo print so                                                      | 26.JA |
| 0        | GO TO \$700                                                        | 26JA  |
| n .      | B610 PRINT 61                                                      | 26 JA |
| ie.      | GO TO 9700                                                         | 26JA  |
| 0        | a620 PRINT 62                                                      | 26JA  |
| 0        | GO TO 9700                                                         | 26JA  |
| 0        | STID PRINT TI                                                      | 26 JA |
| 0        | GO TO 9700                                                         | Z6JA  |
| 0        | 8720 PRINT 72                                                      | 26JA  |
| -0       | GO TO 9700                                                         | 26JA  |
| 10       | 8730 PRIMT 73                                                      | Z6JA  |
| 10       | GO TO 9700                                                         | 26JA  |
| ×0       | 8740 PRINT 74                                                      | 26JA  |
|          |                                                                    |       |

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|                                                                                                                                                             | 60 TO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| C<br>C<br>C<br>COMMENT<br>COMMENT<br>COMMENT<br>2<br>3<br>4                                                                                                 | SUBROUTINE<br>- SUBROUTINE<br>- SUBROU<br>KESTRA<br>COMMUN /BL<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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  | 26 JAO<br>26 |
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KEEP6, KEEI<br>- KEEP6, KEEI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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SXXI 751<br>51. SXXI 751<br>51. CZ21 75<br>751. ERYY1 75<br>K1/ KEEP2. K1<br>YPE. NCD2. NO<br>RAM. IFORM. 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    13 FEO           124 T51,         13 FEO           127 T51,         13 FEO           137 EO         13 FEO           13 FEO         13 FEO           13 FEO         13 FEO           14 FEO         14 FEO           15 FEO         15 FEO           14 FEO         14 FEO           15 FEO         15 FEO           14 FEO         14 FEO           15 FEO         14 FEO           14 FEO         14 FEO           15 FEO         14 FEO           14 FEO         14 FEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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DATA.ACCUM<br>ITS DATA AND PRIN<br>Y1 751.<br>N SYVI 751.<br>N RXXI 751.<br>N RXXI 751.<br>EP3. REEP4. KEEP<br>C3. NCD4. NCD<br>4. NJT. NST.<br>2. LETT. 17.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SUBROUTING<br>AND RESTRAIN<br>LATES JOINT LUC<br>TS ACCUMULATEL<br>QXXI 751, DI<br>SZZI 751, DI<br>RVY( 751, R<br>9, KEEP6, KEEI<br>, NCD6, NCD<br>, NLT, TQL<br>, TVDE, DD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>T - SUBROUTINE<br>T - SUBROUT<br>T - (TABLE<br>T - HESTRA<br>COMMUN /BL<br>UZ2( T<br>DYYL T<br>ERXXX<br>COMMUN /BL<br>IT<br>IA<br>No.<br>No.<br>No.<br>No.<br>No.<br>No.<br>No.<br>No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TINE<br>JHTDAT<br>TINE JHTDAT II<br>A1.0HECKS FOI<br>INTS.ECHO PRI<br>OCK1/ X1 751.<br>51. SXX1 751<br>51. SXX1 751<br>53. DZ21 751<br>751. EXY1 75<br>K1/ KEEP2. KI<br>YPE. NCD2. NC<br>BAN, IFORM. NO<br>MP1. HI<br>C 40. C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SUBROUTINE<br>MPUTS JOINT LOAD:<br>R BAD DATA.ACCUMM<br>ITS DATA AND PRIM<br>Y(75).<br>N SYYI 75).<br>N RXX 75).<br>BL RZ2(75).<br>EEP3. KEEP4. KEEF<br>CD3. NCD4. NCD3<br>4. NJT. NST.<br>2. ISTT. LTT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SUBROUTINE<br>AND RESTRAIN<br>LATES JOINT LO<br>ITS ACCMULATEL<br>QXXI 751, OT<br>SZZI 751, DI<br>RYYI 751, R;<br>S. KEEP6, KEEI<br>, NCD6, NCD<br>, NLT, TOLL<br>, ITYPEL, IDJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 26 JAQ<br>26 JAQ<br>27 151, 13FEQ<br>13FEQ<br>26 JAQ<br>26 JAQ<br>26 JAQ<br>26 JAQ<br>26 JAQ<br>26 JAQ<br>27 151, 13FEQ<br>13FEQ<br>26 JAQ<br>26 JAQ<br>27 151, 13FEQ<br>26 JAQ<br>27 151, 13FEQ<br>27 151, 13FEQ<br>26 JAQ<br>27 151, 13FEQ<br>27 151, 15FEQ<br>27 151, 15FEQ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>- SUBROUTINE<br>- TABLE<br>- TABLE<br>- RESTRA<br>- RESTRA<br>- COMMUN /BL<br>- UZI<br>- DYII<br>- DYII<br>- COMMUN /BL<br>- C<br>- C<br>- C<br>- C<br>- C<br>- C<br>- C<br>- C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | TINE<br>JHTDAT<br>TINE JHTDAT IP<br>A1-CHECKS FOO<br>INTS.ECHO PRIP<br>OCKI/ XI 751.<br>51. SXXI 751.<br>51. DZ2I 75.<br>751. ERYY( 75.<br>K1/ KEP2. KI<br>YPE. NCD2. NO<br>BAN. IFORM. NO<br>HP1. NI<br>C. IP8. II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SUBROUTINE<br>RPUTS JOINT LOAD:<br>R BAD DATA.ACCUM<br>ITS DATA AND PRIM<br>Y ( 75).<br>N SYY( 75).<br>N SYY( 75).<br>SI. ERZ2( 75).<br>EP3. KEEP4. KEEP<br>CD3. NCD4. NCD3<br>N. JT. NST.<br>2. ISTT. LTT.<br>P10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SUBROUTING<br>AND RESTRAIN<br>MATES JOINT LUC<br>TS ACCUMULATEL<br>GXX(75), OT<br>SZ2(75), OT<br>SZ2(75), OT<br>RYY(75), R<br>SZ2(75), OT<br>RYY(75), R<br>SZ2(75), OT<br>RYY(75), R<br>SZ2(75), OT<br>RYY(75), R<br>SZ2(75), OT<br>RYY(75), R<br>SZ2(75), OT<br>RYY(75), R<br>SZ2(75), OT<br>R<br>SZ2(75), OT<br>SZ2(75), OT<br>SZ2(7 | 26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>27 J 26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>27 26 JAO<br>27 26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>27 26 JAO<br>27 26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>27 26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>26 JAO<br>27 26 JAO<br>27 26 JAO<br>27 26 JAO<br>27 26 JAO<br>26 JAO<br>27 26                                                                                                                                                                |
| C<br>C<br>C<br>COMMENT<br>COMMENT<br>COMMENT<br>C<br>COMMENT<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | SUBROUTINE<br>- SUBROUTINE<br>T - SUBROU<br>T - (TABLE<br>T - NESTRA<br>UZ2(7<br>DY117<br>ERXX(<br>COMMUN /BL<br>IT<br>IA<br>NG<br>COMMUN /BL<br>COMMUN /BL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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PRIN<br>Y (75).<br>SYY (75).<br>SYY (75).<br>SYY (75).<br>CR24 (75).<br>BI. ER22(75).<br>EP3. REP4. KEEP<br>CO3. NCD4. NCD5<br>NJT. NST.<br>2. ISTT. LTT<br>P. IP10<br>T-WNLT.NUM.MNC5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SUBROUTING<br>AND RESTRAIN<br>RATES JOINT LO<br>ITS ACCUMULATEL<br>OXXI 751. OT<br>SZEI 751. DI<br>RYYI 751. RI<br>S. KEEP6. KEEI<br>. KCD6. NCO<br>. NLT. TOL.<br>. ITYPEL.IDJ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>T - SUBROU<br>T - TABLE<br>T - NESTRA<br>COMMUN /BL<br>UZZ T<br>DYYL 7<br>ERXX(<br>COMMUN /BL<br>IT<br>IA<br>COMMUN /BL<br>FORMAT (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TINE<br>JHTDAT<br>TINE JHTDAT II<br>A1.0HECKS FOI<br>INTS.ECHO PRID<br>OCK1/ X1 751,<br>51. SXXI 751<br>51. SXXI 751<br>51. DZ21 75<br>751. ERYY( 75<br>K1/ KEEP2. K1<br>YPE. NCD2. NO<br>BAN, IFORM. NO<br>MP1. HI<br>C. IPS. II<br>K3/ NUIT, NU:<br>35H SAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| C<br>C<br>C<br>COMMENT<br>COMMENT<br>COMMENT<br>COMMENT<br>2<br>3<br>4<br>5<br>7<br>1<br>7<br>1<br>9<br>1                                                   | SUBROUTINE<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | TINE<br>JHTDAT<br>TINE JHTDAT II<br>A1-CHECKS FOU<br>INTS.ECHO PRIN<br>OCKI/ XI 751.<br>51. SXXI 751.<br>51. CXXI 751.<br>51. C                | SUBROUTINE<br>RPUTS JOINT LOAD:<br>R BAD DATA.ACCUM<br>ITS DATA AND PRIN<br>Y ( 75).<br>). SYYI 75).<br>). RXXI 75].<br>). RXXI 75].<br>RXXI                                       | SUBROUTING<br>AND RESTRAIN<br>MATES JOINT LC<br>TS ACCUMULATEL<br>QXX 751, D1<br>SZE 751, D1                                                                                                                                                                                                                                                     | 26 JAO<br>26 JAO<br>27 1 37 EO<br>27 26 JAO<br>26 JAO<br>26 JAO<br>27 7 26 JAO<br>27 7 26 JAO<br>27 7 60<br>27 7 60<br>27 7 60<br>28 JAO<br>29 7 7 60<br>29 JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>- SUBROUTINE<br>- SUBROUTINE<br>- (TABLE<br>- (TAB     | TINE<br>JHTDAT<br>TINE JHTDAT II<br>A1.0HECKS FOI<br>INTS.ECHO PRIDOCK17 X1 751.<br>51. SXX1 751.<br>51. SXX                  | SUBROUTINE<br>MPUTS JOINT LOAD:<br>R BAD DATA.ACCUM.<br>I'S DATA AND PRI<br>Y (75).<br>S SYYI 75).<br>S RXX 75).<br>S RXX 75).<br>B RXX 75).<br>B RXX 75).<br>CB3. NC04. NC05<br>NC04. NJT. NST.<br>P. 151. LTT.<br>P. 1510.<br>AS INPUT FOR THI<br>AS INPUT FOR THI<br>S - JOINT DATA.//                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SUBROUTING<br>AND RESTRAIN<br>RATES JOINT LO<br>ITS ACCUMULATEL<br>QXXI 751. QT<br>SZZI 751. DI<br>RYYI 751. RI<br>S. KEEP6. KEEI<br>MC AND ACCOMPLATE<br>NLT. TOL<br>ITYPEL.IDJ.<br>NF6.MD IT.MNI C<br>S PROBLEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| C<br>C<br>C<br>C<br>COMMEN<br>C<br>COMMEN<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | SUBROUTINE<br>T - SUBROUTINE<br>T - SUBROUTINE<br>T - KESTRA<br>COMMUN /BL<br>UZIT<br>DYLT<br>ERXXI<br>COMMUN /BL<br>IT<br>IA<br>No.<br>COMMUN /BL<br>FORMAT & 2<br>FORMAT & 2<br>FORMAT & 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TINE<br>JHTDAT<br>TINE JHTDAT I/<br>A1.CHECKS FOU<br>INTELECHO PRII<br>OCK1/ X1 751.<br>51. SXXI 751.<br>51. S                | SUBROUTINE<br>RPUTS JOINT LOAD:<br>R BAD DATA.ACCUM<br>ITS DATA AND PRIM<br>Y ( 75).<br>N XY1 75).<br>R XX1 75).<br>R XX1 75).<br>R RXX1 7                                                                                             | SUBROUTING<br>AND RESTRAIN<br>MATES JOINT LU<br>TS ACCUMULATES<br>OXX(75), OT<br>SZ2(75), OT<br>SZ2(75), OT<br>SZ2(75), OT<br>RYY(75), R;<br>SZ2(75), OT<br>RYY(75), R;<br>SZ2(75), OT<br>RYY(75), R;<br>SZ2(75), OT<br>SZ2(75), OT                                                  | 26 JAO<br>26 JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>T - SUBROUTINE<br>T - SUBROUT<br>T - (TABLE<br>T - RESTRA<br>UZ2(7<br>DY117<br>ERXX(<br>COMMUN /BL<br>UZ2(7<br>IT<br>IT<br>IT<br>FORMAT (1<br>FORMAT (1<br>FORMAT (1<br>FORMAT (1<br>FORMAT (1)<br>FORMAT (1)<br>F                                                               | TINE<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SUBROUTINE<br>MPUTS JOINT LOAD:<br>R BAD DATA.ACCUMU<br>ITS DATA AND PRIN<br>Y1 751.<br>SYY1 751.<br>SYY1 751.<br>SHEP3. KEEP4. KEEF<br>CD3. MCD4. KCD3<br>4. NJT. NST.<br>P2. ISTT. LTT<br>5. I                                                                                                                   | SUBROUTING<br>AND RESTRAIN<br>RATES JOINT LO<br>ITS ACCUMULATEL<br>QXX1 751, DI<br>SZ21 751, DI<br>RYY (751, R)<br>SKEEP6, KEEI<br>, NCD6, NCD<br>, NLT, TQL<br>, ITYPEL, IDJ<br>WF6, MC IT.MNI (<br>S PROBLEM)<br>(7)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>T - SUBROU<br>T - (TABLE<br>T - NESTRA<br>COMMUN /BL<br>UZZ( T<br>DYYL 7<br>ERXX(<br>COMMUN /BL<br>IT<br>IA<br>COMMUN /BL<br>FORMAT (<br>FORMAT (<br>F | TINE<br>JHTDAT<br>TINE JHTDAT I/<br>41 - CHECKS FOU<br>INTS.ECHO PRID<br>OCK1/ X( 751,<br>51, SXXI 75<br>51, SXXI 75<br>51, SXXI 75<br>51, CEP2, KI<br>YPE, NCD2, NC<br>BAN, IFORM, ND<br>MP1, HI<br>C. IP6, II<br>K3/ N17, MN<br>SAME<br>SH TABLE /<br>X-15+6E10-31<br>25X-20H INPUT<br>X, SAMONT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>R BAD DATA.ACCUM<br>ITS DATA AND PRIN<br>Y (75).<br>N RXX1 75).<br>N RXX1 75).<br>RXX1 75).<br>RX                                     | SUBROUTING<br>AND RESTRAIN<br>LATES JOINT LC<br>ITS ACCUMULATEL<br>GXX1 751, GY<br>SZ1 751, GY<br>SZ2 751, DI<br>RYY( 751, R;<br>SZ, KEEP6, KEEI<br>, NCD6, NCO',<br>NLT, TGL,<br>ITYPEL, IDJ,<br>NF6, MC IT.MNI (<br>S PROBLEM)<br>()<br>MOMENT(21)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26 JAO<br>26 JAO<br>26 JAO<br>24 APO<br>24 APO                                                                                                                                                                                                                                                                                                                                                                               |
| C C C C C C C C C C C C C C C C C C C                                                                                                                       | SUBROUTINE<br>T - SUBROUTINE<br>T - SUBROUTINE<br>T - KESTRA<br>COMMUN /BL<br>UZ2( 7<br>DY1 7<br>ERXX(<br>COMMUN /BL<br>UZ2( 7<br>DY1 7<br>ERXX(<br>COMMUN /BL<br>FORMAT (<br>FORMAT (       | TINE<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SUBROUTINE<br>APUTS JOINT LOAD:<br>R BAD DATA.ACCUM<br>ITS DATA AND PRIN<br>Y ( 75).<br>N RXX( 75).<br>N RXX( 75).<br>RXX( 7                                       | SUBROUTINE<br>AND RESTRAIN<br>MATES JOINT LUC<br>TS ACCUMULATEL<br>OXX1 751, OT<br>SZ1 751, OT<br>SZ2 751, DI<br>SZ2 751, D                                                                                                                                                                                                                                                    | 26 JAO<br>26 JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>T - SUBROUTINE<br>T - (TABLE<br>T - KESTRA<br>COMMUN /BL<br>UZ2(7<br>DYY1 7<br>ERXX1<br>(COMMUN /BL<br>COMMUN /BL<br>COMMUN /BL<br>FORMAT (2<br>FORMAT (2<br>FORMAT (2<br>FORMAT (2)<br>FORMAT                                                                     | TINE<br>JHTDAT<br>TINE JHTDAT II<br>A1.0HECKS FOI<br>INTS.ECHO PRIDOCKI / X1751<br>51. SXX1 751<br>51. SXX1 751 | SUBROUTINE<br>SUBROUTINE<br>BAD DATA.ACCUM<br>ITS DATA AND PRIN<br>Y (75).<br>SYYI 75).<br>RXXI 75).<br>RXXI 75].<br>RXXI 75].<br>RXXI 75].<br>RXXI 75].<br>RXXI 75].<br>SI. ERZI 75].<br>EP3. REP4. KEEF<br>CD3. NCD4. NC5<br>AUT. NUM.MIN(5)<br>AS INPUT FOR THIS<br>AS INPUT FOR THIS<br>AS INPUT FOR THIS<br>SPRING(X) SPRING<br>SPRING(X) SPRING<br>SPRING(X) SPRING<br>SPRING(X) SPRING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SUBROUTINE<br>SAND RESTRAIN<br>RATES JOINT LO<br>ITS ACCUMULATEL<br>QXXI 751, DI<br>RYY( 751, R]<br>SZI 751, DI<br>SZI 751                                                                                                                                                                                                                                                      | E SUBROUTIME<br>26 JAO<br>15 26 JAO<br>15 26 APO<br>MDS AND 24 APO<br>DATA 24 APO<br>19 DATA 24 APO<br>19 DATA 24 APO<br>19 CAPO<br>19 CAP                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| C C C C C C C C C C C C C C C C C C C                                                                                                                       | SUBROUTINE<br>T - SUBROUTINE<br>T - SUBROU<br>T - (TABLE<br>T - NESTRA<br>UZI T<br>DY1 7<br>ERXX(<br>COMMUN /BL<br>IT<br>IA<br>IA<br>FORMAT (<br>FORMAT  | TINE<br>JHTDAT<br>TINE JHTDAT I/<br>A1.CHECKS FOO<br>INTS.ECHO PRIDOCKI/ XI 751.<br>51. SXXI 751.<br>51. SXX                  | SUBROUTINE<br>CONTRACTION<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBRO                                                                 | SUBROUTINE<br>AND RESTRAIN<br>RATES JOINT LUC<br>TS ACCUMULATEL<br>OXX(75), OT<br>SZ2(75), OT<br>SZ2(75), OT<br>RYY(75), R;<br>SZ2(75), OT<br>RYY(75), R;<br>SZ2(75), OT<br>RYY(75), R;<br>SZ2(75), OT<br>RYY(75), R;<br>SZ2(75), OT<br>RYY(75), OT<br>RYY(75), OT<br>RYY(75), OT<br>SZ2(75), OT<br>RYY(75), OT<br>SZ2(75), OT<br>RYY(75), OT<br>SZ2(75), OT<br>RYY(75), OT<br>SZ2(75), OT                                                                                                                                                                                                                                                    | 26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>26 JAO<br>27 1 37 EO<br>13 FEO<br>13 FEO<br>26 JAO<br>26                                                                                                                                                                                                                                                                                                                                                                               |
| C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                 | SUBROUTINE<br>- SUBROUTINE<br>T - SUBROUT<br>T - (TABLE<br>T - NESTRA<br>UZ2(7<br>DY117<br>ERXX(<br>COMMUN /BL<br>UZ2(7<br>IT<br>IT<br>IT<br>FORMAT (1<br>FORMAT                                   | TINE<br>JHTDAT<br>TINE JHTDAT II<br>41.0.MECKS FOI<br>INTS.ECHO PRID<br>OCK1/ XI 751.<br>51. SXXI 751<br>51. SXXI 751<br>SXI 751.<br>EMYI 7.MM<br>MP1. HI<br>C. IP8. II<br>C. IP8. II<br>SH SAME<br>X.IS.6E10.31<br>X.IS.6E10.31<br>X.IS.6E10.33<br>X.IS.6E11.31<br>25X.20H INPUT<br>X. JOHJOINT (<br>25X.20H INPUT<br>X. JOHJOINT (<br>J.ZSX.23H ACCO<br>8H HOLDING<br>8H TOT FOI 10H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SUBROUTINE<br>MPUTS JOINT LOAD:<br>R BAD DATA.ACCUMU<br>ITS DATA AND PRIN<br>Y1 751.<br>SYV1 751.<br>SYV1 751.<br>CR221 751.<br>CD3. NCD4. NCD3<br>A. NJT. NST.<br>P. ISTT. LTT.<br>P. IP10<br>T. MNLT.MMM.MNC5<br>AS INPUT FOR THI<br>S. JOINT DATA.//<br>FORCE(K) FORCE!<br>SPRING(X) SPRING<br>MALATED JOINT DATA.//                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SUBROUTING<br>AND RESTRAIN<br>LATES JOINT LUC<br>TS ACCUMULATEL<br>QXX1 751, DI<br>SZ21 751, DI<br>SZ21 751, DI<br>SY (751, R)<br>SKEEP6, KEEI<br>ACC6, NCD<br>ALT, TOL<br>TYPEL, IDJ<br>WF6, M IT.MNIC<br>S PROBLEM<br>()<br>NDMENT(21)<br>SPRING(2)<br>TA.//)<br>REVIOUS PROBLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 26 JA0<br>26 JA0<br>26 JA0<br>26 JA0<br>26 JA0<br>26 JA0<br>26 JA0<br>26 JA0<br>27 J 51 , 13 FE0<br>13 FE0<br>26 JA0<br>26 J                                                                                                                                                                                                                                                                                                                                                                                 |

| 20 FOR    | MAT I 35H JOINT NUMBERS MUST RE POSITIVE)                | 26JA0   |
|-----------|----------------------------------------------------------|---------|
| 23 FOR    | MAT ( 10H NONE )                                         | 26JA0   |
| 27 FOR    | MAT I SUN TYPE 3 PROBLEM DOES NOT ALLOW ANY CHANGE IN .  | 26JA0   |
| 2         | 10H SUPPORTS                                             | 021110  |
| 3         | SON RESTRAINTS MAY NOT CHANGE FROM LAST PROBLEM          | 1 02MYO |
| 30 FOR    | NAT I JSH NG DATA I                                      | 02840   |
| SU FUR    | MAT 1 43N JOINT NUMBER ABOVE GREATER THAN NUMBER.        | 26 JA0  |
| 2         | 20N OF JOINTS IN FRAME I                                 | 26.JA0  |
| PRI       | NT 9                                                     | 26JA0   |
|           | IF (ITYPE .NE. 3) GO TO 1120                             | 02440   |
| COMMENT - | STORE JOINT RESTRAINTS FOR OFFSPRING PROBLEMS            | 04MY0   |
|           | 00 1110 1 # 1-NJT                                        | 02440   |
|           | ERXELLI = SXXIII                                         | 02MY0   |
|           | ERYY(1) - SYY(1)                                         | 02MY0   |
|           | EM22(1) = SZ2(1)                                         | DZMYC   |
| 1110      | CONTINUE                                                 | O2HYO   |
| 1120      | CONTINUE                                                 | O2HYO   |
|           | IF IKEEP4 .EO. 11 GO TO 1230                             | 26JA0   |
| COMMENT - | ZERO JOINT DATA                                          | 04MY0   |
|           | TCHN + 1 + 1 HNUT                                        | 26JA0   |
|           | OXX(1) = QYY(1) = QZ2(1) = 0.0                           | 26 JAO  |
| 1200      | \$XX(1) + \$YY(1) + \$ZZ(1) + 0.0                        | 26JA0   |
|           | IF INCO4 .NE. 01 GO TO 1240                              | OZMYO   |
| PRI       | NT 30                                                    | 2HY0    |
|           | GO TO 5000                                               | 2HY0    |
| COMMENT - | HOLDING DATA                                             | 04MY0   |
| 1230 PRI  | NT 1T                                                    | 26JA0   |
|           | IF INCDA .ME. 01 GO TO 1240                              | OZMYO   |
| PR1       | MT 23                                                    | ZMYO    |
|           | 60 10 9800                                               | OZMYO   |
| 1240      | CONTINUE                                                 | ZEJAO   |
| PRI       | NT 14                                                    | 26JA0   |
| PRI       | AT 15                                                    | ZEJAO   |
|           |                                                          | 25.340  |
| COMMENT   | READ AND PRINT ONE DATA CARD                             | 04440   |
| NLA       |                                                          | 26 JAU  |
| PRI       | IF II                                                    | 26.740  |
|           | 17 11 10/10 10/10 0700<br>18 11 18 6 1 60 To 8300        | 20000   |
| COMMENT - | 17 11 400 0 1 00 10 0200                                 | 04MV0   |
| Country . | OVVIII - OVVIII - OVVI                                   | 26.340  |
|           | OVVIII - OVVIII - OVVI                                   | 26.140  |
|           | $077111 \pm 077111 + 0771$                               | 26.140  |
|           | Craits a Craits & Crai                                   | 26,340  |
|           |                                                          | 26.140  |
|           | \$77113 a \$77113 + \$771                                | 26JA0   |
| 4900      | CONTINUE                                                 | 26.JA0  |
| 5000      | CONTINUE                                                 | 2440    |
|           | IF LITYPE .ME. 31 GO TO 6000                             | 02HYO   |
| COMMENT - | LUMPARE JUINT RESTRAINTS WITH LAST PROBLEM FOR OFFSPRING | 04MY0   |
|           | 00 5900 E = 1+NJT                                        | 02MY0   |
|           | IF IERXXIII .NE- SXXIIII GO TO 8270                      | 02HYQ   |
|           | IF LERYYLII .NE. SYVILII GO TO 8270                      | 02MY0   |
|           | IF (ERZZ(1) .NE. SZZ(1)) GU TO 8270                      | 02MY0   |
| 5900      | CONTINUE                                                 | - 2MY0  |
| 6000      | CONTINUE                                                 | 02MYO   |
|           |                                                          |         |

ţ

|        | GO TO 9800                                                          | 26JA0     |
|--------|---------------------------------------------------------------------|-----------|
| 8200   | PRINT 20                                                            | 26JAO     |
|        | GU 10 9700                                                          | 26JAO     |
| \$270  | PRINT 27                                                            | 26JAC     |
|        | 60 10 9700                                                          | 26JA0     |
| 8540   | PRINT 50                                                            | ZEJAO     |
| 9700   | IABAN # 1                                                           | 26 JAO    |
|        | GO TO 9900                                                          | 26 JA0    |
| 9840   | CONTINUE                                                            | 26JA0     |
| COMMEN | IT - PRINT ACCUMULATED JOINT DATA UNLESS IT IS THE SAME AS INDUIT   | 04MYP     |
| COMMEN | IT - FOR THIS PROBLEM                                               | 04MYO     |
|        | PRINT 16                                                            | 76JAO     |
|        | 1F IKEEP4 .EQ. 11 GO TO 9820                                        | 26JA0     |
|        | 1F (NCD4 .EQ. 0) GO TO 9900                                         | 02440     |
|        | PRINT 7                                                             | 26 JAO    |
|        | GO 10 9900                                                          | 26JA0     |
| 9820   | CONTINUE                                                            | 26 JA0    |
|        | PRINT 15                                                            | ZJAPO     |
|        | DO 9860 I = 1+ HJT                                                  | 26JA0     |
|        | IF (QXX(1) .NE. 0) GG TO 9850                                       | ZEJAO     |
|        | 1F (QYY(1) .NE. 0) GO TO 9850                                       | 26JA0     |
|        | 1F (022(1) "ME. 3) GO TO 9850                                       | 26JA0     |
|        | 17 (SXX(1) .NE. 0) GO TO 9850                                       | 26.JA0    |
|        | 1F (SYV(1) .ME. 0) GO TO 9850                                       | 26 JAO    |
|        | 1F (\$22(1) "ME. 0) GO TO 9850                                      | 26JAO     |
|        | GO 10 9860                                                          | 26 JA0    |
| 9859   | PRINT 13. 1.0XX(1).0YY(1).0Z2(1).5XX(1).5YY(1).5Z2(1)               | 26JA0     |
| 9840   | CONTINUE                                                            | 26JAO     |
| 9900   | CONTINUE                                                            | 26JA0     |
|        | RETURN                                                              | 26 JAO    |
|        | END                                                                 | 26JA0     |
| ç      |                                                                     |           |
| ç      |                                                                     | ********  |
| ç      |                                                                     |           |
| C      | SUBROUTINE SUBROUTINE SUBROUTINE S                                  | UBROUTINE |
| ç      |                                                                     |           |
| C      |                                                                     |           |
| C      |                                                                     |           |
|        | SUBRUIINE RUMSI                                                     | 26 JAU    |
| COMMEN | IT - SUBRUTINE RUMST INFUTS REPORT INCIDE STIFFIESS DATA (TABLE 3), | 24 APU    |
| COMMEN | The Checks For BAD VALATCONVERTS INFOL DISTANCES TO PENDEN          | 24470     |
| COMMEN | IT - COUNDINALES AND ECHU PRINIS DAIA                               | 24 40     |
| -      |                                                                     | 26340     |
| 2      | UCTAL 2019 PRE1 2016 PRE1 2016 MUSL 2016 IA40PSL 2016               | 20440     |
| 3      | ) - LUPUPE 2019 [PIREL 2019  PIRKL 2019 RC211 2019 SPEC 2013)<br>   | 201110    |
|        | (UNNON /DEVENJ/ XEST /311 - XEST /311 - FET /314 - ALE /214         | 20340     |
| 2      | CONTRACTOR STEL (7) SALL (3)                                        | 20340     |
| -      | COMMUN /BLKI/ REEPZ, REEP3, REEP4, REEP5, REEP6, REEP1,             | ZEJAN     |
| 2      | ITTPE, ACD2, ACD3, ACD4, ACD5, ACD6, ACD7,                          | 26JA0     |
| 3      | I JABAMI IFUNDA ANAI MUTA MUTA MUTA MUTA TOLA                       | 76380     |
|        | HE HELS HEZS ISITE LITE ITTELSIDJ.                                  | 12460     |
| ,      | MCL. IPST IPTT IPTO                                                 | 1 37 60   |
| -      | CUMMAN /BLN3/ MAJTANASTANALTANANAANCSAMACAANDJTAMALC                | 07450     |
|        | FURMAT I AUH TABLE 5 - MEMBER SLIFFNESS DATA ,///)                  | ZEJAO     |
| 12     | **************************************                              | 10440     |
|        |                                                                     |           |

| 14 CODMAT     | 144 404 STIER MOD OF DRICHATIC DRICHATIC             | ALMYA  |
|---------------|------------------------------------------------------|--------|
| 14 FUNHAT     | 1// HUM STIFF OUD OF FRISHILL FRISHILLS              | 10400  |
| -             | JUN NO AXIS OUPUT PIN PIN //                         | 30000  |
| 3             | ACH ITPE ELAST I A ,                                 | 30440  |
| •             | SONCARDS OPT OPT FROM TO +771                        | 30MKO  |
| 15 FORMAT     | (10X+7E10+3)                                         | 26JA0  |
| 16 FORMAT     | ( 5K+7E11+3)                                         | 26 JAO |
| 17 FURMAT     | 4 48H HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS;   | 26 JAO |
| 2             | 15H THE FOLLOWING +//}                               | 26 JAO |
| 18 FORMAT     | E /+20H STIFF TYPE+ 15+6H CONTD+5X+                  | 04MY0  |
| 2             | 40H RESTRAINTS ARE IN NEMBER PRIMED AXES             | UVPAU  |
| 3             | 3X+ 47H FROM TO 1 A +                                | 02MYO  |
| 4             | 30H SX SY SZ+/3                                      | 02MYO  |
| 23 FORMAT     | ( 10H NONE )                                         | 26 JA0 |
| 30 FORMAT     | { 25H NO DATA IN TABLE 5 }                           | 31MR0  |
| 31 FORMAT     | 1 51H NUMBER OF CARDS TO FOLLOW MUST NOT BE NEGATIVE | 104AP0 |
| 32 FORMAT     | ( 35H OUTPUT OPTION MUST BE 0 OR 1 )                 | OAMYO  |
| 33 FORMAT     | ( SOH PIN OPTION MUST BE D OR 1)                     | 04HYO  |
| 51 FORMAT     | 1 35H STIFF DATA MUST START AT 0.0 1                 | 1 IMRO |
| 57 FORMAT     | LAOH STIFF DATA HUST STOP AT FND OF MEMBI            | TIMRO  |
| 51 FORMAT     | I SOU STIFF SFOURNER MUST BE LONGER THAN 3740 SPAN 1 | 11080  |
| SA FURMAT     | I SAU STIFF DATA MIST BE SECTIFIED CONTINUASS V. IF  | 11000  |
| 3             | The POR DIST MICE POINT LEAST TO DIST.               | 51480  |
| 55 FORMAT     | A AND MO CAPES IN TABLE & BUIL STORE TYPES NOT ALL.  | 20400  |
| 37 ( 0,4,1,1) | IAN CAPTIERD                                         | 20400  |
| SA FORMAT     | ION AFCIFICUT                                        | 29450  |
| 20            | I WIN ALL LANDS STELITIED FOR INDLE 3 NEW DUI ALLY   | 27AFU  |
| -             | AND STIFF THES AND SPECIFIEDATE                      | JUAPU  |
| 3             | THE CHECK CARD COURT AND HUMBER OF STIFF TIFEST      | JUAPO  |
| 37 FURRAL     | I NOM ALL STIFF TYPES SPECIFIED OUT ALL CANDS MUTH   | JUAPO  |
| -             | SH READ # / #                                        | JUAPU  |
| 3             | ATH CHECK CARD COURT AND HUMBER OF STIFF ITPEST      | JUAPO  |
| 38 FURMAL     | t and Axis office HUST Equal 1, 2, or 3 1            | JOAPO  |
| BO FURHAT     | SOH NEGATIVE VALUES OF A I ARE NOT PERMITTEDI        | 02470  |
| 65 FORMAT     | A SH STIFF TYPES MUST BE IN ASCENDING ORDER 1        | 31980  |
| 67 PURPAT     | I SOM IF ZND CARD USED FOR STIFF TYPE, PRISMATIC I . | OZMTO  |
| 2             | ZOH AND A MUST BE 0.0 1                              | OZMYO  |
| 71 FURMAT     | ( 40H STIFF TYPES MUST NOT BE NEGATIVE )             | 31MR0  |
| 72 FORMAT     | ( 40H STIFF TYPE GREATER THAN TOTAL NUMBER OF STIFF. | 3 1MR0 |
| 2             | 20H TYPES SPECIFIED I                                | 31MR0  |
| PRINT 1       | 9                                                    | 26JA0  |
| 18            | IXEEPS .EQ. 0) NSTL = 0                              | 24AP0  |
| COMMENT - FR/ | AME HUST HAVE AT LEAST ONE STIFFNESS TYPE            | 04MY0  |
| 16            | INCDS .LE. O +AND. KEEPS .LE. O) GO TO 8300          | 26JA0  |
| 16            | (NCD5 ,NE. 0) GO TO 1150                             | 26 JAO |
| 1#            | INST .NE. NSTLI GO TO 8550                           | 29AP0  |
| PRINT         | 17                                                   | ZGJAO  |
| PRINT 2       | 23                                                   | 26 JAO |
| 60            | TO 9900                                              | 26JA0  |
| 1150 COP      | NTINUE                                               | 76 JA0 |
| 1F            | IKEEP5 .EQ. 13 GO TO 1240                            | ZEJAO  |
| COMMENT - ALL | L NEW DATA                                           | OAMYO  |
| 00            | 1200 1=1.MNST                                        | 26.140 |
|               | NC51(1) = -1                                         | 26JA0  |
| 1200          | NCD5111# - 1                                         | 76.140 |
|               | N(5 + 0                                              | 26 JAO |
| 60            | 10 1250                                              | 26.140 |
| 1240 PRINT    | 17                                                   | 24.180 |
|               | -                                                    | ****** |
|               |                                                      |        |

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| 1250 CONTINUE                                                         | 26 JA0 | COMMENT |
|-----------------------------------------------------------------------|--------|---------|
| PRINT 14                                                              | 26 JA0 | R       |
| NCRS = 0                                                              | 29AP0  | 2       |
| COMMENT - DO FOR EACH STIFF TYPE                                      | 04MYO  | P       |
| DO 4900 JJ =1.NST                                                     | 26JA0  | 2       |
| COMMENT - SKIP FOR STIFF TYPE PREVIOUSLY DEFINED                      | D4MY0  |         |
| 1F (MCDSIJJ) •NE• -11 GO TO 4900                                      | 06440  |         |
| IF (JJ .EQ. 1) 60 TO 1300                                             | 26JA0  | COMMENT |
| IF (JJ .EQ. NSTL + 1) GO TO 1300                                      | 24AP0  |         |
| COMMENT - PRINT NEW HEADING FOR FIRST STIFF TYPE OF PROBLEM AND AFTER | 04440  |         |
| COMMENT - LVERY NON PRISMATIC STIFF TYPE                              | 04MY0  | COMMENT |
| 1F (MCDS(JJ - 1) .GT. 0) PR1MT 14                                     | 26JA0  |         |
| 1300 CONTINUE                                                         | 4446   | 2600    |
| IF INCRS .EQ. NCD3) 60 TO 8560                                        | 29APO  |         |
| COMMENT - READ AND PRIMT 1ST CARD FOR STIFF TYPE                      | 04MY0  |         |
| READ 12+ ISTT+E+PRIT+PRAT+NCDST+1AXOPT+IOPOPT+IPINLT+IPINRT           | 04440  | 2760    |
| PRINT 13+ 1STT.E.PRIT.PRAT.NCDST.IAXOPT.IOPOPT.IPINLT.IPINRT          | 30MR0  |         |
| IF LIAXOPT .LT. 1 .OR. IAXOPT .GT. 3) GO TO 8580                      | 30APO  | 2840    |
| 1F (MCDST .LT. 0) GO TO 8310                                          | 04MYC  | COMMENT |
| 1F 110P0PT .LT. 0 .OR. 10P0PT .GT. 13 GO TO 8320                      | 04MY0  |         |
| IF (IPINLT .LT. O .OR. IPINLT .GT. 1) GO TO 8330                      | 04MYD  |         |
| <b>1F (1PINRT "LT. O "OR. 1PINRT "GT. 1)</b> GO TO 8330               | D4MY0  |         |
| NCR5 = NCR5 + 1                                                       | 29APO  |         |
| COMMENT - MULTIPLY A AND I BY E                                       | 04MY0  |         |
| PRFT - E+PRIT                                                         | 30MR0  |         |
| PRAET = E+PRAT                                                        | 30MR0  | 32 40   |
| 1F (JJ .NE. 15TT) 60 TO 8656                                          | 26JA0  | 3300    |
| 1F (1STT .gt. NST) 60 TO 8720                                         | 26JA0  |         |
| 1F (1STT .LT. 0) GO TO 8710                                           | 26JA0  | 4000    |
| 1F (NCDST .GT. 0) GO TO 2400                                          | 26JAO  | 4540    |
| COMMENT - PRISMATIC MEMBER - NO CARDS FOLLOW                          | D4MYO  | COMMENT |
| IF (PRFT LE. G.OOR. PRAET LE. 0.0) GO TO 8660                         | 10AP0  |         |
| COMMENT - STORE TEMPORARY READ IN VALUES                              | 04MY0  |         |
| PRF(1STT) = PRFT                                                      | 26 JAO |         |
| PRAE(1STT) = PRAET                                                    | 26JA0  | 4900    |
| MCDS(1STT) = 0                                                        | 26JA0  |         |
| IAXOPS(ISTT) = IAXOPT                                                 | 26JA0  |         |
| 10POP(1STT) = 10POPT                                                  | 26JA0  | 8300 P  |
| 1P1NL(1STT) = 1P1NLT                                                  | 26 JAO |         |
| [PINR(ISTT) = ]PINRT                                                  | 26JA0  | 831u P  |
| GO TO 4900                                                            | 26JA0  |         |
| 2400 CONTINUE                                                         | 26JA0  | 832U P  |
| COMMENT - NON PRISMATIC MEMBER - NODST CARDS FOLLOW                   | O4MYO  |         |
| IF (PRFT .GT. 0.0 .OR. PRAET .GT. 0.0) GO TO 8670                     | 10AP0  | 8330 P  |
| COMMENT - STORE TEMPORARY READ IN VALUES                              | 04MYO  |         |
| NCDS(1STT) = MCDST                                                    | 74 180 | 4510 P  |
| IAXOPS(1STT) = IAXOPT                                                 | 26JA0  |         |
| 10P0P(1STT) = 10P0PT                                                  | 26JA0  | 8520 P  |
| IPINL(ISTT) - IPINLT                                                  | 26 JA0 |         |
| IPINR(ISTT) + IPINRT                                                  | 26 JA0 | 8534 P  |
| PRINT 16,1STT                                                         | 0AL 65 |         |
| COMMENT - DO FOR EACH ADDITIONAL DATA CARD FOR THIS STIFF TYPE        | 04MY0  | 8540 P  |
| DD 4500 11 = 1+MCDST                                                  | 26JA0  |         |
| NC3 = NC3 + 1                                                         | 26 JA0 | 855U P  |
| IF (II .EQ. 1) MC\$1(ISTT) - MC5                                      | 76 JA0 |         |
| IF INCRS .EQ. NCDSI GO TO 8560                                        | 29APO  | 856U P  |
|                                                                       |        |         |

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| READ AND PRINT NON PRISMATIC STIPPRESS VALUES                                      | 04440                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D 10, KLS(NC); KMS(NC); FL(NC); AEL(NC); SKL(NC); SKL(NC);                         | ZEJAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| SZLINCJI<br>Ny taona 2008 marta mpikaka pianaka amin'ny fisiana amin'ny fisiana    | ZGJAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 16.4L \$ (NC5) + 2K \$ (NC5) + FL (NC5) + AEL (NC5) + SXL (NC5) + STL (NC5) +      | ZEJAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| SZL (NCS)                                                                          | 26JA0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NCR5 = NCR5 + 1                                                                    | 29AP0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IF (AELINCS) .LE. 0.0 .OR. FL(NCS) .LE. 0.0) GO TO 8660                            | 04MYO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| HULTIPLY A AND I BY E                                                              | OAMYO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| FLINCS) = E FLINCS)                                                                | 30MRO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ALLINCSI - E+ALLINCSI                                                              | 30HRD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CONVERT DISTANCES TO REPBER COORDINATES                                            | 64MYO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| GO TO (2800,2790,2600), TAXOPT                                                     | 04440                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ALS(ML)) * XLS(MC)/0(25(15TT)                                                      | 26 JA0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ARSINCJI # XRSINCJI/UCZSIISTTI                                                     | 26JA0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    | 26JA0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ALSINCS) = XLSINCS//DCISIISIII                                                     | 26 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| AMSINCS) + XRSINCS1/DC15(15TT)                                                     | DALAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    | 26 JAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CHELK FUR DAD DATA                                                                 | USMTO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IN P ZLSTISTI/M                                                                    | DAL65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IF (]] .EU. [] GO TO 3200                                                          | 14490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IF ERLSINCES - NE& XHSENCE - 111 GO TO 8540                                        | INAPO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IF (ALSINCS) WE COUT GUTU 3300                                                     | 14420                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IF (ALSING) - 1) + TH .GE. AKS(N(5) ) GU TU 8530                                   | ZUAPO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    | I SAPO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LT TALBINLT ONLO USUI UU TU 0710                                                   | 30400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IF IXMSINGSI ALMA 0400 GU 10 4000                                                  | 20400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 17 (ALSINUS) - IN "GE" XKS(NCS)1 00 10 0530                                        | 14470                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    | 14460                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| LUNIINUE<br>- Check Edd Coles Not Coding at END of Member                          | Zejaŭ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CHELK FUR SIITT HUI SIUTING AT ENU UT MEMBER<br>Fooim - Art (Pictistis - Vocanceis | 34 140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| EAUTH A VAN ( 1947) LO 40 4830                                                     | 203400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| IF IENKEN GT. USTTAT GU TU 8520                                                    | 23420                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| X#31#C31 # 2L3115114                                                               | 26 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    | 26380                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| IT (HCH2 (L1) HCU3/ 00 10 82/0                                                     | 34 140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| UU 10 7700                                                                         | 26,040                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| TI JU (0.100)                                                                      | 20540                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NT 11                                                                              | 20340                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 10 JA                                                                              | 54MV2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NO 10 7700                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                    | 04840                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NV 10 7700                                                                         | 4840                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 11 JJ<br>66 TO DIAD                                                                | 04890                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NU 10 7700                                                                         | 74 140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 40 TO 8700                                                                         | 20.040                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| WU 10 7700                                                                         | 20380                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1 72<br>(4) TO 8700                                                                | 26 380                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                    | 26380                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| TI 73                                                                              | 20.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    | 26 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    | Zejaŭ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GU TO 9700                                                                         | ZGJAO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CU 10 9700<br>NT 55                                                                | 26JA0<br>29AP0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                    | SZLINC51<br>NT 16 % LSINC5) % XRSINC5) % FLINC5) * AELINC5) * SXLINC51 * NCR5 * 1<br>IF (AELINC5) * LE 0.0 , OR * FLINC51 * LE 0.0) GO TO 8660<br>MULTIPLY A AND 1 BY E<br>FLINC51 * E*FLINC5)<br>AELINC51 * E*FLINC5)<br>AELINC51 * E*FLINC51<br>CONVERT DISTANCES TO MEMBER COORDINATES<br>GO TO 12800 * 2700 * 2600 1 AX097<br>KLSINC51 * XLSINC51/DC25(1STT)<br>XRSINC51 * XLSINC51/DC25(1STT)<br>XRSINC51 * XLSINC51/DC15(1STT)<br>XRSINC51 * XLSINC51/DC15(1STT)<br>CONTINUE<br>CHECK FOR BAD DATA<br>TH * ZLSILSIT1/M<br>IF (11 * E0, 11 GO TO 3200<br>IF (XLSINC51 * NE * XRSINC51 / DC1300<br>IF (XLSINC51 * NE 0.0) GO TO 3300<br>IF (XLSINC51 * NE 0.0) GO TO 3300<br>IF (XLSINC51 * H * GE * XRSINC51 1 GO TO 8530<br>GO TO 4000<br>IF (XLSINC51 * H * GE * XRSINC51 1 GO TO 8530<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTON<br>NT 32<br>GO TO 9700<br>NT 33<br>GO TO 9700<br>NT 53<br>GO TO 9700<br>NT 53<br>GO TO 9700<br>NT 53<br>GO TO 9700 |

•
|                                     | 60 TG 9760                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 29APO                                                                          |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 8570                                | PRINT \$7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | JOAPO                                                                          |
|                                     | 50 TO 9709                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30APO                                                                          |
| 8580 1                              | PRINT SE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30APO                                                                          |
|                                     | 60 TO 9708                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30APO                                                                          |
| 8450 1                              | PRINT 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26JA0                                                                          |
|                                     | 60 TO 9798                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 26 JAO                                                                         |
| 8440 1                              | RINT 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26.JA0                                                                         |
|                                     | 60.10 9708                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 24 JAD                                                                         |
| 8470 B                              | PRINT A7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24.140                                                                         |
|                                     | 60 TO 9760                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 74 140                                                                         |
| 8710                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 74 140                                                                         |
| •••••                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24 140                                                                         |
|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24 140                                                                         |
|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24 140                                                                         |
| 9700                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 20.00                                                                          |
| 9900                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 20,000                                                                         |
|                                     | RET RET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ZAAPU                                                                          |
|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 26JAU                                                                          |
| _ 1                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Zéjao                                                                          |
| ç                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |
| ç                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |
| ç                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |
| ç                                   | SUBROUTINE SUBROUTINE SUBROUTINE S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | UBROUTINE                                                                      |
| ç                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |
| C                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ********                                                                       |
| c                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |
|                                     | LUBROUTINE REMLD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 26JAO                                                                          |
| COMMENT                             | T - SUBROUTINE ROMLD INPUTS MEMBER LOAD DATA (TABLE 6) CHECKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 24 APO                                                                         |
| COMMEN                              | F - FOR BAD DATA, CONVERTS LOADS AND DISTANCES TO MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24AP0                                                                          |
| COMMEN                              | r - Coordinates and Echo Prints Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 24AP0                                                                          |
|                                     | COMMUN /BLOCK3/ DXLE 501. DYLE 501. ZLLE 501. DC1LE 501.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26JA0                                                                          |
| 2                                   | DC2L( 50). UQX( 50). UQY( 50). NCDL( 50). IAXOPL( 50).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26JA0                                                                          |
| 3                                   | NC61( 50)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26JA8                                                                          |
|                                     | CONNUM /BLOCK6/ XLL(190), XRL(190), OXL(190), OVL(190),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26JA0                                                                          |
| 2                                   | QZL (150)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26JA0                                                                          |
| _                                   | COMMUN /BLAI/ KEEP2, KEEP3, KEEP4, KEEP5, KEEP4, KEEPT,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26JA0                                                                          |
| 2                                   | ITYPE. NCD2. NCD3. NCD4. NCD5. NCD6. NCD7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ZGJAQ                                                                          |
| ī                                   | LABARA LEGENA MILL NATE NETS HETS TOLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26 JA0                                                                         |
|                                     | No. MP1. MP2. ISTT. LTT. ITYPELIDJ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12FF0                                                                          |
|                                     | M.C. 198. 199. 1910                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 13FF#                                                                          |
| -                                   | COMPLEX / DLCS/ MALT - MAST - MALT - MARS - MACS - MALS - MALLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OTFEO                                                                          |
|                                     | FORMAT & ADM TABLE & - NEWBER LOAD DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 74.340                                                                         |
|                                     | CONAT / STA 18, 2014 2010 84 51-215 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DBJED                                                                          |
|                                     | FORMAT ( SX. 15. 2F11.5. 215.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 25480                                                                          |
| 14                                  | CORNAT (// SOM I DAD UNIFORM IMIFORM NO AXIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26 160                                                                         |
|                                     | Convert (1), 1901                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 34 140                                                                         |
|                                     | A ROM TYPE ON ON CARDS OPT .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                |
|                                     | AN TYPE OX OV CAPOS OPT +                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 74 140                                                                         |
| 17.5                                | /, 904 ΤΥΡΕ Οχ ΟΥ ΓΑΡΟΣ ΟΡΤ ,<br>//)<br>FORMAT (101-6818-9)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 26 JA0                                                                         |
| 16                                  | /, 50Ν ΤΥΡΕ ΟΧ ΟΥ ΓΑΡΟΣ ΟΡΤ ,<br>//)<br>/ormat (10x,5210.3)<br>Format (1x,5211.3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26JA0<br>26JA0<br>26JA0                                                        |
| ié                                  | /, 504 TYPE OX OY CAPOS OPT ,<br>//)<br>Format (02,5210.3)<br>Format ( 57,5211.31<br>Format ( 200.5211.31)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0AL85<br>0AL85<br>0AL85<br>0AL85                                               |
| 16                                  | /, 50M TYPE OX OY CAPOS OPT ,<br>//1<br>Format (301-5E10-3)<br>Format (32-5E11-3)<br>Format (4BH Holding Data From the Previous Problem Plus-<br>to the formation of the theory of theory of the theory of the theory of the t | 26JA0<br>26JA0<br>26JA0<br>26JA0                                               |
| 16<br>17<br>2                       | /, 50H TYPE OX OY CAPOS OPT ,<br>//1<br>FORMAT (10X+5E10+3)<br>FORMAT ( 5X-5E11+3]<br>FORMAT ( ABH HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS+<br>15H THE FOLLOWING ;//1<br>FORMAT ( ADH HOLDING ;//)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                             |
| 16<br>17<br>2                       | /, SON TYPE OX OY CAPOS OPT ,<br>//1<br>FORMAT (DR.SE10.3)<br>FORMAT (SR.SE11.31<br>FORMAT (ADM HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS.<br>19H THE FOLLOWING .//1<br>FORMAT (//.20M LOAD TYPE .15.6H CONTD./.2X.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 26,140<br>26,140<br>26,140<br>26,140<br>26,140<br>26,140<br>26,140             |
| 16<br>17<br>2<br>18<br>2            | /, 50H TYPE OX OY CAPOS OPT ,<br>//1<br>FORMAT (JOX.5E10.3)<br>FORMAT (JOX.5E11.3]<br>FORMAT ( ABH HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS.<br>JSH THE FOLLOWING .//1<br>FORMAT (//.20H LOAD TYPE .15.6H CONTD./.2X.<br>ASH FROM TO QX QY .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>02HY0<br>26JA0                    |
| 16<br>17<br>2<br>18<br>2<br>3       | /, SON TYPE OX OY CAPOS OPT ,<br>//) FORMAT (JOX.5E10.3) FORMAT (SX.5E11.3] FORMAT (SX.5E11.3] FORMAT (ABM HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS.<br>JSH THE FOLLOWING .//) FORMAT (//.20H LOAD TYPE .IS.6H CONTD./.2X.<br>A9H FROM TO OX QY .<br>30H GE . //)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26,140<br>26,40<br>26,40<br>26,40<br>26,40<br>26,40<br>26,40<br>26,40<br>26,40 |
| 16<br>17<br>2<br>18<br>2<br>3<br>23 | /, SON TYPE OX OY CAPOS OPT ,<br>//)<br>FORMAT (JOX,5E10.3)<br>FORMAT (JOX,5E11.3)<br>FORMAT (ABH HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS.<br>JSH THE FOLLOWING ,//)<br>FORMAT (//.20H LOAD TYPE ,15.6H CONTD./.2X.<br>ASH FROM TO OX QY .<br>30H OZ . //)<br>FORMAT (JOH MOME )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0  |

| 52 FOR    | MAT ( 5   | OH LOAD      | SPECIFIED     | BEYOND   | THE EN         | D OF HE | MBFR 1      | 31MR0   |
|-----------|-----------|--------------|---------------|----------|----------------|---------|-------------|---------|
| 53 FOR    | MAT ( 5)  | OH LOAD      | SEQUENCE      | HUST BE  | LONGER         | THAN ]  | 740 SPAN 1  | 3 IMRO  |
| 54 FUR    | MAT E 5   | IN LOAD      | SPECIFIED     | AT NEG   | AT I VE D      | ISTANCE | ALONG MEMB  | 131480  |
| 55 FOR    | MAT ( 4   | 2H TO DI     | STANCE OF     | ZERO I   | PLIES          | THAT IT | IS FIRST.   | 21AP0   |
| 2 55      | H CARD OF | TWO CARD SE  | QUENCE AN     | D NEXT ( | CARD WE        | LL HAVE | FROM.7.     | 21AP0   |
| 3 20      | H DISTANC | E OF ZERO    | 1             |          |                |         |             | 21AP0   |
| 56 FOR    | MAT ( SI  | OH ALL C     | ARDS SPEC     | IFIED FO | DR TABL        | E & REA | D BUT ALL . | 29AP0   |
| 2         | 2         | SHLOAD TYPES | NOT SPEC      | IFIED .  | 1.             |         |             | 30APO   |
| 3         |           | 6H CHECK     | CARD COU      | NT AND P | NUMBER         | OF LOAD | TYPESI      | 30AP0   |
| 57 FUR    | MAT ( 4)  | 8H NU СА     | RDS IN TA     | BLE 🌢 E  | UT ALL         | LOAD T  | YPES NOT .  | 29AP0   |
| 2         | 1         | OH SPECIFIED | 1             |          |                |         |             | 29AP0   |
| SE FOR    | MAT ( 5   | 1H ALL L     | OAD TYPES     | SPECIFI  | IED BUT        | ALL CA  | DS NOT READ | 30AP0   |
| 2         | A         | 6H CHECK     | CARD COU      | NT AND P | IUMBER         | OF LOAD | TYPESI      | 30APO   |
| 59 FUR    | MAT ( 4)  | OH AX15      | OPTION NU     | ST BE 1  | 2.3. 0         | R AL    | )           | TOAPO   |
| 60 FOR    | MAT L 5   | 1H NUMBE     | R OF CARD     | S TO FOL | LOW HU         | ST NOT  | BF NEGATIVE | 104 APO |
| 61 FOR    | MAT I A   | BH CONCE     | NTRATED L     | DADS AT  | 0.0 4R         | E NOT P | ERMITTEN    | DAMYO   |
| 45 FOR    | MAT E A   | SH LUAD      | TYPES HUS     | T BE IN  | ASCEND         | ING ORD | IER 1       | 31HR0   |
| 47 FUR    | MAT ( 5)  | OH IF 2N     | D CARD US     | ED FOR L | OAD TY         | PE, UNI | FORM LOAD . | 33HR0   |
| 2         | 2         | OHVALUES MUS | T BE 0.0      | 1        |                |         |             | 31MR0   |
| 71 FUR    | MAT ( 3   | 6H LQAD      | TYPES MUS     | T NOT BI | E NEGAT        | IVEI    |             | 31HR0   |
| 72 FUR    | MAT E AI  | BH LUAD      | TYPE GREA     | TER THAP | & TOTAL        | NUMBER  | OF LOAD.    | 31MR0   |
| 2         | 14        | 6H TYPES SPE | C 1 F 1 E O 1 |          |                |         |             | 31HR0   |
| COMMENT - | PRINT TA  | BLE HEADING  |               |          |                |         |             | 05MY0   |
| PRI       | NT 9      |              |               |          |                |         |             | 26JA0   |
|           | IF IKEEP  | 6 .EQ. 01 ML | 1L = 0        |          |                |         |             | 24 APO  |
|           | IF INCOG  | .EO. 0 .AND  | . KEEP6 .     | EQ. 0) ( | <b>10 TO 1</b> | 110     |             | D4FEO   |
|           | GO TO 11. | 20           |               |          |                |         |             | OAFEO   |
| 1110 PR1  | NT 24     |              |               |          |                |         |             | AFEO    |
|           | IF INLT   | .NE. 0) GO T | 0 8570        |          |                |         |             | 29AP0   |
|           | GO TO 99  | 00           |               |          |                |         |             | AFEO    |
| 1120      | IF INCD6  | .NE. 0) GO   | TO 1150       |          |                |         |             | 04F E 0 |
|           | IF INLT   | .NE. NLTLI G | 0 10 8570     |          |                |         |             | 29AP0   |
| PRI       | NT 17     |              |               |          |                |         |             | 26JA0   |
| PRI       | NT 23     |              |               |          |                |         |             | 26 JAO  |
|           | GO TO 99  | 00           |               |          |                |         |             | 26JA0   |
| 1150      | CONTINUE  |              |               |          |                |         |             | 26JA0   |
|           | IF IKEEP  | • .EQ. 1) GO | TO 1240       |          |                |         |             | 26 JAO  |
| COMMENT - | ALL NEW I | DATA         |               |          |                |         |             | 04MY0   |
| 1160      | 00 1206   | 1 = 1.MNLT   |               |          |                |         |             | 06MY0   |
|           | HC6       | 1(1) * -1    |               |          |                |         |             | 26 JAD  |
| 1200      | NCDI      | Lille - 1    |               |          |                |         |             | 26JA0   |
|           | NC6       | • 0          |               |          |                |         |             | 26JA0   |
|           | GO TO 12  | 50           |               |          |                |         |             | 26JA0   |
| 1240 PRI  | NT 17     |              |               |          |                | ••      |             | 26JA0   |
|           | IF INLTL  | .EQ. 01 GO   | 10 1160       |          |                |         |             | O6MY0   |
| 1250      | CONTINUE  |              |               |          |                |         |             | 26 JAO  |
| PRI       | NT 14     |              |               |          |                |         |             | 26JA0   |
|           | NCR       | <b>6</b> = 0 |               |          |                |         |             | SAVA    |
| COMMENT - | DO FOR E  | ACH LOAD TYP | E             |          |                |         |             | 05440   |
|           | DO 490.   | JJ =1+NLT    |               |          |                |         |             | 26JAC   |
| COMMENT - | SKIP FOR  | LOAD TYPES   | HELD FROM     | PREV10L  | IS PROB        | LEM     |             | 5MYO    |
|           | IF INCOL  | (JJ) "ME1    | 1 GO TO 4     | 900      |                |         |             | 06MY0   |
|           | LF (JJ al | EQ. 11 GO TO | 1300          |          |                |         |             | 76JA0   |
|           | 1F 4JJ    | EQ. HLTL + 1 | ) GO TO 1     | 300      |                |         |             | 24470   |
|           | IF INCOL  | 1JJ - 1) +GT | . OI PRIN     | T 14     |                |         |             | 26JA0   |
| 1300      | CUNTINUE  |              |               |          |                |         |             | 4MY0    |
|           |           |              |               |          |                |         |             |         |

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| 17 INCK6 -E0, NCD61 GD TU 8360                                   | ZYAPO  |
|------------------------------------------------------------------|--------|
| COMMENT - READ AND PRINT FIRST CARD FOR LOAD TYPE                | 05MY0  |
| READ 12. LTT.UGXT.UGYT.NCDLT.IAXOPT                              | OAMYO  |
| PRINT 13. LTT.UQXT.UQYT.NCDLT.IAXOPT                             | 24 JAO |
| IF LIAXOPT ALTAL ADR. LAXOPT ATTAL OT ASSA                       | 30AP0  |
|                                                                  | 79400  |
|                                                                  | 24 140 |
|                                                                  | ZOJAU  |
| IF I LTT .LT. 01 GO TO 8710                                      | ZEJAO  |
| IF (JJ .ME. LTT) GO TO 0650                                      | 26JA^  |
| 1F (NCDLT .LT. 0) 60 TO 8600                                     | OAMYO  |
| 1F (NCDLT .GT. 0) 60 TO 2400                                     | 26JA0  |
| COMMENT - UNIFORM LOADS ONLY                                     | 05440  |
| 1F (14X0PT -EQ. 1) 60 TO 1500                                    | 17MR0  |
| 15 (1AXOPT - 50- 2) 60 TO 1400                                   | 17480  |
| COMMENT - AVIE OF THE OF A - CONVERT AND COM LOADE TO DISCULANCE | ALHYA  |
| Company - wate aligned and a control culture route in precisions | 020110 |
| COMERT - AND INTERSTIT OF NEMDER ARES                            | UTHEU  |
| TERPI = ABSTOCILICITII                                           | ZEJAD  |
| TEMP2 = ABSIDC2L(LTT))                                           | 26JA0  |
| UQX(LTT) = UQXT#DC1L(LTT)#TEMP2 +                                | 26 JAO |
| 2 UQY1+DC2L(LTT)+TEMP1                                           | 26JA0  |
| LADY(LIT) = -LADXT#DC2L(LIT)#TEMP2 +                             | 24.140 |
|                                                                  | 24 140 |
|                                                                  | 24 140 |
|                                                                  | 20340  |
| COMPANY - WIS CHICK 2 - COMPANY COMPS IN DIRECTIONS OF           | UTHEU  |
| CONVENT - HERDER AKES                                            | DAMC   |
| 1499 UGR(LTT) = UGRT=DC1L(LTT) + UGRT=DC2L(LTT)                  | ZEJAO  |
| UGY(LTT) = - UGXT+DC2L(LTT) + UGYT+DC1L(LTT)                     | 26 JAO |
| 60 TO 1600                                                       | 26JA0  |
| COMMENT - AKIS OFTION 1 - LOADS ALLREADY IN MEMBER AXES          | 05MY0  |
| 1540 HOXILTT + HOXT                                              | 26.JA0 |
|                                                                  | 75.140 |
|                                                                  | 24 140 |
|                                                                  | 20000  |
|                                                                  | 26340  |
| <b>W</b> 10 4700                                                 | 26340  |
| CONTENT - VARIABLE LONDING                                       | 05970  |
| 2400 CONTINUE                                                    | ZEJAO  |
| IF (UGXT -ME, O .OR. UGYT .ME. 0) GO TO \$679                    | 26 JAQ |
| NCDLILTTI - NCDLT                                                | 26 JAO |
| IAXOPL(LTT) = IAXOPT                                             | 26.JA0 |
| PRINT 18. LTT                                                    | 26.JA0 |
| COMMENT - DO FOR FACH ADDITIONAL CARD OF LOAD TYPE               | 5870   |
|                                                                  | 74 140 |
|                                                                  | 20340  |
|                                                                  | 26JAU  |
| IF III .EQ. 11 MCGILLITT = MCG                                   | 76 JA0 |
| 1F (NCR6+EQ, NCD6) GO TO 8560                                    | 29AP0  |
| COMMENT - READ AND BRIAL ADMINILORM FORD DATY                    | rspvn  |
| READ 15. XLL(NC6).XRL(NC6).QXLT.QYLT.QZL(NC6)                    | 26 JAQ |
| PRINT 16 + XLL(NC6)+XRL(NC6)+OXLT+OYLT+OZL(NC6)                  | 26.340 |
| NCR6 = NCR6 + 1                                                  | 29AP0  |
| TH = ZLL(LTT)/H                                                  | 26 JAQ |
| COMPANY - CONVERT DISTANCES TO MEMBER COORDINATES                | 05840  |
|                                                                  | 21480  |
|                                                                  | 210-0  |
|                                                                  | 20380  |
| ARLINGS - XRLINGS/DCZLILIII                                      | ZOJAU  |
| GO TO 2800                                                       | 26 JAD |
| 2700 XLL(NC6) = XLL(NC6)/DC1L(LTT)                               | 26JAD  |

|         | XRLINCG) = XRLINCGI/DCILILTTI                                   | Z6JA      |
|---------|-----------------------------------------------------------------|-----------|
| 2800    | CONTINUE                                                        | 26 JA(    |
| COMMENT | " CHECK FOR ILLEGAL DATA                                        | 05440     |
|         | IF (XLLINC6) .LT. 0.0) GO TO 8540                               | 21AP0     |
|         | IF (XRL(NC6) .GT. ZLL(LTT) + 0.14TH) GO TO 8520                 | 21AP0     |
|         | IF (XRLINC6) .EQ. 0.0) GO TO 2838                               | SIMPO     |
|         | 1F ()I .EO. 1) GO TO 2829                                       | 04MY      |
|         | 1F (XRL(NC6 - 1) .NE. 0.01 GO TO 2820                           | 71AP0     |
|         | 1F (XLL(NC6) .NE. 0.0) GO TO 8550                               | 21AP(     |
|         | DEL = XRL(NC6) - XLL(NC6 - 1)                                   | ZIAPO     |
|         | GO TO 2830                                                      | ZIAPO     |
| 2820    | DEL = XRL(NC6) ~ XLL(NC6)                                       | 21AP0     |
|         | 1F (DEL .EG. 0.0) GO TO 2840                                    | ZIAPO     |
| 2830    | IF IDEL .LE. THI GO TO 8530                                     | ZIAPO     |
|         | G0 T0 2840                                                      | ZIAP      |
| 2838    | DEL * 1.0                                                       | ZIAPO     |
|         | IF []] .EO. ]) GO TO 2840                                       | OANTO     |
|         | IF IXLL(NC6) .EG. 0.0 .AND. XHL(NC6 - 11 .EG. 0.0) GD TU 8610   | OAMYO     |
| 2840    |                                                                 | ZIAPO     |
|         | IF (IAXOPT .EO. 1) GO TO 2900                                   | ZIAPO     |
|         | IF (IAXOPT, EQ. 2 -OR. DEL .EQ. 0.01 GO TO 2850                 | ZIAP      |
| COMMENT | - AXIS APTIONS 3 OR 4 - CONVERT DISTRIBUTED COADS TO DIRECTIONS | 03840     |
| COMMENT | - AND INTERSITY OF HEMBER AKES                                  | USHT      |
|         | TEMP1 • ABS(DELCETT)                                            | 20.340    |
|         |                                                                 | 20 34 14  |
| -       |                                                                 | 20.34     |
| Z       |                                                                 | 20 34 144 |
| -       |                                                                 | 20,00     |
| Z       |                                                                 | 20341     |
| 3850    |                                                                 | 2034      |
| 2030    | CUTINUE                                                         | ASMY:     |
| CONNENT | - ANIS OF TOW 2 OF CONCENTRATED COMPS - CONVENT DISINGUILD      | 0510      |
| COMERI  | - ANY CONCERTRATES CONST TO DIRECTIONS OF PERSON AND A          | 74 14     |
|         |                                                                 | 26.14     |
|         |                                                                 | 26.14     |
| 2900    |                                                                 | 26.34     |
| COMMENT | - ANIS UPTION 1 - (GADS ALLREADY IN MEMBER AXES                 | OSMY      |
|         | ONI (NCA) + OXLI                                                | ZEJA      |
|         | OVI (NCA) + OVI T                                               | ZGJA      |
| 2950    | CONTINUE                                                        | ZIAP      |
| 45-0    | CONTINUE                                                        | ZEJA      |
| 4900    | CONTINUE                                                        | ZEJA      |
|         | 1F (NCR4 .LT. NCD4) GO TO 8580                                  | OIMY      |
|         | 60 10 9900                                                      | ZEJA      |
| 8520 P  | RINT 52                                                         | 26 JA     |
|         | GD TO 9700                                                      | 9FE       |
| 8530 P  | RINT 53                                                         | ZEJA      |
|         | GO TO 9700                                                      | 26JA      |
| 8540 P  | RINT 54                                                         | 9FE       |
|         | GU TO 9700                                                      | 26JA      |
| 8550 P  | RINT 55                                                         | ZIAP      |
|         | 60 TO 9700                                                      | 21AP      |
| 8560 P  | RINT 56                                                         | ZYAP      |
|         | GQ TO 9700                                                      | 29AP      |
| 8570 P  | RINT 57                                                         | 29AP      |
|         |                                                                 |           |

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| 8590 PRI/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| 8600 PR11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| DIMENT -<br>DIMENT -<br>DIMENT -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                                                                                                                                                                                                                                | COMP INPUTS :<br>LENS, CHECKS FOL<br>ACCUMULATES PR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| DIVIENT -<br>DIVIENT -<br>DIVIENT -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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CHECKS FO<br>ACCUMULATES PR<br>ACCUMULATED PR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| DIMENT -<br>DIMENT -<br>DIMENT -<br>DIMENT -<br>DIMENT -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| DIMENT -<br>DIMENT -<br>DIMENT -<br>DIMENT -<br>DIMENT -<br>DIMENT -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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MULTIPL<br>M(21)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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MULTIPL<br>MI211<br>KEEP4, KEEP5,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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KEEP3.<br>HCD2. NCD3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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KEEPT,<br>NCD6. NCD7.                                                                                                                                                                                      | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>09JE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2004ENT<br>2004ENT<br>2004ENT<br>2004ENT<br>01M<br>COM<br>COM<br>2<br>3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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HULTIPL<br>H(21)<br>KEEP4, KEEP5,<br>HCD4, HCD3,<br>LJT, HST,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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KEEP7.<br>NCD6. NCD7.<br>NLT. TOL.                                                                                                                                                                         | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24APC<br>09JE0<br>09JE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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HP2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>11YPEL.IDJ.                                                                                                                                                          | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>09JE0<br>07FE0<br>07FE0<br>12FF0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2000 - 2000<br>2000 - 2000<br>2000 - 2000<br>2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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KEEP3.<br>IFORM. NM.<br>IFORM. NM.<br>IFORM. NM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SUPERPOSITION<br>R BAD DATA.SE<br>DBLE MULTIPLI<br>DBLEM MULTIPL<br>MI211<br>KEEP4. KEEP5.<br>MUT. NST.<br>ISTT. LTT.<br>ISTT. LTT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | I DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>ITYPEL.IDJ.                                                                                                                                                          | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>24APC<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>12FF0<br>13FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| NUENT -<br>NUENT -<br>NUENT -<br>NUENT -<br>COM<br>COM<br>2<br>3<br>4<br>5<br>COM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | COMP INPUTS:<br>COMP INPUTS:<br>NLEMS.CHECKS FOI<br>ACCUMULATES PH<br>ACCUMULATES PH<br>N121.NPT121<br>/ NP121.21. 21<br>KCD2. NCD3.<br>If COM. NH.<br>If COM. NH.<br>IP0. IP9.<br>IP0. IP9.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SUPERPOSITION<br>R BAD DATA-SE<br>DOLE MULTIPI<br>MI21)<br>KEP4- KEEP5,<br>NCD4- NCD5-<br>NJT- NST-<br>ISTT- LTT-<br>IP10-<br>NMI-MMC5-NMC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | I DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7.<br>NCD6. NCD7.<br>NLT. TOL.<br>ITYPEL.IDJ.                                                                                                                                                          | 07FE0<br>24AP0<br>1L Y24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>12FF0<br>13FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| XWENT -<br>XWENT -<br>XWENT -<br>XWENT -<br>DIMENT -<br>DIMENT -<br>DIMENT -<br>DIMENT -<br>COM<br>COM<br>2<br>3<br>4<br>5<br>COM<br>9 FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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                                                                                                                                                                                                                                | COMP INPUTS:<br>COMP INPUTS:<br>ILEMS.COMECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B121.NPT121<br>/ NP121.21. 21<br>KEEP2.KEEP3. 2<br>KEEP2.KEEP3.<br>IFORM.NM.<br>IFORM.NM.<br>IP3. NP2.<br>IP3. IP3.<br>INST.MALT -<br>IADLE 7 - I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPL<br>NOLEM MULTIPL<br>MI21)<br>KCEP4, KEEP5,<br>NCD4, MCD5,<br>NJT, RST,<br>ISTT, LTT,<br>IP10<br>,MM1,MMC5,MMC<br>COMPILATION 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | I DATA (TABLE 73 FOR<br>ITS UP STORAGE FOR FAMI<br>IERS.ECMO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>JTYPEL.IDJ.<br>:6.MDJT.MNLC<br>IABLE .///)                                                                                                                           | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| XWENT -<br>XWENT -<br>XWENT -<br>DIMENT -                                                                                                                    | SURIOUTINE COM<br>SULUTIONS<br>AND PRINTS<br>AND PRINTS<br>AND PRINTS<br>AND PRINTS<br>AND PRINTS<br>AND PRINTS<br>AND PRINTS<br>AND PRINTS<br>AND PRINTS<br>AND ADD<br>ADD<br>ADD<br>ADD<br>ADD<br>ADD<br>ADD<br>ADD<br>ADD<br>AD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | COMP INPUTS:<br>COMP INPUTS:<br>ILEMS.CHECKS FO<br>ACCUMULATES PR<br>ACCUMULATED PR<br>BI21.HPT121<br>/ NP121.21.21.21<br>/ NP121.22.21<br>/ KEEP2. KEEP3.1<br>IFOM. NM.1<br>HP1. NP2.<br>IP0. [P9.<br>MLJT.MLST.HMLT<br>TABLE 7 - 1<br>NO DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SUPERPOSITION<br>R BAD DATA.SE<br>DBLE MULTIPLI<br>DBLEM MULTIPL<br>MI211<br>KEEP4. KEEP5.<br>MUT. NST.<br>ISTT. LTT.<br>ISTT. LTT.<br>IP10<br>.MMM.MMC5.MMC<br>COMPLATION 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | I DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7,<br>NCD6. NCD7.<br>NLT. TGL.<br>ITYPEL.IDJ.<br>:6.MDJT.MNLC<br>(ABLE .///)                                                                                                                           | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07JE0<br>07FE0<br>07FE0<br>07FE0<br>12FF0<br>13FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| жиелт -<br>жиелт -<br>жиелт -<br>жиелт -<br>сою<br>сою<br>2<br>3<br>4<br>5<br>5<br>6<br>9<br>7<br>600<br>9<br>7<br>600<br>11<br>16<br>600<br>11<br>16<br>600<br>11<br>16<br>600<br>10<br>600<br>10<br>10<br>600<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IGUY INE COM<br>SUL UT INE<br>FAMILY PRO<br>SUL UT IONS.<br>AND PRINTS<br>AND PRINTS<br>ASIGN NPRO<br>KH /BLCK0.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | COMP INPUTS:<br>COMP INPUTS:<br>DLEMS.CHECKS FO<br>ACCUMULATES PM<br>ACCUMULATES PM<br>D121.MPT12)<br>/ NP121.21.21<br>/ NP121.21.21<br>/ NP121.21.21<br>/ NP121.21.21<br>/ NP121.21<br>/ N                                                                                                                | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPL<br>N(21)<br>KEP4- KEEP5-<br>NCD4- NCD5-<br>NJT- NST-<br>ISTT- LT-<br>IP10<br>- NMI-MMC5-MMC<br>COMPILATION T<br>- L) CMITTED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>:6.MDJT.MNLC<br>(ABLE .///)                                                                                                                           | 07FE0<br>24APO<br>24APO<br>24APO<br>24APO<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2000ENT -<br>2000ENT -<br>COMENT -<br>COMENT -<br>COMENT -<br>COMENT -<br>2<br>3<br>5<br>COME<br>9 FOR<br>10 FOR<br>11 FOR<br>11 FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | COMP IMPUTS:<br>COMP IMPUTS:<br>ILEMS.CHECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B121.NPT121<br>/ NP121.21. 21<br>KEEP2.KEEP3. 2<br>KEEP2.KEEP3. 2<br>KEEP2.KEEP3.<br>IFONI.NH.<br>IFONI.NH.<br>IFONI.NH.<br>TABLE 7 - 1<br>NO DATA<br>TABLES (2<br>NO ING DA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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MULTIPL<br>MI(21)<br>KEEPA- KEEPS-<br>NCDA- MCDS-<br>MJT- NST-<br>ISTT- LTT-<br>ISTT- LTT-<br>ISTT-<br>ISTT- LTT-<br>ISTT- LTT-<br>ISTT- LTT-<br>ISTT- LTT-<br>I                                                                                                                                                                                                                                                                 | L DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>CONDJT.MULC<br>(ABLE .///)<br>.///)<br>NCD15 PROBLEM PLISS.                                                                                           | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2000ENT<br>2000ENT<br>2000ENT<br>COMENT<br>COMENT<br>2<br>3<br>4<br>5<br>COME<br>9 FOR<br>10 FOR<br>11 FOR<br>12 FOR<br>12 FOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | COMP INPUTS:<br>COMP INPUTS:<br>NLEMS, OMECKS FOI<br>ACCUMULATES PM<br>ACCUMULATES PM<br>N121.MPT121<br>/ MP121.21. 21<br>/ MP121.21. 21<br>/ MP121.21. 21<br>/ MP12. MP3.<br>IPG. IP9.<br>IPG. IP9.<br>MUJT, MUST, MULT<br>TABLE 7 - 1<br>MO DATA<br>TABLE 7 - 1<br>MOLDING OA<br>TABLES (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SUPERPOSITION<br>R BAD DATA.52<br>DOLE MULTIPLI<br>DOLEM MULTIPL<br>M(21)<br>KED4. KEEP5.<br>KED4. KEEP5.<br>NCD4. NCD5.<br>NCT. NST.<br>LT. NST.<br>LT.<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI<br>DI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | A DATA (TABLE 7) FOR<br>ETS UP STORAGE FOR FAMI<br>TERS.CCHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7.<br>NCD6. NCD7.<br>NLT. TOL.<br>ITYPEL.IDJ.<br>C.MOJT.MILC<br>TABLE .///)<br>MEVIOUS PROBLEM PLUS.                                                                                                   | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>12FF0<br>13FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT<br>COMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GUY INE COM<br>SULUTIONS.<br>SULUTIONS.<br>AND PRINTS<br>INSIGN NPRO<br>INT /BLCCKO.<br>IN /BLK1/<br>ITYPE.<br>IABAN.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N.<br>N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | COMP INPUTS:<br>COMP INPUTS:<br>ILEMS.CHECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B12).MPT12)<br>/NP121.2). 2<br>(NP121.2).                                                                                                                                                                                                  | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPL<br>NI21)<br>KEEPA- KEEPS,<br>NCDA- NCDS-<br>NJT- NST-<br>ISTT- LTT.<br>IP10<br>- MMA-MMCS-MMC<br>COMPILATION T<br>- 6) OMITTED<br>TA FROM THE T<br>- /// )<br>DE BROW EN N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | I DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7.<br>NCD6. NCD7.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>:6.NDJT.MILC<br>(ABLE .//)<br>REVIOUS PROBLEM PLUS.<br>MARFES AND MH TIDI LEGS                                                                        | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2000ENT -<br>2000ENT -<br>2000ENT -<br>2000ENT -<br>2000ENT -<br>2<br>3<br>5<br>5<br>5<br>5<br>6<br>6<br>9<br>9<br>7<br>6<br>0<br>9<br>9<br>7<br>0<br>8<br>9<br>9<br>7<br>0<br>8<br>10<br>7<br>0<br>8<br>11<br>7<br>0<br>8<br>11<br>7<br>0<br>8<br>11<br>7<br>0<br>8<br>11<br>7<br>0<br>8<br>10<br>8<br>1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | IGUY INE COM<br>SULUTIONS.<br>AND PRINTS<br>INSION NPROI<br>ON /BLRI/<br>ITYPE.<br>[ABAN,<br>N.C.<br>NLC.<br>NLC.<br>NLC.<br>NLC.<br>NLC.<br>NLC.<br>NLC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | COMP INPUTS:<br>COMP INPUTS:<br>DLEMS.CHECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B121.NPT121<br>/ NP121.21. 21<br>KEEP2.KEEP3. 2<br>KEEP2.KEEP3. 2<br>KEEP2.KEEP3. 2<br>FORM.NO1. 1<br>P12.SP3.<br>FORM.NO1. 1<br>P13. HP2.<br>IP3. IP3.<br>HUJT.MIST.MULT<br>TABLE 7 - 1<br>NO DATA<br>TABLES (2<br>HOLDING DA<br>TWF FOI YOUNG<br>IMPUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPL<br>DOLEM MULTIPL<br>MI211<br>KEEPA- KEEPS-<br>MCD4- MCD5-<br>MJT- NST-<br>ISTT- LTT-<br>ISTT- LTT-<br>ISTT- LTT-<br>ISTT- LTT-<br>IST- LTT-<br>IST-<br>IST- LTT-<br>IST-<br>IST- LTT-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IST-<br>IS | L DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>CONDJT.MULC<br>(ADLE .///)<br>.///)<br>MREVIOUS PROBLEM PLUS.<br>NUMBERS AND MULTIPLIERS                                                              | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 20002NT -<br>20002NT -<br>20002NT -<br>DIMENT -<br>DIMENT -<br>COMM<br>COMM<br>COMM<br>2<br>3<br>4<br>5<br>COMM<br>9<br>FORM<br>10<br>FORM<br>11<br>FORM<br>12<br>FORM<br>13<br>FORM<br>13<br>FORM<br>13<br>FORM<br>14<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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                                                                                                                                                                                                                                | COMP INPUTS:<br>COMP INPUTS:<br>DLEMS, CHECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B121.mPT121<br>/ NP121.21. 21<br>/ NP121.21                                                                                                                                                                                                                                                             | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPI<br>NG121)<br>KEP4- KEEP5-<br>NCD4- NCD5-<br>NJT- NST-<br>ISTT- LT-<br>ISTT- LT-                                                                                                                                                                                                                                     | A DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>ERS.CCMO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7.<br>NCD6. NCD7.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>C.NDJT.MILC<br>(ABLE .///)<br>.///)<br>MREVIOUS PROBLEM PLUS.<br>NUMBERS AND MULTIPLIERS                                                               | 07FE0<br>24APO<br>24APO<br>24APO<br>24APO<br>24APO<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 20002NT -<br>20002NT -<br>20002NT -<br>DINENT -<br>DINENT -<br>DINENT -<br>DINENT -<br>DINENT -<br>DINENT -<br>DINENT -<br>DINENT -<br>DINENT -<br>COMMANNEL -<br>2<br>3<br>4<br>5<br>COMMANNEL -<br>2<br>10<br>5<br>COMMANNEL -<br>2<br>11<br>5<br>COMMANNEL -<br>2<br>12<br>5<br>COMMANNEL -<br>2<br>13<br>5<br>COMMANNEL -<br>2<br>14<br>5<br>COMMANNEL -<br>2<br>15<br>5<br>COMMANNEL -<br>2<br>15<br>5<br>COMMANNEL -<br>5<br>COMMANNEL | COUTINE         COUNTINE           SUBROUTINE         FAMILY           FAMILY         PROI           SULUTIONS         AND           AND         PRINTS           AND PRINTS         ASION NPROI           KHINS         INFROI           INYPE         IABAN           NLC         NLC           NM         PLCS           MAT         ISH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | COMP INPUTS:<br>COMP INPUTS:<br>DLEMS.COMECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B12).NPT12)<br>/NP121.2). 2<br>/NP121.2). 2<br>/NP121.2). 2<br>/NCD2, NCD3. 2<br>/NCD3. 2<br>/NCD                                     | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPL<br>NOLEM MULTIPL<br>MI21)<br>KEEPA- KEEPS-<br>NCDA- MCDS-<br>NJT- RST-<br>ISTT- LTT-<br>ISTT- LTT                                                                                                                                                                                                                                                                   | L DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7.<br>NCD6. NCD7.<br>NLT. TOL.<br>JTYPEL.IDJ.<br>:6.NDJT.NNLC<br>(ABLE .///)<br>.///)<br>REVIOUS PROBLEN PLUS.<br>NUMBERS AND MULTIPLIERS                                                              | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2000ENT -<br>2000ENT -<br>2000ENT -<br>COMENT -<br>COM                                                                                                                   | UUTINE COUNTINE<br>FAMILY PROU<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTION | COMP IMPUTS:<br>COMP IMPUTS:<br>NLEMS.COMECKS FOI<br>ACCUMULATES PM<br>ACCUMULATES PM<br>N121.MPT121<br>/ MP121.21.21<br>/ MP121.21.21<br>/ MP121.21.21<br>/ MP12.02.21<br>/ MP12.02.21<br>/ MP12.02.02<br>/ MP1.00<br>/ MP1.0 | SUPERPOSITION<br>R BAD DATA.52<br>OBLE MULTIPLI<br>DOLLM MULTIPLI<br>M(21)<br>KEP4. KEEP5.<br>MCD4. MCD5.<br>NCD4. MCD5.<br>ISTT. LT.<br>ISTT. LT.<br>ISTT. LT.<br>ISTT. LT.<br>ISTT. LT.<br>ISTT. LT.<br>IST. LT.<br>IS                                                                                                                                                                                                   | L DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEPG. KEEPT,<br>NCDG. NCDT.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>:6.NDJT.MNLC<br>(ADLE .///)<br>.///)<br>MREVIOUS PROBLEM PLUS.<br>NUMBERS AND MULTIPLIERS                                                             | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>C6.NDJT.NNLC<br>(ABLE .///)<br>.///)<br>MEVIOUS PROBLEM PLUS.<br>NUMBERS AND MULTIPLIERS                                                               | 07FE0<br>24APO<br>24APO<br>24APO<br>24APO<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| DINERT -<br>DINERT -<br>DINERT -<br>DINERT -<br>DINERT -<br>DINERT -<br>COM<br>COM<br>COM<br>COM<br>COM<br>COM<br>COM<br>COM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | COUTINE         COUNTINE           SUBROUTINE         FAMILY           FAMILY         PROI           SULUTIONS.         AND           AND         PRINTS           INSION         NPROI           CON         /BLK1/           ITYPE.         IABAN.           NLC.         NLC.           NM.         /BLK3/           MAT         ISHA           <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | COMP INPUTS:<br>COMP INPUTS:<br>DLEMS.COMECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B12).NPT12)<br>/NP121.2). 2]<br>KEEP2.KEEP3. 2]<br>KEEP2.KEEP3. 2]<br>NCD2.NCD3. 2]<br>NCD2.NCD3. 2]<br>NCD2.NCD3. 2]<br>NCD2.NCD3. 2]<br>NCD2.NCD3. 2]<br>NCD2.NCD3. 2]<br>NCD2.NCD3. 2]<br>NCD3.COMP.CANT.<br>TABLES (2)<br>NCD ING DA<br>TABLES (2)<br>NCD ING DA<br>TABLES (2)<br>NCD ING DA<br>TABLES (2)<br>NCD ING DA<br>TABLES (2)<br>NCD ING DA<br>S.<br>PROBLEM NU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPLI<br>DOLEM MULTIPL<br>MI21)<br>KEEPA- KEEPS-<br>NCDA- NCDS-<br>NUT. NST.<br>ISIT- LTT-<br>ISIT- LT                                                                                                                                                                                                                                                                   | L DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7,<br>NCD6. NCD7.<br>NLT. TOL.<br>1TYPEL.IDJ.<br>                                                                                                                                                      | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 20000017 -<br>20000017 -<br>20000017 -<br>20000017 -<br>2000000000000000000000000000000000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IGUYINE COMUTINE<br>SUBROUTINE<br>FAMILY PRO<br>SULUTIONS.<br>AND PRINTS<br>INSIGN NPRO<br>NM /BLC1/<br>ITYPE.<br>IABAR.<br>NLC.<br>NH /BLKJ/<br>IAT ( 35H<br>IAT ( 35H<br>IAT ( 35H<br>IAT ( 50H<br>//5K.20MU<br>IAT (5X.A1.)<br>IAT ( ////.<br>SOH<br>IAT ( ////.<br>SOH<br>IOH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | COMP IMPUTS:<br>COMP IMPUTS:<br>DLEMS, CHECKS FOI<br>ACCLUMALATES PH<br>ACCLUMALATES PH<br>N121.NPT121<br>/ NP121.21. 21<br>KEP2. KEP3. 21<br>KEP2. KEP3. 21<br>KEP2. KEP3. 21<br>FOM. MH. 1<br>HP1. HP2.<br>IP0. IP9.<br>HUJT, MKST, HMLT<br>TABLE 7 - 1<br>HOLDING DATA<br>TABLE 7 - 1<br>HOLDING DA<br>TAFFRI 'OWING<br>IMPUT<br>#ROB MULTI<br>IA.10X, E10.31<br>SX.<br>PROBLEM #/.5X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SUPERPOSITION<br>R BAD DATA-SE<br>DOLE MULTIPI<br>MI21)<br>KEEP4. KEEP5.<br>NCD4. NCD5.<br>NJT. NST.<br>ISTT. LT.<br>ISTT. LT.<br>IST. LT.<br>IST. ANCS.NMC<br>COMPILATION T<br>- 6) OMITTED<br>TA FROM THE F<br>. // )<br>OF PROBLEM IN<br>PLIER.// )<br>MORES AND MLL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | A DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>ERS.CCMO PRINTS DATA<br>.IERS<br>, KEEP6. KEEP7.<br>NCD6. NCD7.<br>NLT, TOL.<br>1TYPEL.DJ.<br>C.NDJT,NNLC<br>TABLE .///)<br>NREVIOUS PROBLEM PLUS.<br>NUMBERS AND NULTIPLIERS                                                                         | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>10FE0<br>10FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2000 NT -<br>2000 AT -<br>2000 AT -<br>2000 AT -<br>COM<br>COM<br>COM<br>2<br>3<br>4<br>5<br>COM<br>9 FOR<br>10 FOR<br>12 FOR<br>2<br>14 FOR<br>15 FOR<br>15 FOR<br>2<br>3<br>4<br>4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | IGUY INE COM<br>SULUTIONS.<br>SULUTIONS.<br>AND PRINTS<br>INSIGN NPRO<br>INT SIGN NPRO                                                                                                                                                                             | COMP INPUTS:<br>COMP INPUTS:<br>ILEMS.COMECKS FOI<br>ACCUMULATES PR<br>ACCUMULATES PR<br>B12).MPT12)<br>/NP121.2). 2<br>(NP121.2).                                                                                                                                                                                                 | SUPERPOSITION<br>R BAD DATA-SE<br>DBLE MULTIPL<br>MI21)<br>KEEPA- KEEPS,<br>NCDA- NCDS-<br>NJT- NST-<br>ISTT- LTT.<br>ISTT- LTT.<br>ISTT- LTT.<br>ISTT- LTT.<br>ISTT- AFRON THE T<br>- 6) ONITTED<br>TA FRON THE T<br>- 7// 1<br>OF PRODLEM IN<br>PLIER.// 1<br>MBERS AND MUL<br>MBERS IN ORDE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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KEEP7.<br>NCD6. NCD7.<br>NLT. TOL.<br>ITYPEL.IDJ.<br>:6.NDJT.MILC<br>(ABLE .///)<br>MEVIOUS PROBLEM PLUS.<br>NUMBERS AND MULTIPLIERS<br>.TIPLIERS USED FOR THIS<br>:R.PROBLEMS WERE INPUT                  | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>10JE0<br>00JE0<br>10FE0<br>10FE0<br>10FE0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CHAR NT -<br>CHAR NT -                                                                                                                                                           | UUTINE COUNTINE<br>FAMILY PROU<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTIONS<br>SULUTION | COMP IMPUTS:<br>COMP IMPUTS:<br>NLEMS.CHECKS FOI<br>ACCUMULATES PM<br>ACCUMULATES PM<br>N121.MPT121<br>/ MP121.21.21<br>/ MP121.21.21<br>/ MP121.21.21<br>/ MP121.21.21<br>/ MP12.22.21<br>/ MP12.22.21<br>/ MP12.22.21<br>/ MP12.21.21<br>/ MP13.51.44<br>/ MP1.451.44<br>/ MP1.451.44<br>/ MP1.451.44<br>/ MP1.451.451.451<br>/ MP0BLEM MU<br>MPROBLEM MU<br>MPROBLEM MU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUPERPOSITION<br>R BAD DATA.52<br>OBLE MULTIPLI<br>OBLEM MULTIPLI<br>M(21)<br>KEP4. KEEP5.<br>MCD4. MCD5.<br>NCD4. MCD5.<br>NCT. NST.<br>LTT. NST.<br>LTT.<br>ISTT. LTT.<br>ISTT. LTT.<br>ISTT. LTT.<br>ISTT. LTT.<br>ISTT. LTT.<br>ISTT. LTT.<br>ISTT. LTT.<br>IST. LTT.<br>MDERS AND MULTIPLIER.//                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | L DATA (TABLE 73 FOR<br>ETS UP STORAGE FOR FAMI<br>IERS.ECHO PRINTS DATA<br>.IERS<br>, KEEPG. KEEPT,<br>NCDG. NCDT.<br>NLT. TOL.<br>ITYPEL.IDJ.<br>CO.NDJT.MULC<br>IABLE .///I<br>.///I<br>MREVIOUS PROBLEM PLUS.<br>NUMBERS AND MULTIPLIERS<br>.TIPLIERS USED FOR THIS<br>IR PROBLEMS WERE INPUT<br>/ ) | 07FE0<br>24AP0<br>24AP0<br>24AP0<br>24AP0<br>09JE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0<br>07FE0 |

|   | 30 FORMAT ( SOH PROBLEM TYPE 3 MUST FOLLOW A TYPE 2 OR TYPE 3)           | 07FEO   |
|---|--------------------------------------------------------------------------|---------|
|   | 40 FORMAT ( 45H PROBLEM TYPE 4 MUST HAVE DATA IN TABLE 7)                | 07FE0   |
|   | SU FORMAT ( SOH PROBLEM TYPE & MUST FOLLOW A TYPE 2+ TYPE 3+ +           | O7FE0   |
|   | 2 10HOR TYPE & I                                                         | O7FE0   |
|   | 60 FORMAT 1 46H A PROBLEM NUMBER MAY NOT BE REPEATED IN A.               | 07FE0   |
|   | 2 SOH SERIES OF RELATED PROBLEMS                                         | 07FE*   |
|   | 70 FORMAT ( 50H STORAGE LIMITATION ON NUMBER OF CONSECTUTIVE .           | O7FEO   |
|   | 2 25H TYPE 3 PROBLEMS EXCEEDED                                           | O7FEO   |
|   | 80 FURMAT ( SOH LAST PROBLEM WAS NOT TYPE 4 - HENCE DATA CAN .           | O7FEO   |
|   | 2 15H NOT BE HELD                                                        | OTFEO   |
|   | 90 FORMAT ( 20H PROBLEN NUMBER +AS+ 20H HAS NOT BEEN WORKED+             | 09FEO   |
|   | 2 39H IN THIS SERIES OF RELATED PROBLEMS)                                | O7FEO   |
|   | PRINT 9                                                                  | TEFO    |
|   | IF STYPE ALTA & AMD. NCDT ANE. 0) GO TO B360                             | OTEEO   |
|   | 60 TO ( 1200, 1050, 1060, 1250 ) LTYPE                                   | 07650   |
|   | COMMENT - LITTPE - 2 - PARENT PROBLEM - FIRST PROBLEM OF SERIES IN WHICH | 054110  |
|   | COMMENT - THE STIFFNESS OF THE STRUCTURE DOES NOT CHANGE - THE RESULTS   | 05MYO   |
|   | COMMENT - WE THE PARENT AND IT'S DEESPEING ARE STORED SO SUPPERPOSITION  | 05NYO   |
|   | COMPENT - SOLITIONS FAN AF MADE FOR FANTLY PROBLEMS                      | OLMYO   |
|   |                                                                          | 07660   |
|   |                                                                          | 09 150  |
|   |                                                                          | 00 50   |
|   |                                                                          | 7660    |
|   | (CAMERT - LIVE - 3 - OFFSERING PROBLEM - SOLUTION OF PARENT FOR ANOTHER  | POLINYO |
|   | COMPANY - LUAD CONSTITUTE                                                | 054490  |
| - | 1040 IF (ITYPE) -FO. 2 -OF. ITYPEL -FO. 31 60 TO 1070                    | 07650   |
| • |                                                                          | 7550    |
|   |                                                                          | 07550   |
|   |                                                                          | 011120  |
|   |                                                                          | 07320   |
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|   |                                                                          |         |
|   | 1300 CONTINUE - LITE - L - READEAN PROBLEM                               | 07550   |
|   |                                                                          | 3550    |
|   |                                                                          | 1720    |
|   |                                                                          | OFFED   |
|   | COMMENT - TITLE FAMILY PROBLER - SUPERPOSITION SOLUTION OF               | OPHTO   |
|   | COMPERT - A GROUP OF RELATED OFFSPRING PROBLEMS AND POSSIBLY THEIR       |         |
|   | COMPENT - PARENT                                                         | 27770   |
|   |                                                                          | 07720   |
|   |                                                                          | OVEED   |
|   | IF (ITTPEL .EG. I .GR. ITTPEL .EG. 0) GO TO 8500                         | OVEED   |
|   | THE LET A AND. FIFT TO, I GO TO BROO                                     | OWEO    |
|   |                                                                          | 77 60   |
|   | [* IKEEP7 .EG. ]] GU 10 1350                                             | OTFEO   |
|   | COMPERT - ZERU NULTIPLIERS                                               | USHY0   |
|   | UU 1320 I # 1+MLC                                                        | UTFEO   |
|   | 1320 ZA(1) = 0.0                                                         | UTFEO   |
|   | uo 10 1400                                                               | DTFEO   |
|   | 1350 PRIMI 12                                                            | 7FEO    |
|   |                                                                          | OTFEO   |
|   | PRIMI 13                                                                 | 7FEO    |
|   | COMMENT - READ AND PRINT PROBLEM NUMBERS AND HULTIPLIERS                 | 05MYO   |
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| C deseased<br>C SUBROUTINE<br>C SUBROUTINE F<br>CONNENT - SUBROUTINE<br>CONNENT - PRISMATI                                                                                                                                                                                                                         | NE SUBROUTIN<br>DRAST ( RN, RO, W, SL<br>NINST ( RN, RO, W, SL<br>NE FORMST CALCULATES<br>C AND VARIABLE CROSS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| C SUBROUTINE PO<br>C SUBROUTINE PO<br>C SUBROUTINE PO<br>CONNENT - SUBROUTINE PO<br>CONNENT - PRISMATI<br>CONNENT - PRISMATI                                                                                                                                                                                       | NE SUBROUTIN<br>DRMST ( RM. RO, W. SL<br>NE FORMST CALCULATES<br>C AND VARIABLE CROSS<br>VECTOR SMMILL = 1,13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| C SUBROUTINE P<br>C SUBROUTINE P<br>C SUBROUTINE P<br>COMMENT - SUBROUTINE<br>COMMENT - PRISMATIN<br>COMMENT - COMPACT<br>DIMENSION FM                                                                                                                                                                             | NE SUBROUTIN<br>DRUST ( RN, RO, W, SL<br>NE FORMST CALCULATES<br>C AND VARIABLE CROSS<br>VECTOR SPMT(1 = 1,13<br>N(6), SPMT(13)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| INE         SURROUTINE           1NE         SURROUTINE           * L4, L6 I         OBAPO           OR BOTH         24APO           D STORES IN         24APO           24APO         24APO           00 STORES IN         24APO           00 STORES IN         24APO           00 STORES IN         24APO           00 STORES IN         24APO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| C deserver<br>C SUBROUTINE<br>C SUBROUTINE<br>C SUBROUTINE<br>COMMENT - SUBROUTI<br>COMMENT - PRISMATI<br>COMMENT - PRISMATI<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM                                                                                                                                       | NE SUBROUTIN<br>DRINST ( RN. RO, W. SL<br>NE FORMST CALCULATES<br>C AND VARIABLE CROSS<br>VECTOR SMIT(1 = 1,1)<br>H(6), SHOT(13)<br>(L3,L6), RO(L61. W(L6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | E SUBROUT<br>• SU, SMMT. LI. L3<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AN<br>1<br>1. SL(L3). SU(L4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | INE SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SU |
| C 4000000000<br>C SUBROUTINE<br>C 50000000<br>C 500000000<br>C 5000000000<br>C 50000000000                                                                                                                                                                                                                         | NE SUBROUTIN<br>DOUNST ( RN. RO. W. SL<br>NE FORNST CALCULATES<br>C AND VARIABLE CROSS<br>VECTOR SMMT(1 = 1,13<br>H(6). SMOT(13)<br>(13,46). RO(16). W(16<br>K2/ DXS( 50). DYS(                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | E SUBROUT<br>SUD SMOTE LIE LS<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AN<br>)<br>1. SL(LS). SU(LA)<br>SO), ZLS( S0).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | INE SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SU |
| C SUBROUTINE<br>C SUBROUTINE<br>C SUBROUTINE<br>C SUBROUTINE<br>COMENT - SUBROUTINE<br>COMENT - PRISMATI<br>COMENT - COMPACT<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION RM                                                                                                       | Bits         Subrows         Subrows           DRMST (1 RM, RO, W, SL         ROMNST CALCULATES           C AND VARIABLE CROSS         VECTOR SMMT(1 - 1,1)           M161, SMMT(13)         (1,2,6), RO(161, W(14, S))           (L2, L5, S0), DYST         S0), PRAES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | E SUBROUT<br>• SU, SMHT, L1, L3<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AN<br>1<br>1. SL(L3), SU(LA)<br>501, 2L5( 50),<br>501, MCDS( 50),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | INE SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SU |
| C deserver<br>C SUBROUTINE F<br>C SUBROUTINE F<br>C SUBROUTINE F<br>COMMENT - SUBROUTI<br>COMMENT - PRISMATI<br>COMMENT - PRISMATI<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN                 | NE         SUBROUTIN           DRMST ( RN, RO, W. SL           NE FORMST CALCULATES           C AND VARIABLE CROSS           VECTOR SMMT(1 = 1,1)           M(6). SUMT(13)           113,L61. ROIL61. WILL           L2,L61. ROIL61. WILL           L2,L61. ROIL61. WILL           L3,L61. ROIL61. WILL           L9. PRF(50). DYSI           D. PRF(50). IPINM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | E SUBROUT<br>• SU, SMMT. L1. L3<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AM<br>1<br>1. SL(L3). SU(L4)<br>SOI, ZLS( SOI.<br>50). MCDS( SO).<br>( SO). MCDS( SO).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | INE SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SU |
| C 4000000000<br>C SUBROUTINE<br>C 50000000<br>C SUBROUTINE FO<br>COMENT - SUBROUTINE<br>COMENT - PRISMATO<br>COMENT - PRISMATO<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>COMMUN /BLOCO<br>2 DC251 50<br>3 LOPON / SLOCO                                                                                   | NE         SUBROUTIN           DRUNST ( RM. RO. W. SL           DRUNST CALCULATES           C AND VARIABLE CROSS           VECTOR SMMT(1 = 1,13           N(5). SMOT(13)           (13,46). RO(16). W(16           K2/ DXS1 50). DYS1           ). PRF( 50). PRAE(           ). PRF( 50). IPIMM           K5/ XL\$1 75). XRS1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | E SUBROUT<br>. SU, SMNT, L1, L3<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AN<br>)<br>1. SL(L3), SU(L4)<br>50), ZLS( 50),<br>50), NCDS1 50),<br>( 50), NCS1 ( 50),<br>75), FL1 75),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | INE SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SU |
| C 400000000<br>C SUBROUTINE<br>C SUBROUTINE<br>C SUBROUTINE<br>COMENT - SUBROUTINE<br>COMENT - PRISNATI<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>COMMUN /BLOC<br>2 DC251 50<br>3 LOPOPI 55<br>COMMON /BLOC<br>2 SIRL 751 | NE         SUBROUTIN           DRMST ( RM, RO, W, SL           CAMD VARIABLE (ROSS           VECTOR SMMT(13)           (L3,L4), RO(L61, W(L64, W(L64, K2/D35))           D), PR( SO), PRAC(D), PRAC(D), PRAC(D), PRAC(D), SO)           D), PRIMIT SO), IPINM           SVL(175), S2L(                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | E SUBROUT<br>• SU: SMOIT. LI. L3<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AN<br>1<br>• SL(L3). SU(LA)<br>50). ZLS( 50).<br>50). NCDS( 50).<br>50). RCS( 50).<br>751. FLI 75).<br>751                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | INE SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SURROUTINE<br>SU |
| C 444 888 84<br>C SUBROUTINE F<br>C SUBROUTINE F<br>C SUBROUTINE F<br>COMPENT - SUBROUTI<br>COMMENT - PRISMATI<br>COMMENT - FOMPACT<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>DIMENSION FN<br>COMMON /BLOCK<br>2 STRL 1751<br>COMMON /BLOCK                                                               | NE         SUBROUTIN           DRMST ( RN, RO, W, SL           NE FORMST CALCULATES           C AND VARIABLE CROSS           VECTOR SPMIT(1 = 1,15)           M(6), SPMIT(13)           (13,L6), RO(L6), W(L6), W(L6), SPMIT(13)           Jo PRF( 50), PARE(10), PRF(150), PRF(150), PRF(150), PRF(150), SPMIT(150), PRF(150), SPMIT(150), | E SUBROUT<br>• SU, SMMT. L1. L3<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AM<br>1<br>• SL(L3). SU(L4)<br>SO1. ZLS( SO1.<br>50. MCDS( SO).<br>( SO1. MCDS( SO).<br>( SO1. MCDS( SO).<br>751. FL( 75).<br>751.<br>SX( 42).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | LA. LA IA IN CONTROLUCION<br>LA. LA IA IN CONTROLUCIÓN<br>ALLA IA IN CONTROLUCIÓN<br>ALLA IA IN CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLUCIÓN<br>CONTROLICIÓN<br>CONTROLUCI                                                         |
| C 400000000<br>C SUBROUTINE<br>C 50000000<br>C SUBROUTINE<br>C 50000000<br>C SUBROUTINE<br>COMMENT - SUBROUTINE<br>COMMENT - SUBROUTINE<br>COMMENT - COMPACT<br>DIMENSION FM<br>DIMENSION FM<br>DIMENSION FM<br>COMMON /BLOCC<br>2 SIL 4751<br>COMMON /BLOCC<br>2 SIL 421,                                         | NE         SUBROUTIN           DRUNST ( RM. RO. W. SL           NE FORMST CALCULATES           CAMD VARIABLE CROSS           VECTOR SMMT(1 = 1,13           H(1). SMMT(13)           (1).LSL61. W(L6           K2/ DXS1 50). DVS1           D. IPIMEr 50). IPIME           K9/ RLS1 751. X2L1           K7/ F1 423. AEI A           QX1 423. QV1 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | E SUBROUT<br>. SU: SMMT. L1. L3<br>STJFFMESS MATRIX F<br>SECTION MEMBERS AN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | INE SURROUTINE<br>.L4, L6   OBAPO<br>OR BOTH 24APO<br>D STORES IN 24APO<br>OBAPO<br>OBAPO<br>OBAPO<br>DCIS( 501, 24APO<br>DCIS( 501, 24AO<br>IAROPS( 501, 24AO<br>ACL ( 751, 26JAO<br>26JAO<br>SY(421, 26JAO<br>ACL 20, 76AO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| C 400 000000<br>C SUBROUTINE<br>C SUBROUTINE P<br>COMMENT - SUBROUTINE<br>COMMENT - PRISMATI<br>COMMENT - PRISMATI<br>DIMENSION RM<br>DIMENSION RM<br>DIMENSION RM<br>COMMON /BLOCI<br>2 SIL 1 751<br>COMMON /BLOCI<br>2 SIL 4 21,<br>3 B1 421,                                                                    | NE         SUBROUTIN           DRMST ( RM. RO. W. SL           CAMD VARIABLE (ROSS           VECTOR SPMT(I = 1,13)           H(6). SPMT(I = 1,13)           H(6). SPMT(I = 1,13)           L).L(6). RO(L(6). W(L(6). W(L(6)))           D). PR(F SO). PRAE(           D). [PIML( SO). 1PIMM           KS/ RLS( 75). SL(1           K7/ F( 42). AE( 42). O( 4           Al( 42). O( 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | E SUBROUT<br>• SU: SMONT. L1. L3<br>STIFFNESS MATRIX F<br>SECTION MEMBERS AN<br>1<br>• SL(L3). SU(L4)<br>501. ZLS( 501.<br>501. NCDS( 501.<br>501. RCSI (50).<br>751. FLI 751.<br>751.<br>21. SX( 421.<br>1. OX( 421.<br>1. OX( 421.<br>1. OX( 421.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | INE SURROUTINE<br>. L4, L6 I OBAPO<br>OR BOTH ZAAPO<br>D STORES IN ZAAPO<br>OBAPO<br>DCIS(501, 24APO<br>OBAPO<br>DCIS(501, 24AO<br>AAC 501, 24AO<br>SWC(5013) IIFEO<br>AEL(751, 26AO<br>SWC(5013) Z6AO<br>SWC(5013) Z6AO<br>ACL 751, 26AO<br>OCAO<br>SY1421+ 26AO<br>ACAO<br>SY1421+ 26AO<br>OV(421+ 26AO<br>OV(421+ 26AO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| A 07/A21-             | 411/471                        | W1/431.       | 41/471.        | 11314 31.  | 1 14000         |
|-----------------------|--------------------------------|---------------|----------------|------------|-----------------|
| 4 V2(A1).             | W71471                         | C#7(431.      | EPV(A3).       | 5974433    | 1 1480          |
| A Dyress.             | DV/431.                        | 01/411        | Carrent        | C          | 1 1 1 1 1 1 1 1 |
| B RALWERS             | KIL4277                        |               |                |            | 1.3404.0        |
| COMMON /BLK1/         | RECPZ+ REEPS                   | In KEEPNA KI  | LEPS, KLEP6,   | LEEPT,     | 26JA0           |
| 2 11YPE+              | NGDZ NCD3                      | NC04 + N      | CD5, MCD6,     | NCD7.      | 26JA0           |
| 3 1ABAN,              | LFORM. NM.                     | NJT. N        | ST+ NLT+       | TOL.       | 26JA0           |
| 4 H.                  | HP1. HP2.                      | ISTT, L       | T. ITYPEL.     | 10J+       | 12FE0           |
| 5 NLC+                | 108. 109.                      | 1010          |                |            | 13FE0           |
| COMMUN /BLK2/ 3       | xcxR.x1.x2.1                   | 1.12.NO.H.    | IN-HSO-HCU-X2  | L f        | 26JA0           |
| COMMON /BLK3/         | HAJT MAST .H                   | ILT. HHH. HHC | .MNC . MDJT .M |            | OTFEO           |
| COMMON ZBLKAZ         | ST1.ST2.ST8.S                  | TA-STS.STA    |                |            | 26.140          |
|                       |                                |               |                |            | 08400           |
|                       | W 300                          |               |                |            | 00400           |
|                       |                                |               |                |            | 1 MMMA          |
| COMMENT - SET TENPOR  | ART CONTROL C                  | UNSIANIS P    | W 21164 1465   | 1211       | 13410           |
| 16 Jun                | T # [PINL(15)                  |               |                |            | ZEJAU           |
| 1PINR                 | T = 1PINR(151                  | 111           |                |            | 26JA0           |
| ZL = ;                | ZLS(ISTT)                      |               |                |            | 26JA0           |
| PRFT                  | PRF(LSTT)                      |               |                |            | 26JA0           |
| PRAET                 | - PRAE(ISTT)                   | )             |                |            | 26 JAO          |
| NCDST                 | . HCDS(LSTT)                   | 1             |                |            | 26JA0           |
| MC51T                 | . NC51(1STT)                   |               |                |            | 26.JA0          |
| IF INCOST             | .W. 01 60 10                   | 2100          |                |            | 26.140          |
| commut = 201 cmatic   |                                |               |                |            | 11000           |
|                       |                                |               |                |            | 1 9440          |
| COMMENT - COMPUTE CO  | ASTANTS AND A                  | VIAL PILLE    | ME 226 2       |            | 13440           |
| 262 -                 | 21.+21.                        |               |                |            | ZEJAU           |
| ZL3 -                 | ZL2#ZL                         |               |                |            | ZGJAO           |
| SPUTC                 | 1) = PRAET/ZL                  | •             |                |            | 26JA0           |
| SMATE                 | 2) + -SMAT(1)                  | 1             |                |            | 26 JAO          |
| SHATE                 | 101 - SHHT(1)                  | 1             |                |            | 26JA0           |
| 1F (1P1m).T           | FO. O AND                      | 1PINRT .E     | 0 01 60 TO 1   | 500        | 26JA0           |
| COMMENT - ZERO FLEXU  | PAL STIFFHESS                  | VALUES        |                |            | 134170          |
| S THE                 | NI - CHINTIAL                  |               |                | -0         | 26.180          |
|                       |                                |               |                |            | 34 140          |
|                       |                                |               | . 30011111 -   |            | 20040           |
| 20011                 |                                |               |                |            | 26340           |
| IP CIPINLT            | "Ede 1 "VUD                    | IPENKT 4E     | 4 11 60 10 Z   | 000        | ZOJAU           |
| COMMENT - CUMPUTE FL  | EXURAL STIFF                   | ESSES FOR I   | IEMBER PINNED  | AT ONE END | 1 3MAO          |
| SPHT (                | 3) = 3.0+PRF1                  | 7263          |                |            | 26 JA0          |
| SMMT (                | 11) - SMAT(3)                  |               |                |            | 26JA0           |
| SHOLT ( )             | 5) = ~ <u>s</u> mit(\$)        | ł             |                |            | 26JA0           |
| 1F (1P1NRT            | .EQ. 11 GO 1                   | 0 1700        | •              |            | 26 JAO          |
| SMMT                  | 61 - 3.0*PRF1                  | 1/262         |                |            | 26.JAO          |
| SHINT C               | 121                            | u -           |                |            | 26 JAO          |
| SMMT C                | 131 - 3.0+PRF                  | 1/21          |                |            | 26JA0           |
| 60 TO 2000            |                                |               |                |            | 74.140          |
| 1700 2000             |                                |               |                |            | 74 140          |
|                       | 4) 4 Jevernei<br>7. – 3 Ammeri |               |                |            | 26 340          |
| 24411                 | 11 - 3404PRP                   |               |                |            | 20,00           |
| SMALL                 | 81 a - 24eri(4)                | ,             |                |            | UALOS           |
| GU TO 2000            |                                |               |                |            | 26 JAO          |
| CUMPLAT - CUMPUTE FLI | EXURAL STIFFA                  | IESSES FOR    | REPORT WITH R  | 1010       | 1 3M YO         |
| COMMENT - CUNNECTION  | S AT BOTH JOI                  | INTS          |                | ,          | 13MYO           |
| 1800 SPWT1:           | 31 = 12.0+PRF                  | 77/263        |                |            | 26 JAO          |
| SMITE                 | 41 = 6.0*PRF1                  | 1/242         |                |            | 26 JA 9         |
| SPUT (                | 5) = -SHHT(3)                  | -             |                |            | 26 JA0          |
| SHIET (               | AL . SPOTIAL                   |               |                |            | 26 JA0          |
| Calat I               | 71 . A. ORPEFI                 | 771           |                |            | 26.140          |
|                       |                                |               |                |            | 74 140          |
| Plane 1 f             | At a _3tau((d)                 | •             |                |            | 10040           |

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|           | SWIT (9) = 0.50 SWIT (7)                                      | 26 JA0  |
|-----------|---------------------------------------------------------------|---------|
|           | SPOT (11) - SPOT (3)                                          | ZEJAO   |
|           | SMUT(12) = -SMUT(6)                                           | ZEJAN   |
|           | SPUT(13) - SPUT(7)                                            | 26JA0   |
| 2008      | IFORM = 0                                                     | 26 JAO  |
|           | 60 TO 9900                                                    | 26JA0   |
| 2100      | CONTINUE                                                      | 26JA0   |
| CONVENT ~ | NONPRISHATIC HENGERS                                          | 2 2MYO  |
| CONNENT - | COMPUTE CONSTANTS FOR MEMBER SOLUTIONS FOR STIFFNESS VALUES   | 13MY0   |
|           | TH = 2L/H                                                     | 26 JAO  |
|           | N                                                             | 26 JA0  |
|           |                                                               | 26.JA0  |
|           |                                                               | 26.JA0  |
|           |                                                               | 26.JA0  |
|           |                                                               | 24.140  |
| -         | CURRING ALCOST ALCOSTIDES NEWER STIFFNESS DATA F. AF.         | 1 30 70 |
| COMMENT - | avenue list bister bisterices where differences bein it with  | IWYA    |
|           |                                                               | 11550   |
|           |                                                               |         |
| COMENT -  | along hender for heathail all - ale                           | 1 34110 |
|           |                                                               | 26340   |
|           |                                                               | 26.040  |
|           |                                                               | 26.340  |
|           |                                                               | 26.340  |
|           |                                                               | 26340   |
|           |                                                               |         |
| COMENT -  | BET HERBER END RESTRAINTS TO INDERFY POR SIX HERBER SOLUTIONS | 1 34110 |
|           | SX(1) = SX(10-1) = 1.0249                                     | ZEJAO   |
|           | ST(1) - ST(N-1) - 1.0ETT                                      | ZEJAO   |
|           | SZ(1) = SZ(10) = 1.0099                                       | 26JA0   |
| CONNENT - | ZERO PINNED END ROTATION RESTRAINTS                           | 1 34440 |
|           | $1F \ ( \ IPIMLT \ .EQ. \ 1) \ SZ(1) = 0.0$                   | ZEJAQ   |
|           | )F ( [P]NRT .EQ. 1) SZ(MP1) = 0.0                             | SETUR   |
|           | PLT = 1                                                       | 26 JAO  |
|           | ML = 1                                                        | 26 JAO  |
| CONNENT - | ZERO MEMBER LOADS QX, QY, QZ                                  | I 3MYO  |
|           | DO 3100 [ = 1,MP2                                             | 26JA0   |
| 3100      | GR(1) = GV(1) = GZ(1) = 0.0                                   | 26JA0   |
| COMMENT - | AKIAL SOLUTION FOR UNIT AXIAL DISPLACEMENT AT FROM JOINT      | 13440   |
|           | QX(1) = 1.0 E79                                               | 26 JAO  |
| COMMENT - | SUBROUTINE ARIAL SOLVES FOR ARIAL DISPLACEMENTS OF MEMBER     | 13HY0   |
| CAL       | L ARIAL (MLT)                                                 | 26.JA0  |
|           | G(1) = 0.0                                                    | 26 JAN  |
|           | GY(1) = 1.00E99                                               | 26JA0   |
| CONNENT - | LATERAL SOLUTION FOR UNIT LATERAL DISPLACEMENT AT FROM UNIT   | 1 3HYO  |
|           | NF\$48 = 12                                                   | OBAPO   |
| COMMENT ~ | SUBROUTINE GRIPZA SOLVES FOR LATERAL PISPLACEMENTS AND        | 1 3MYO  |
| COMMENT - | ROTATIONS OF MEMBERS                                          | 13440   |
| CAL       | L SRIPZA ( RH, RO, W, SL, SU, L3, L4, L6, 3 )                 | 15440   |
|           | $QY(1) = 0_0$                                                 | 26.JA0  |
| CONNENT - | SUBROUT THE MEMERID SOLVES FOR END FORCES ON MEMBER           | 1 3HYO  |
| Č Č Č Č L | L NEHEND ( V. FINI, L6 )                                      | OBAPO   |
| CONNENT - | SET STIFFNESS VALUES EQUAL TO MEMBER-END-FORCES               | 1 3HYO  |
|           | SMNT(1) = FMN(1)                                              | ZEJAO   |
|           | SMUT(2) - FMU(4)                                              | 26 JA0  |
|           | SMIT(3) = FMI(2)                                              | 26 JA0  |
|           | SMUTIAL - FMULLE                                              | 26.JA0  |
|           |                                                               |         |

| SHUT(5) = FHH(5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| SHIT(6) - FRI(6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26JA0   |
| COMMENT - 250 CIERCE TEDEC TO BINNER COMMECTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ZEJAO   |
| CONCENT - ZENO STEFTERS FOR FINED CONNECTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 13410   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 27460   |
| SMMT(8) = 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 26,00   |
| SMNT (9) = 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 26.140  |
| GO TO 3600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 26 JA0  |
| COMMENT - LATERAL SOLUTION FOR UNIT ROTATION AT FROM JOINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 13440   |
| 3500 02(1) = 1.0299                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ZEJAO   |
| COMMENT - SUBROUTINE GRIPZA SOLVES FOR LATERAL DISPLACEMENTS AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 13HY0   |
| COMMENT ~ ROTATIONS OF MEMBERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 13440   |
| CALL GRIPZA ( RM, RO, W, SL, SU, L3, L4, L6, 3 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15HY0   |
| $\varphi_{\mathcal{I}}(1) = c_{-}0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 26JA0   |
| COMMENT - SUBROUTINE MEMEND SOLVES FOR END FORCES ON MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 13MYO   |
| CALL MEMEND ( W, FMM, L6 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OBAPO   |
| COMMENT - SET STIFFNESS VALUES EQUAL TO MEMBER-END-FORCES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 3MYO  |
| SANT(7) - FAN(3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0   |
| STAT (8) - FAR(3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ZEJAD   |
| START (9) + FAR(6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ZGJAO   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26 JAO  |
| COMENT - ARTAL SUCCITOR FOR ONTT ARTAL DISPLACEMENT AT TO SOTAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 3410  |
| COMMENT - CONDUCTINE AVIAL CALVER FOR AVIAL DIEDIACEMENTE OF MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1000    |
| CALL AVIAL AND A DATES FOR ANTAL DISCREENENTS OF HENDER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 74 140  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26.140  |
| CONNENT - LATERAL SOLUTION FOR UNIT LATERAL DISPLACEMENT AT TO IN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | T 13HYO |
| QY(1921) = 1.0599                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 26.JA0  |
| CUMMENT - SUBROUTINE GRIPZA SOLVES FOR LATERAL DISPLACEMENTS AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 3HYO  |
| COMMENT - ROTATIONS OF MEMBERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 3HYO  |
| CALL GRIPZA ( RM. R0, W. SL. SU. L3, L4, L6, 3 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15440   |
| GA(NbJ) = 0°0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ZGJAO   |
| COMMENT - SUBROUTINE MEMEND SOLVES FOR END FORCES ON MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1 3HYO  |
| CALL MEMEND ( W, FMM, L6 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | OBAPO   |
| COMMENT - SET STIFFNESS VALUES EQUAL TO MEMBER-END-FORCES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 3MYO  |
| SMMT(10) - FMM(4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ZEJAD   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ZEJAD   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26340   |
| COMMENT - TERMETERE FERME FOR DIMER COMMECTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 100   |
| Constant = 2EKC STIFTEESS TEKCS FOR FINED CONNECTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 27460   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 27460   |
| SMMT(12) + 0-0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 27AG0   |
| SMMT(13) = 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ZEJAO   |
| GO 10 9900                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 27AG0   |
| COMMENT - LATERAL SOLUTION FOR UNIT ROTATION AT TO JOINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 13MYO   |
| 3700 Q2(HP1) = 1.0E99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26JA0   |
| COMMENT - SUBROUTINE GRIPZA SOLVES FOR LATERAL DISPLACEMENTS AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 3MYO  |
| COMMENT - ROTATIONS OF MEMBERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 3MYO  |
| CALL GRIPZA ( RH+ RO+ H+ SL+ SU+ L3+ L4+ L6+ 3 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15440   |
| QZ(MP1) = 0,0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 26JA0   |
| COMMENT - SUBROUTINE MEMEND SOLVES FOR END FORCES ON MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1 3MYO  |
| CALL MEMERD ( We FINH & LG )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | USAPO   |
| COMPERIATION OF A CONTRACT | 1 34110 |
| N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |

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|           | SHATELS - FAM        | (6)              |                       | 74 140      |
|-----------|----------------------|------------------|-----------------------|-------------|
| 9900      | CONTINUE             |                  |                       | 26,40       |
| #FT:      | Ra                   |                  |                       | 26 140      |
| END       |                      |                  |                       | 26.140      |
| c         |                      |                  |                       | 100-0       |
| č         |                      |                  |                       |             |
| č         |                      |                  |                       |             |
| č         | SUBROUT INF          | SUBROUTINE       | SUBROUTENE            | SUBROUTINE  |
| č         |                      |                  |                       |             |
| č         | ****************     | **************   | ******************    |             |
| ć         |                      |                  |                       |             |
| SUB       | ROUTINE DISCST ( NCS | IT. NCDST. ZL. L | 11                    | 11FE0       |
| CONVENT - | SUBROUTINE DISCAT D  | ISCRETIZES HENDE | R STIFFNESS DATA F.   | E. 22MYO    |
| CONNENT - | SX. SY. AND SZ       |                  |                       | 2 2 MY D    |
| ĊOH       | HUN /BLOCKS/ XLSI 75 | 1. XRS( 75).     | FL( 75) . AEL( 75)    | . 26JA0     |
| 2         | SKL( 75) . SYL( 75   | 1. SZL( 75)      |                       | 26JA0       |
| COM       | HON /BLOCKT/ FI 421  | AE1 421+         | \$X( 42) . SY(42) .   | 26JAD       |
| 2         | SZ( 42) . QX( 42)    | . OYI 421.       | Q21 421+ A1 421+      | 26 JAD      |
| 3         | BI 421+ A11 421      | . DI 421.        | DX1 421. DY1 421.     | 26 JA0      |
| - Ā       | DZ1421+ U11421+      | ¥1(42).          | W1 (42). U2(42).      | 1 3MR0      |
| 5         | V21421+ W21421+      | ERX(42).         | ERY1423+ ER21421      | 1 3MR0      |
| 6         | RX(42). RY(42).      | R2 (421          |                       | 13HR0       |
| COM       | NUN /BLK1/ KEEPZ+ K  | EEP3, KEEP4, KEE | P3. KEEP6. KEEP7.     | ZEJAO       |
| 2         | ITYPE. NCD2. N       | CD3. NCD4. NCD   | . NCD6. NCD7.         | 26 JAO      |
| 3         | LABAN. IFORM. N      | M. NJT. HST.     | NLT. TOL.             | 26 JA0      |
| Ă.        | Ma MP1a M            | P2. ISTT. LTT.   | 17YPEL.10J.           | 12FE0       |
| 5         | MLC. IPA. I          | P9. 1P10         |                       | ISFEO       |
| COM       | HUN /BLK2/ XL.XR.X1. | X2.11.12.NQ.H.TH | HSQ.HCU.X2L           | 26JA0       |
| COMMENT - | ZERO HEMBER STIFFNE  | SS DATA          |                       | 13440       |
| DO        | 102D 1 = 1-MP2       |                  |                       | 26JAD       |
|           | SX(1) = 0.0          |                  |                       | 26JA0       |
|           | SY(1) = 0.0          |                  |                       | 26 JAD      |
|           | SZ(1) = 0.0          |                  |                       | 26JA0       |
|           | FI11 = 0.0           |                  |                       | 26JAD       |
|           | AE(1) = 0.0          |                  |                       | 26 JA0      |
| 1020      | CONTINUE             |                  |                       | 26 JA0      |
|           | ICOUNT = 0           |                  |                       | 26 JAD      |
|           | NC52T = NC51T        | - 1 + MCDST      |                       | 26 JA0      |
| COMMENT - | 11 GOES FROM NC51T   | TO NC521         |                       | 134440      |
|           | 11 = NC51T = 1       |                  |                       | 26 JAO      |
| 1050      | 11 - 11 + 1          |                  |                       | 26JA0       |
| COMMENT - | READ DATA FROM ONE   | CARD IMAGE (ST1) | FFNESS AT LEFT OF SEC | TIONE 130YO |
|           | XL = XLS(11)         |                  |                       | 26JA0       |
|           | XR = XRS(11)         |                  |                       | 26 JA0      |
|           | FLT = FL(11)         |                  |                       | 26 JA0      |
|           | AELT = AEL(11)       |                  |                       | 26 JA0      |
|           | SXLT - SXL(111       |                  |                       | 26JAO       |
|           | SYLT = SYLEISI       |                  |                       | 26JA0       |
|           | SZLT = SZL(11)       |                  |                       | 26JA0       |
|           | 17 (XR .NE. 0.0) GO  | TO 1100          |                       | 26 JAO      |
| COMMENT - | VARIABLE STIFFNESS   | SECTION READ ONE | CARD IMAGE ISTIFFNES  | S AT 13MYO  |
| CONMENT - | RIGHT OF SECTIONI    |                  |                       | 13MY0       |
|           | 11 - 11 + 1          |                  |                       | 26JAD       |
|           | XR = XRS(11)         |                  |                       | 26JA0       |
|           | #RT = #L(11)         |                  |                       | 26 JAO      |
|           | AERT = AEL(11)       |                  |                       | 26 JA0      |

| 26JA0       | SXRT = SXL([[]                                                      | 26 JAO       |
|-------------|---------------------------------------------------------------------|--------------|
| ZGJAD       | SYRT = SYL(11)                                                      | 26JA0        |
| 26JA0       | 52RT = 52L(1)                                                       | 26.JA0       |
| 26.140      | GO TO 1110                                                          | 26 JA0       |
|             | COMMENT - UNIFORM STIFFNESS SECTION SET STIFFNESS ON BIGHT FOMAL TO | 134470       |
|             | POMMENT - OTIEBERS AN IERT                                          | 1 3440       |
|             |                                                                     | 24 140       |
|             |                                                                     | 20340        |
| SUBROOT THE | ALRI - ALLI                                                         | 26340        |
| _           | SXRT • SKLT                                                         | ZGJAD        |
| *********   | SYRT = SYLT                                                         | 26JAD        |
|             | SZRT = SZLT                                                         | 26JA0        |
| 11FE0       | 1110 CONTINUE                                                       | 26JA0        |
| 2 2MYO      | IF (ICOUNT .NE. 0 ) GO TO 1210                                      | 26JA0        |
| 2 2 HY 0    | CONMENT - FIRST SECTION OF MEMBERS STIFFNESS DATA                   | 13440        |
| 76.140      | ICOUNT = 1                                                          | 26.JAD       |
| 24 140      | 11 • 2                                                              | 24 180       |
| 20000       |                                                                     | 26 140       |
| 26340       |                                                                     | 20340        |
| 76JAU       |                                                                     | 20340        |
| 26JA0       | 1210 CONTINUE                                                       | LIMTO        |
| 1 30000     | 11 = 12 + 1                                                         | ZEJAU        |
| 1 30000     | $x_1 = T_H - x_2$                                                   | 26 JA0       |
| 13MR0       | 1250 CONTINUE                                                       | 26JAD        |
| 26JAO       | IF IXR .NE. ZLI GD TO 1260                                          | 26 JAŬ       |
| 26 JA0      | COMMENT - LAST SECTION OF MEMBERS STIFFNESS DATA                    | 1 3MYO       |
| 26 JA0      | 12 - HP1                                                            | 26JAD        |
| 12FE0       | $x_2 = 0.0$                                                         | 26 JA0       |
| INFER       | 60 10 1210                                                          | 26.JA0       |
| 76 140      |                                                                     | 74 140       |
| 1 10000     |                                                                     | 24 140       |
| 1,54410     |                                                                     | 26340        |
| ZEJAC       |                                                                     | 20340        |
| ZGJAD       | 1270 NG = 12 - 11                                                   | ZOJAU        |
| 26 JAD      | CONNENT - SUBROUTINE LINSTE DISTRIBUTES F AND AE                    | 13440        |
| 26JA0       | CALL LINSTF ( FLT+ FRT+ F+ FTT2+ L1 )                               | 11FE0        |
| 26JA0       | CALL LINSTF (AELT, AERT, AE, AETT2, L1 )                            | 11FE0        |
| 26 JA0      | CONMENT - SUBROUTINE LINLD DISTRIBUTES SX+SY+SZ+ QX+QY+ AND QZ      | 3 3MYO       |
| 26JA0       | IF (SXLT .EQ. 0-0 .AND. SXRT .EQ. 0.0) GO TO 1280                   | 11MYO        |
| 26 JA0      | CALL LINLD ( SXLT, SXRT, SX, L1 )                                   | 11FE0        |
| 26JAO       | 1280 IF (SYLT .EQ. 0+0 .AND. SYRT .EQ. 0+01 60 TO 1290              | 11MY0        |
| 1 3470      | CALL LINED ( SYLT, SYRT, SY, L1 )                                   | 11FE0        |
| 26.140      | 1280 JE (521 T -FO- 0+0 -AND- SZRT -FO- 0-01 50 TO 1330             | 11870        |
| 74 140      |                                                                     | 11650        |
| 10000       |                                                                     | 74 140       |
|             |                                                                     | 26 140       |
| ZOJAU       | KZL = XZ                                                            | 20340        |
| ZEJAU       | COMPENT - RETORN FOR IMAGE OF REAT DATA CARD IP IT LESS THAN HERET  | 13010        |
| 26JA0       | 9000 IF ([] LT. MC52TI GO TO 1050                                   | Z6JA0        |
| 26JAO       | 9900 CONTINUE                                                       | 26JA0        |
| 26JAO       | RETURN                                                              | 26JAD        |
| 26 JAO      | END                                                                 | 26 JA0       |
| 26 JA0      | c                                                                   |              |
| 26 JA0      | L ************************************                              |              |
| 1 3470      | c                                                                   |              |
| 1 34640     |                                                                     | SUBROUT I ME |
| 34.140      |                                                                     |              |
| 20JAU       |                                                                     | **********   |
| DAL 65      |                                                                     |              |
| ZŐJAD       |                                                                     |              |
| 26JA0       | SUBROUTINE LINSTF (STLISTRISTISTT2:L1)                              | 11FE0        |

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| CONNENT - | SUBROUTINE LINE                         | STE DISTRIBUTES F AND        | AE                   | 2 2 MY 0    | SUBR       |
|-----------|-----------------------------------------|------------------------------|----------------------|-------------|------------|
| DIN DIN   | ENSIGN ST(L1)                           |                              |                      | 11FE0       | COMMENT -  |
| · CON     | MUN /BLK2/ XL,XI                        | 1, X1, X2, I1, 12, NG, H, TH | ,HSQ,HCU,X2L         | 26JA0       | DIME       |
|           | IF I XL .ME. O.                         | 0 1 60 10 1150               |                      | 26JA0       | COMP       |
| COMMENT - | FIRST SECTION C                         | IF HEHBER                    |                      | 1 3MYO      | COMMENT -C |
|           | X2L + 0.0                               |                              |                      | 26JA0       |            |
|           | STT2 = 1.0                              | )                            |                      | 26 JA0      | COMMENT -  |
| 1150      | CONTINUE                                |                              |                      | 26.JA0      | COMMENT -  |
|           | IF I STR .EQ. 1                         | TL 1 60 TO 1310              |                      | 26JAO       | COMMENT -  |
| COMMENT - | LINEAR STIFFNES                         | S SECTION                    |                      | 13MYO       |            |
| COMMENT - | CALCULATE SLOPE                         | OF LINEAR STIFFNESS          | VARIATION            | 1 3MYO      |            |
|           | DS = ISTR                               | - \$TL}/(XR-XL)              |                      | 26JAC       |            |
| COMMENT - | FIRST ELEMENT                           | TH LONG) OF SECTION          |                      | 1 3HYO      |            |
| COMMENT - | COMPUTE EFFECT                          | IVE STIFFNESS OF ELEN        | ENT CONSIDERING JUMP | AT 15HYO    |            |
| COMMENT - | START OF SECTIO                         |                              |                      | 15440       |            |
|           | 571 = 5TL                               |                              |                      | 26JA0       | CALL       |
|           | 572 - 5TL                               | + 05+X1                      |                      | 26JA0       | COMMENT -  |
|           | \$TT1 = 0.5                             | P(ST1 + ST2)                 |                      | 26JAO       | 1005       |
|           | 57(11) = (                              | 11#5111+51121/1X2L#5         | TT1 + X345TT2)       | 26.JA0      |            |
|           | IF ING .EQ. 0 1                         | 60 10 1250                   |                      | 24JAQ       |            |
|           | 11 <b>P1 = 11</b>                       | + 1                          |                      | 0AL65       |            |
|           | 11 <b>PNG = 1</b> 1                     | 1 + NQ                       |                      | 26.JAQ      |            |
| COMMENT - | REMAINING NO EL                         | EHENTS                       |                      | 13MYO       |            |
| COMMENT - | COMPUTE STIFFIE                         | ISS AT MED POINT OF E        | LEMENT               | 1544.0      | CALL       |
|           | 00 1210 1 - 11                          | P1. 11PNQ                    |                      | 26JA0       | 1009       |
|           | ST1 = ST2                               |                              |                      | 76 JAQ      | 1020       |
|           | 5T2 = 5T1                               | + DS+TH                      |                      | CAL-35      | COMMENT -  |
| 1210      | ST(1) = 0,                              | \$*(ST1 + ST2)               |                      | 26 JAO      |            |
| 1250      | CONTINUE                                |                              |                      | 26JA0       |            |
|           | ST1 + ST2                               |                              |                      | 26JA0       |            |
|           | 5T2 - STR                               |                              |                      | 26JA0       |            |
|           | 5112 - 0.1                              | #1\$T1 + ST21                |                      | 26JA0       |            |
| 1290      | 60 TQ 1800                              |                              |                      | 26,340      |            |
| COMMENT - | UNIFORM STIFFIN                         | LSS SECTION                  |                      | 13470       |            |
| COMMENT - | FIRST ELEMENT                           | TH LONG) OF SECTION          |                      | 134440      | CALL       |
| CONNENT - | COMPUTE EFFECT                          | WE STIFFHESS OF ELEM         | ENT CONSIDERING JUMP | AT LSHYO    | 1990       |
| CONVENT - | START OF SECTIO                         |                              |                      | 15440       | 2000       |
| 1310      | STT1 = ST                               | L                            |                      | 04L85       | RETU       |
|           | ST(11) - (                              | THPSTT1+\$TT21/(x2L+5        | TT1 + x1+STT21       | 26,340      | END        |
|           | 17 180 .00. 0                           | 60 10 1360                   |                      | 26,346      | C          |
|           | 11P1 - 11                               | + 1                          |                      | 26.JAQ      | C          |
|           | 11PHQ - 11                              | L + 1400                     | •                    | 26JA0       | C          |
| COMMENT - | REMAINING NO EL                         | ENENTS HAVE CONSTANT         | STIFFNESS            | 15MY0       | c          |
|           | DO 1350 1 - 11                          | P1. 11PHQ                    |                      | 26JA0       | C          |
| 1350      | \$1(1) = 1                              | STL                          |                      | 26JA0       | Ç          |
| 1360      | STT2 - ST                               |                              |                      | 26JA0       | c          |
| 1800      | CUNTINUE                                |                              |                      | 26 JAO      | SUBH       |
| RET       |                                         |                              |                      | 26JA0       | CONVENT *  |
| END       | ) i i i i i i i i i i i i i i i i i i i |                              |                      | 26JA9       | COMMENT -  |
| C         |                                         |                              |                      |             | DIME       |
| C         | *************                           |                              |                      | *********** | COMP       |
| C         |                                         |                              |                      |             |            |
| č         | SABROUTINE                              | SUBROUTINE                   | SUBROUTINE           | SUPROUTINE  |            |
| ć         |                                         |                              |                      |             |            |
| č         | *************                           |                              | ******************   |             |            |
| è         | •                                       |                              |                      |             |            |
| -         |                                         |                              |                      |             |            |

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| SU         | BROUTINE LINLD (    | QL, QH, 0,L11      |                          | 11FE0            |
|------------|---------------------|--------------------|--------------------------|------------------|
| [(Margen)  | - SOBROUTINE LINED  | DISTRIBUTES SAN S  | STO SET WAT OLD WAD AT   | 12010            |
| ()<br>()   |                     | 21-22-11-12-00-9-1 | N                        | 11720            |
| COMMENT    | -CUMPITE CODE OF    | LINCAR VARIATION   | N8-1341-1-U #AZE         | 26380            |
| C          | 00 = (00 =          | CINERY AND - AID   |                          | 12010            |
| COMMENT    | - CLAPHTE CONCENTR  | ATED LUAD OF PESTS | ATHY FOR FLEMENT AT RIGH | 70JAU<br>7 1444A |
| COMMENT    | - END OF SECTION O  | 1. DISTANCE TO LIN | IE OF ACTION 2 AND CALL  | 15400            |
| COMMENT    | - CUNLD TO DISTRIB  | UTE TO ADJACENT ST | ATIONS                   | 154470           |
|            | 02 • GR             |                    |                          | 26.140           |
|            | 01 = 08 - D         | Q* X 2             |                          | 26.JA0           |
|            | IF 1 ABS 101 + 0    | 21 .LE. 1.0E-18 1  | 60 TO 1005               | 26.140           |
|            | Z = XR - X2         | + 182/3-01+12-0+0  | (01 + 01)/(01 + 02)      | ZAJAO            |
|            | Q1 - 0.5+X2         | +101 + 021         |                          | 26.JA0           |
|            | IF I ABSIGIT .LE    | . 1.0E-10 ) GO TO  | 1005                     | 26.JA0           |
| CA         | LL CONLD I          | 01. Z. Q. LI 3     | •                        | 1 IFEO           |
| CONNENT    | - SAME AS ABOVE FO  | R ELEMENT AT LEFT  | END OF SECTION           | 15MY0            |
| 1005       | 01 - OL             |                    | •                        | 26.JA0           |
|            | 02 = 0L + D         | G=x1               |                          | 26 JA0           |
|            | IF ( ABS 101 + 0    | 2) .LE. 1.0E-10 +  | GO TO 1009               | 26JA0            |
|            | Z = XL + 1X         | 1/5-01-12-0-02 + 0 | 11/101 + 021             | ZAJAO            |
|            | 01 + 0.5*XI         | *101 + 023         |                          | 26JA0            |
|            | IF ( ABS(Q1) LE     | . 1.0E-10 > GO TO  | 1009                     | 26JA0            |
| CA         | LL . COMLD (        | Q]. Z. Q. Ll )     |                          | I IFEO           |
| 1009       | IF ( NO .EQ. 0 )    | GD TO 2000         |                          | 26JA0            |
| 1020       | XX = XL + X         | 1                  |                          | 26 JAO           |
| COMMENT    | - SAME AS ABOVE FO  | R REMAINING NO ELE | MENTS                    | 15MYO            |
|            | DO 1990 11 - 1,8    | 0                  |                          | 26JA0            |
|            | 01 = 02             |                    |                          | 26JA0            |
|            | Q2 = 01 + D         | Q+ TH              |                          | 76JA0            |
|            | IF ( A85191 + 92    | ) .LE. 1.0E-10) 60 | 0 10 1990                | 11MY0            |
|            | Z = XX + (T         | H/3.C1=12.0=02 + C | 11/(01 + 02)             | 26 JAO           |
|            | XX = XX + T         | н                  |                          | 26JA0            |
|            | Q1 = 0.5+TH         | e(01 + 02)         |                          | 26JA0            |
| CA         | LL CONLD (          | Q1, Z, Q, L1 )     |                          | 11FEO            |
| 1990       | CONTENUE            |                    |                          | 26JA0            |
| 2000       | CONTINUE            |                    |                          | 26JA0            |
| RE         | TURN                |                    |                          | 26JA0            |
| EN         | D                   |                    |                          | 26JAU            |
| ç          |                     |                    |                          |                  |
| ç          |                     |                    |                          |                  |
| ç          | 1                   |                    |                          | C                |
| L.         | SUBMOUT THE         | SUBKOUTINE         | SOBROUTINE               | SUBRUUTINE       |
| 2          |                     |                    |                          |                  |
| 2          |                     |                    |                          |                  |
| ۲.<br>در   |                     | 31. 7. 20. 111     |                          | 11550            |
| CONNELT    | - SUBRIAITINE COMIN | DISTRIBUTES CONCE  | MTRATED LOAD OR FLASTIC  | 15840            |
| CONNENT    | - SPRING RESTRAINT  | TO ADJACENT STATI  | ONS 1 AND 1P1            | 15440            |
| 01         | NENSLON ODIL1)      | - Apencent Statt   |                          | 11550            |
| <b>c</b> 0 | MAN /BLEZ/ XLATR-   | X1.X2.11.17.00-H-T | HANSOANCUAX2L            | 26 JA0           |
|            | Z1 B Z/TH           | + 1.0              |                          | 26.140           |
|            | 1 = 21              | * ===              |                          | 26JA0            |
|            | C = 2 = 1+1         | H + TH             |                          | 01,10            |
|            | iP1 = 1 + 1         |                    |                          | 01.4.0           |
|            | 90(1) = 90(         | 11 + QI+(TH - C)/1 | н                        | OIJLO            |
|            |                     |                    |                          |                  |

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|        | Q0(1P1)                               | = QO(1P1) + Q1=C/TH                    |                       | 01,41,0      |
|--------|---------------------------------------|----------------------------------------|-----------------------|--------------|
| 1      | RETURN                                |                                        |                       | 26JA0        |
| 1      | END                                   |                                        |                       | 26,140       |
| c      |                                       |                                        |                       |              |
| ċ      |                                       | ************************               | ******************    | ************ |
| č      |                                       |                                        |                       |              |
| č      | SUBROUT LIKE                          | SUBROUT I NE                           | SUBROUTINE            | SUBROUT I NE |
| č      |                                       |                                        |                       |              |
| č      | **********                            |                                        |                       |              |
| ċ      |                                       |                                        |                       |              |
| -      | SUBROUTINE AXIA                       | L (HLT)                                |                       | 26.JAQ       |
| CONNEN | T - SUBROUTINE                        | TAL SOLVES FOR ATIAL                   | STATEMENTS OF HEMBE   | R DE 15MYO   |
| CONVEN | T - SUBROUTINE A                      | XIAL SETS UP STIFFNESS                 | COEFF (BB+ CC+ DD) AN | D 15HYO      |
| CONNEN | T - LUAD FF AND                       | SOLVES FOR DX USING RE                 | CURSIVE SOLUTION OF   | 15MY0        |
| COMMEN | T - PREVIOUS BEA                      | M COLUMN SOLUTIONS NOT                 | ING THAT AA = EE = 0  | 15MY0        |
|        | COMMUN /BLOCK7/                       | F( 42)+ AE( 42)+                       | SX( 42) . SY(42) .    | 26 JA0       |
| 2      | SZ( 42)+                              | QX( 42). QY( 42).                      | Q21 421 A1 421 .      | 26,140       |
| . ī    | 81 421.                               | A1( 42) . D( 42) .                     | DX( 42) . DY( 42) .   | 24 JA0       |
|        | DZ (42) .                             | U1(42). V1(42).                        | W1 (42) . U2 (42) .   | 13480        |
| 5      | ¥21421.                               | M2(42). FRI(42).                       | FRY(42). FR7(42).     | 1 3480       |
|        | RX(42).                               | RY(42). RZ(42)                         |                       | 13480        |
|        | COMMUN / N.K.1/ K                     | FEP2, KEEP3, KEEP4, KE                 | FPS. KEEPS. KEEP7.    | 26.140       |
| 2      |                                       | CD2. NCD3. NCD4. NC                    | 5. NCDA. NCD7.        | 24.140       |
|        | TABAN .                               | FORMA NUA MUTA NS                      |                       | 24.140       |
|        |                                       | 101. 1002. ISTT. LT                    | TA ITYPEL ID.I.       | 12650        |
|        | in c. i                               | PR. 109. 1010                          |                       | 11550        |
| -      |                                       | · VR · V3 · V2 · I3 • I2 · NO · H • TI | 4.MSD.MC11.X21        | 24 /40       |
|        |                                       | -1-0/ (AE(2) A EV(1)AT                 |                       | 24 140       |
|        |                                       | -R() (AL(2) + 2A(1)*)                  |                       | 24 140       |
|        |                                       | - 0(1) 407(1) 474                      |                       | 26 140       |
|        |                                       | - UTIT-GATTA-IN                        |                       | 20000        |
|        |                                       |                                        |                       | 26,040       |
|        | 171 - 1                               |                                        |                       | 26,00        |
|        | · · · · · · · · · · · · · · · · · · · | -11 60 70 1400                         |                       | 26,00        |
|        | IF THE LEW                            | -11 00 10 1300                         |                       |              |
|        | 00<br>66 - 4                          | AEIII                                  |                       | 26.000       |
|        |                                       | ACTINAL ACTIVITY A SALLIN              | 14                    | 2034"        |
|        |                                       | ACTIFII                                |                       | 26,040       |
|        |                                       |                                        |                       | 26JAU        |
|        | Dill                                  |                                        |                       | 26340        |
|        |                                       |                                        |                       | Zejao        |
|        | ALUI                                  | 0(1)*88                                |                       | ZEJAU        |
| 1200   | PF = 0                                |                                        |                       | ZGJAO        |
|        | AZ = DI                               | []ett                                  |                       | ZEJAD        |
|        | A(I) =                                | Al(I)+A(IHI) - AZ                      |                       | ZGJAO        |
| 2000   | CONTINUE                              |                                        |                       | ZEJAD        |
|        | DEIMPZ                                | 1 = 0.0                                |                       | Zejad        |
|        | 00 2000 L -                           | 1. 1921                                |                       | ZEJAO        |
|        | 1 - 1923                              | - L                                    |                       | ZGJAU        |
|        | 191 - 1                               | + 1                                    |                       | ZGJAŬ        |
| 2800   | PX(I) = A(I)                          | ) + =(1)+OX(1P1)                       |                       | ZEJAO        |
|        | RETURN                                |                                        |                       | ZEJAO        |
| _      | END                                   |                                        |                       | ZGJAO        |
| ç      |                                       |                                        |                       |              |
| C .    | **********                            |                                        |                       |              |
| ç      |                                       |                                        |                       |              |
| c      | SUBROUT INE                           | SUBROUTINE                             | SUBROUTINE            | SUBROUTINE   |

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SUBROUTINE GRIPZA ( RM, RQ, W, SL, SU, L3, L4, L6, M 15870 CONMENT - GRIPZA SULVES BOTH FRAME JUINT EQUILIBRIUM EQUATIONS AND ZAAPO COMMENT - MEMBER EQUILIBRIUM EQUATIONS - GRIPZE CALLS FSUBI WHICH CALLS ZAAPO COMMENT - FSUBIL TO SET UP FRAME EQUATIONS OR FSUBIZ TO SET UP HEMBER ZAAPO CONNENT - EQUATIONS 24APO C 5 5 5 5 5 5 5 5 5 5 5 5 5 8 REVISION DATE = 07 APR 70 DATE NL IS ORDER 6AP0 NL MUST BE GREATER THAN 2 06APO .... M IS HALF-WIDTH ( J = 2"H + 1 1, WHERE J IS THE BAND WIDTH M NUST BE GREATER THAN 1 06APO ... 06AP0 RECURSION MULTIPLIERS CONSTANT TERN FOR THE 1-TH ROW 06APO RM( ) F 06APO ¥ C ) SOLUTION VECTOR 06 A PO DIMENSION RM(L3,L6). RO(L6), W(L61, SL(L3), SU(L4) OBAPO CONNUN /RI/ NL. NL. J1 ZOJA9 JI = 1 11.1.8 H1 = Å - 1 11,11,8  $\mathbf{HP} = \mathbf{H} + \mathbf{1}$ 11JL# ALM1 = AL = 1 11JLA NLHR = NL - R 11JLB 12 - 0 25JL8 25JL8 12 - 1 13 + 1 25JL8 CALCULATE RECURSION MULTIPLIERS SL(1) = 0.007AP0 FSUB1 ( SU, F . H. L4 ) OBAPO CALL 11.JL8 IF ( ML | 210. 100. 100 100 RH(H+1) = -1+0 / SU(MP) 25JL8 DO 150 I = 1 + M1 25JL8 18 - 19 - 1 25JL8 RM(1,18) = SU(1+1) 25JL8 150 CONTINUE 25 JL8 RO(1) = SU(1) 06APO W(1) = RM(M+1) = ( -F ) 11.1.0 210 11.0.8 DO 1000 J = 2 . NL J1 + J - 1 07AP0 IF ( J.GT.M ) J1 = M1 06 A PO 07APO DO 250 1 = 1, J1 18 = J1 + 2 - 1 07APO 07APO SL(18) = SL(18-1) 250 CUNTINUE 07400 SL(1) = SU(1)OTAPA J1 = J 11JL8 FSU01 ( SU+ F + H+ LA ) OBAPO CALL J1 = J = 1 OTAPO 1F ( J.GT.M ) J1 = M1 06APO IF ( ML ) 750. 290. 290 11.1.0 290 1X = J + M125 JL 8 IF ( IX - ML - 1 ) 299 + 295 + 292 25JL8 292 13 = 13 + 125JL8

> 16 ഗ

| 295   | 12 = 12 - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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|       | 12 + 12 + 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| 299   | 11 = 1x + 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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|       | 1E = 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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|       | DO 300 1 = 12 + M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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|       | $\pi_{M}(1,11) = SU(1+1)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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|       | 11 - 11 - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| 300   | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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|       | R0(J) = SU(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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|       | 00 400 L = 1 + J]<br>2008 - DM10, L-1 - DM10-1 - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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|       | IERT - KNINGJEL - KNINESJI<br>IERT LA KNING - KNINESJI - OMRLANJEL A RIVI & TEMO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|       | (XY = 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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|       | $\frac{1}{1} \begin{bmatrix} 1 \\ 1 \end{bmatrix} \begin{bmatrix} 1 \\ $ | 07400        |
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|       | W(J) = W(J) + RM(M-1+J) + W(J+1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|       | 1F ( 1.EQ.K ) GO TO 2200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| 2100  | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| 2200  | $[f \in J_{\mathcal{L}} \in \mathcal{M}_{\mathcal{L}} ] = \mathcal{M}_{\mathcal{L}} = \mathcal{M}_{\mathcal{L}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OGAPU        |
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| COMMENT - SUBROUTINE  | FSUBI CALLS FSUBII FOR                       | FRAME SOLUTION AND FSUB12   | 15MYO     |
|-----------------------|----------------------------------------------|-----------------------------|-----------|
| COMMENT - FOR MEMBER  | SOLUTIONS                                    |                             | 15MY0     |
| DIMENSION SUI         | L41                                          |                             | 08AP0     |
| COMMUN /BLK5/         | NESUB                                        |                             | 084P0     |
| 1F INFSUB             | .EQ. 111 GALL FSUB11 (5                      | Un FFn Lan MI               | ORAPO     |
| LF (NESUB             | .EQ. 121 CALL FSUB12 (5                      | I. FF. LAT                  | OBAPO     |
| ' RETURN              |                                              |                             | RAPO      |
| END                   |                                              |                             | BADO      |
| (                     |                                              |                             | u ar o    |
|                       |                                              |                             |           |
|                       | ••••••••                                     |                             |           |
|                       | 5:500:11 MC                                  |                             |           |
| C SUBROUTINE          | SUBROUTINE                                   | SUBROUTINE S                | OBROUTINE |
| C                     |                                              |                             |           |
|                       | ********                                     |                             |           |
| C                     |                                              |                             |           |
| SUBROUT INE FSU       | B12 ( SU+ FF+ L4 )                           |                             | OBAPO     |
| COMMENT - SUBROUTINE  | FSUB12 FURNISHES RIGHT :                     | SIDE OF SYMMETRIC STIFFNESS | 19MYO     |
| COMMENT - MATRIX SU   | AND LOAD TERM F TO GRIP2/                    | A FOR MEMBER SOLUTION       | 19440     |
| DIMENSION SU          | (L4 )                                        |                             | OBAPO     |
| COMMENT - JJ IS EQUA  | TION NUMBER - SU(1) 15 L                     | AST TERM IN BAND ON RIGHT   | 19MYO     |
| CUMMON /BLUCK7        | / F( 42) + AE( 42) +                         | SX( 42), SY(42),            | 26JA0     |
| 2 521 421.            | QK( 42). QY( 42).                            | Q71 421. A( 42).            | 26JA0     |
| 3 BL 4714             | A1( 4214 D( 4214                             | DEI 421. DVI 421.           | 26.140    |
| A UZ/A71.             | U1 (A 7) . V1 (A 7) .                        | M1(A3)A U2/A3)A             | 1 MRO     |
| 6 W3(43).             |                                              |                             | 1 200     |
| 6 <b>PX</b> (42)      |                                              | Entracia Enclatio           | 13400     |
|                       |                                              |                             | 1 3-140   |
| CONTON /BLK2/         | KL • AR • A 1 • X 2 • 1 1 • 1 2 • MW • H • 1 | 10H5U0HCU0A2C               | 26340     |
| COMPONE / RI / I      | NL, PL, JI                                   |                             | OUAPO     |
|                       | 11                                           |                             | 09AP0     |
| - [[[                 | JJ/2                                         |                             | UBAPO     |
| 111 -                 | 2 +JJJ                                       |                             | ZGJAD     |
| IF (JJ .EQ            | . JIJI 60 TO 600                             |                             | ZEJAO     |
| COMMENT - UDD NUMBER  | ED EQUATION FOR LATERAL I                    | ORCE EQUILIBRIUM            | 19H1-     |
| I = J.                | J/2 + 1                                      |                             | ZGJAO     |
| IP1 -                 | 1 + 1                                        |                             | ZGJAO     |
| COMMENT - SU NOT REQ  | UIRED FOR OFFSPRING                          |                             | 19040     |
| IF (ML .EQ            | 1) GU TO 50                                  |                             | ZGJAO     |
| SU(1)                 | • TH#F([P1)                                  |                             | 26JAO     |
| SU(2)                 | = →2+0#F([P])                                |                             | 26 JAO    |
| SU(3)                 | ➡ ~TH*(F()) = F()P)                          | 1)                          | 26JA0     |
| SU(4)                 | = 2.J+(F()) + F()P1() +                      | SY(1)+HCU                   | 26JA0     |
| 50 FF • (             | DY (1) *HCU                                  |                             | 26JAO     |
| GU TO 800             |                                              |                             | 26JA0     |
| 600 CUNTINUE          |                                              |                             | 26 JAO    |
| COMMENT - EVEN NUMBER | RED EQUATION FOR MOMENT                      | OUILIBRIUM                  | 19440     |
| - I = J.              | J/2                                          |                             | 26JAO     |
| 183 +                 | 1 + 1                                        |                             | 26 JA0    |
| CONNENT - SU NUT REQU | LERED FOR OFFSPRING                          |                             | 19410     |
| IF IMI SEA            | 11 60 10 650                                 |                             | 26.180    |
| SULT                  | . 0.0                                        |                             | 26.JA0    |
| 50177                 | - 1-5+F(IP1)+HS0                             |                             | 26.140    |
|                       | THOF(191)                                    |                             | 26.140    |
| 30(3)                 | - 3-64(6(1) - 6(10)))                        | 0 ASTITI 4450               | 24 140    |
| 50(4)<br>55 -         |                                              | W YJELLI "MEU               | 26 140    |
|                       |                                              |                             | 20040     |
|                       |                                              |                             | 20340     |
| AC LONN               |                                              |                             | 20040     |

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|-----------------------------------------|----------------|-------------------|-----------------------|-------------------------------|--------------|-----------------|
| ç                                       |                |                   |                       | C1000017                      |              |                 |
| č                                       | SUDKOUT INC    | 200               |                       | SOBKOUT                       |              | 2004001145      |
| č                                       |                | **********        |                       | **********                    |              | *********       |
| c                                       |                |                   |                       |                               |              |                 |
| SUB                                     | ROUTINE FORM   | LD ( RH, RO,      | W. SL. SU.            | FOHP + L1+ L                  | 3. LA. L6 )  | 08AP0           |
| COMMENT -                               | SUBROUTINE     | FORMLD CALCU      | LATES FIXED-          | END-FORCE MA                  | TRIX FOR     | 24APO           |
| COMENT -                                | BOTH PRISM     | TIC UNIFORML      | Y LOADED HEN          | BERS AND ALL                  | OTHERS       | 24 APO          |
| DIM                                     | ENSION RHELS   | -L6). RO(L6)      | • W(L6)• SL(          | L3). SU(L4)                   |              | 08AP0           |
| DIM                                     | EASION FOR     | (6)               |                       |                               |              | OBAPO           |
| COM                                     | HUN /BLOCKZ/   | DX5( 90).         | DYS( 50).             | ZLS( 50)+                     | DC15( 50),   | ZEJAD           |
|                                         | 00251 501+     |                   | PRAELOUT              | ACD21 201+                    | TAXOPSI 501  | DAL65           |
| 2                                       |                | 1.1.4 1030        | IPINKC SCI.           | MC511 501+                    | SHL1 50+131  | 20440           |
|                                         |                | UAL ( 50) +       | DYL( 50).             |                               | DC1L1 5075   | 26JA0           |
| <b>.</b>                                |                | UNA( 501+         | UNT 1 501.            | MC9L( 3014                    | 1AA0PL1 3019 | 26340           |
| 3                                       |                |                   | V044 781              | EL ( 161).                    | AEL ( 75.) . | 26340           |
|                                         | EVI / DELOCKS/ | ALS: 1711         | AN31 7379             | FEL 1314                      | ACL1 1316    | 20340           |
| - COM                                   |                | JIL 13501         | ALL (150).            | 071 (150).                    | 000 (150).   | 76JAU<br>26 JAO |
| ,                                       | 071 (150)      | ACC. 13014        | ~~~~                  |                               |              | 76 140          |
| Com                                     | HUN /ALOCK7/   | FL 4214           | AF1 A21.              | ST( A7) -                     | 57(42).      | 26.140          |
| , , , , , , , , , , , , , , , , , , , , | 571 421.       | OK( A21.          | DY1 421.              | 071 421.                      | AI 421.      | 26,140          |
| i                                       | B4 421-        | A1( A2).          | DI 421-               | DEL AZZA                      | DV( 42).     | 26.140          |
|                                         | DZ (42).       | 41 (42) -         | ¥1(42).               | W1 (42)                       | 42(42)       | 13480           |
| i i                                     | ¥21421.        | W2 (42) -         | ERX(42).              | FRY (42) .                    | FR2 (42) .   | 13480           |
| <u> </u>                                | R1(42).        | RY (42).          | RZ (42)               |                               |              | 134R0           |
| COM                                     | MAR /BLK1/     | KEEP2. KEEPS      | . KEEPA. KEE          | PS. KEEP6. K                  | EEP7.        | 26JA0           |
| 2                                       | ITYPE.         | NCD2. NCD3.       | NCD4+ NCD             | 5. NCD6. N                    | CD7.         | 26JA0           |
| 3                                       | IABAR.         | IFORM. NO.        | NJT . RST             | . HLT. T                      | DL.          | 26JAC           |
| ۰.                                      | M.             | MP1. MP2.         | ISTT. LTT             | <ul> <li>ITYPEL.II</li> </ul> | DJ.          | 12FE0           |
| 5                                       | MLC+           | 1P8. 1P9.         | IP10                  |                               |              | 13460           |
| CON                                     | Hull /BLK2/ 3  | L.X. XI.X2.I      | 1 <b>.12.00.</b> H.TH | HS0,HCU,X2L                   |              | 26JA0           |
| CON                                     | PILA /BLK3/    | HILLY, HILST, HIL | LT philliphics,       | HNC6, HDJT, HN                | LC           | OTFEO           |
| CON                                     | MUN /BLKA/ S   | ST1.ST2.ST3.S     | 14+515+516            |                               |              | 26JAD           |
| CON                                     | MUN /BLK5/ I   | <b>FSUB</b>       |                       |                               |              | OBAPO           |
| CON                                     |                | L. FL. JI         |                       |                               |              | OBAPC           |
|                                         | SET TERMUN     | ATTED-END-ED      | DESTANTS FUR          | LOAD ITTE D                   | NICH IS      | 16440           |
| COMPLET -                               |                | I TVER TANK       | NLE MAIKIA T          |                               |              | 10410           |
|                                         | 101300         |                   | 10                    |                               |              | 26.140          |
|                                         | 71 - 1         |                   | ••                    |                               |              | 26.340          |
|                                         |                |                   |                       |                               |              | 76 14 7         |
|                                         | DRAFT          | - PRAEIICTTI      |                       |                               |              | 76 140          |
|                                         | ACDST.         | m MCDS(ISTI)      |                       |                               |              | 26.40           |
|                                         | 86511          |                   |                       |                               |              | ZAJAO           |
|                                         | UQXT           | UQXILTT           |                       |                               |              | ZEJAO           |
|                                         | UOVT           | URYILTT           |                       |                               |              | 26JAO           |
|                                         | NCDLT          | . NCDL(LTT)       |                       |                               |              | 26JAO           |
|                                         | HC61T          | . AC61(LTT)       |                       |                               |              | 26JAO           |
|                                         | IF INCOST      | HE. O .OR. N      | COLT .NE. 0)          | 60 TO 2100                    |              | 26JA0           |
| COMMENT -                               | PRISMATIC P    | REMOER WITH U     | NIFORM LOADS          |                               |              | 16MY0           |
| COMMENT -                               | COMPUTE CO     | ISTANTS AND A     | XIAL FIXED-E          | ND-FORCES                     |              | 16440           |
|                                         | ZL2 -          | ZL * ZL           |                       |                               |              | 26JAD           |

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| FONM(1) = - C.5+UGXT+ZL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26JA0  |
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| IF CIPINCT .EQ. 0 AND. IPINKT .EQ. 01 GO TO 1830                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26JA0  |
| COMMENT - ZERG FLEXURAL FIXED END FORCES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 16410  |
| FOHM(3) = FOHM(6) = 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 26FE0  |
| IF (IPINLT .EG. 1 .AND. IPINRT .EG. 1) GO TO 1600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ZEFEC  |
| IF (IPINHT .EQ. 1) GO TO 1700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ZEJAD  |
| COMMENT - COMPUTE FLEXURAL FIXED-END-FORCES FOR MEMBER PINNED AT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 16410  |
| COMMENT - FROM JOINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 16410  |
| FORM(2) = -0.375-00VT-2L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ZEJAU  |
| FORM(5) = -0-625+0041-2L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ZEJAU  |
| FORMES) = UQVT=2L278.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26JA0  |
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| COMMENT - COMPUTE FLEXORAL FIXED-FORCES FOR REPSER FINNED AT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 10410  |
| COMPLET - BOTH JOINTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 16410  |
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| FORM(ST = FURM(2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20150  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1644   |
| COMMENT - COMPUTE FLERURAL FIRED-FONCES FOR MEMBER FINNED AT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 16410  |
| COMPLAT - TO JUINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 16440  |
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| FURN(S) = -0.375-0041-2L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 26340  |
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| COMMENT - COMPUTE FLEROWAL FIXED-FORCES FOR MEMBER WITH RIGID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10440  |
| convent - convections at Both Johns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10010  |
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| ZINU CUMIINE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 14440  |
| CURRENT - MARKING ON LOO TO 3700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 76 160 |
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| $\mathbf{M}_{\mathbf{n}} = \mathbf{g}_{\mathbf{n}} \mathbf{n}_{\mathbf{n}}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 26 140 |
| COMMENT - DISCRETIZE BELGHATIC STIERNESS DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 16840  |
| DO TACH TA LANDA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 24 140 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26 140 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26340  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 74 140 |
| AF(1) = F(1) = AF(1) = F(1) = F(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26 140 |
| $\mathbf{A}_{\mathbf{L}} = \mathbf{L}_{\mathbf{L}} = \mathbf{A}_{\mathbf{L}} = $ | 26 140 |
| COMMENT - NUMPRISMATIC MEMBER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 16890  |
| COMMENT - SURPORTINE DISCRETIZES MEMBER STIFFMESE DATA F. AF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 164440 |
| COMMENT - SHA CY AND ST DISCRIPTED FUNCTION STITUTES DATE TO ALL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 16490  |
| 2600 CALL DISCAT I MCSIT, MCDST, 2L, 111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 11550  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26 180 |
| COMMENT - STORE MEMARE FMD RESTRAINTS STI-STA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 16890  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 26 180 |
| $J \cdot I = J \wedge I I $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 26040  |
| #16 T #1117                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 10040  |

|           | ST3 = S2(1)                      |                   |                      | 26 JAO               |
|-----------|----------------------------------|-------------------|----------------------|----------------------|
|           | \$T4 = \$X(MP1)                  |                   |                      | 26 JA O              |
|           | \$T5 = \$Y(HP1)                  |                   |                      | 26JA0                |
|           | ST6 = \$2(MP1)                   |                   |                      | 26JA0                |
|           | ML = 1                           |                   |                      | 26JA0                |
|           | HLT = 1                          |                   |                      | 26JA0                |
| COMMENT - | SET MEMBER-END-REST              | RAINTS EQUAL TO   | 1.0E+99 FOR FIXED-EN | D-FORCE16MY0         |
| COMMENT - | SOLUTION                         |                   |                      | 16MY0                |
|           | SX(1) = SX(MP)                   | 1 = 1.0E99        |                      | 26JA0                |
|           | SY(1) = SY(MP)                   | 1 = 1.0E99        |                      | 26JA0                |
|           | SZ(1) = SZ(HP)                   | 1 = 1.0E99        |                      | 26 JAO               |
| COMMENT - | ZERO PINNED END ROT              | ATIONAL RESTRAIN  | ITS                  | 16MY0                |
|           | IF (IPINLT .EQ. 1)               | SZ(1) = 0.0       |                      | 26 JAO               |
|           | 17 (191MRT .EQ. 1)               | SZ(MP1) = 0.0     |                      | 26JA0                |
| 2700      | CONTINUE                         |                   |                      | 26JA0                |
|           | IF INCOLT .NE. 01 6              | io to 2900        |                      | 26JA0                |
| COMMENT - | DISCRETIZE UNIFORM               | MEMBER LOADS      |                      | 16MY0                |
|           | DO 2800 1 = 2,H                  |                   |                      | 26 JAO               |
|           | QX(1) = UQXT#1                   | 10                |                      | 16MY0                |
|           | QY(1) = UQYT#1                   | ÎN .              |                      | 26JA0                |
| 2800      | $Q_{2}(1) = 0.0$                 |                   |                      | 26 JAO               |
|           | QX(MP2) = QY(M                   | 1P2) = 02(1P2) =  | 0.0                  | 26.JA0               |
|           | QX(1) = QX(MP)                   | 1 = 0-5+UQXT+TH   |                      | 26JA0                |
|           | QY(1) = QY(MP)                   | ) = 0+5+UQYT+TH   |                      | 26JA0                |
|           | QZ(1) = QZ(MP)                   | 1 = 0.0           |                      | 26JA0                |
|           | GO TO 3000                       | •                 |                      | 26JA0                |
| COMMENT - | NONUNIFORM LOADS                 |                   |                      | 16MY0                |
| COMMENT - | SUBROUTINE DISCLD D              | ISCRETIZES GENER  | AL HEMBER LOADS QX.  | <b>QY, QZ 16MY</b> O |
| 2900 CAL  | L DISCLD ( NC6                   | IT, NCDLT, ZL, L  | .I. )                | 11/EO                |
| 3000      | CONTINUE                         |                   |                      | 26JA0                |
| COMMENT - | AXIAL SOLUTION FOR               | HEMBER LOADS      |                      | 16MYO                |
| CAL       | L AXIAL (HL1                     | f 1               |                      | 26JA0                |
|           | NFSUB = 12                       |                   |                      | OBAPO                |
| CONNENT - | LATERAL SOLUTION FO              | WE MEMBER LOADS   |                      | 16MY0                |
| CAL       | L GRIPZA (RM)                    | RO, W. SL. SU.    | L3, L4, L6, 3 )      | 15MY0                |
| COMMENT - | CALCULATE NEMBER-EN              | D-FORCES WHICH A  | RE EQUAL TO FIXED-EN | D- 16MYO             |
| COMMENT - | FORCES                           |                   |                      | 16MY0                |
| CAL       | L HEHEND ( W,                    | FOID1, 16 1       |                      | OBAPO                |
| COMMENT - | ZERO END-HOMENTS FO              | X PINNED END HEH  | BERS                 | 16440                |
|           | IF (IPINLT .EQ. 1)               | FOMM(3) = 0.0     |                      | 29JA0                |
|           | IF (IPINRT .EQ. 1)               | FOMM(6) = 0.0     |                      | 29JA0                |
| 9900      | CONTINUE                         |                   |                      | 26JA0                |
| RE 1      | URN                              |                   |                      | 26 JAO               |
| ENC       | I                                |                   |                      | 26JA0                |
| C         |                                  |                   |                      |                      |
| ŕ         | ***************                  |                   |                      | ************         |
| C         |                                  |                   |                      |                      |
| c         | SUBROUT I NE                     | SUBROUTINE        | SUBROUT I NE         | SUBROUT I NE         |
| c         |                                  |                   |                      |                      |
| c         | ***************                  |                   | ****************     | *************        |
| c         |                                  |                   |                      |                      |
| SUE       | RUUTINE DISCLD ( NCA             | AT. NCOLT. ZL. L  | .1 )                 | 11FE0                |
| COMMENT - | SUBBOUTINE DISCLD D              | DISCRETIZES GENER | AL HEMBER LOADS OX+  | QY, QZ 22MYO         |
|           | and the places of                |                   |                      |                      |
| CON       | HUN /BLUCKS/ XLL(150             | )). XRL(150).     | QXL(150). QYL(150    | 1. 26JAO             |
| 2         | HUN /BLUCK6/ XLL(150<br>QZL(150) | )). XRL(150).     | QXL(150). QYL(150    | 1. 26JA0<br>26JA0    |

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| 26 JA0     | 2 SZI 421, QX( 421, QY( 421, QZ( 421, A( 421,                        | 26 JAO  | 16 |
|------------|----------------------------------------------------------------------|---------|----|
| 26JA0      | 3 BI 421+ A11 421+ D1 421+ DX( 421+ DY( 421+                         | 26 JA0  |    |
| 26JA0      | 4 DZ(42), U1(42), V1(42), W1(42), U2(42),                            | 13HR0   | ~  |
| 26JA0      | 5 V2(42), W2(42), ERX(42), ERY(42), ERZ(42),                         | 13480   |    |
| 26JA0      | 6 RX(42), RY(42), RZ(42)                                             | 1 3HR0  |    |
| 26JA0      | CONMUN /BLK1/ KEEP2, KEEP3, KEEP4, KEEP5, KEEP6, KEEP7.              | 26 JA0  |    |
| RCE16MY0   | 2 ITYPE + NCD2 + NCD3 + NCD4 + NCD5 + NCD6 + NCD7 +                  | 26 JA0  |    |
| 16MY0      | 3 IABAN, IFORM, NM, NJT, NST, NLT, TOL.                              | 26.JA0  |    |
| 26JA0      | 4 M. NP1. HP2. ISTT. LTT. ITYPEL.IDJ.                                | 12FE0   |    |
| 26JA0      | 5 MLC+ 1P8+ 1P9+ 1P10                                                | 1 3F FO |    |
| 26 JA0     | COMMAN /BLF2/ XL+XF+X1+X2+11+12+NQ+H+TH+H5Q+HCU+X2L                  | 26.140  |    |
| 16410      | COMMENT - ZERO MEMBER LOAD DATA                                      | 15870   |    |
| 26,140     | 00 1020 L a 1-M92                                                    | 74 140  |    |
| 26.140     | 1020 <b>9x(1) = 9y(1) = 02(1) = 0.0</b>                              | 26.140  |    |
| 24 140     | NGA2T = NGA1T = 1 + NCDLT                                            | 26 140  |    |
| 24 140     |                                                                      | 26 140  |    |
| 16840      | COMMENT = 11 GOES EDOM MCANT TO MCANT                                | 16440   |    |
| 24.140     |                                                                      | 19410   |    |
| 26340      | E = II + I                                                           | ZŐJAO   |    |
| 16440      | COMPENT - MERO DETA PROM ONE CAND IMAGE (LUADS AT LEFT OF SECTION)   | 15410   |    |
| ZOJAU      |                                                                      | ZŐJAO   |    |
| ZEJAU      |                                                                      | ZEJAO   |    |
| ZEJAO      | ORLY = OXL([])                                                       | ZEJAO   |    |
| ZEJAO      | $\sigma_{A}\Gamma_{A} = \sigma_{A}\Gamma(11)$                        | ZEJAD   |    |
| 26JA0      | $\Theta Z L T = \Theta Z L (11)$                                     | 26JAO   |    |
| 0AL95      | IF CHR .NE. 0.01 GO TO 1100                                          | 26JA0   |    |
| 26 JAO     | COMMENT - VARIABLE LOADING SECTION READ ONE CARD IMAGE (LOADS AT     | 15MY0   |    |
| 16MY0      | COMMENT - RIGHT OF SECTIONI                                          | 15MY0   |    |
| 2 16HYO    |                                                                      | 26 JAO  |    |
| 117EO      | XR = XRL(11)                                                         | 26 JA0  |    |
| 26JA0      | ØXRT = QXL(11)                                                       | 26JA0   |    |
| 16MY0      | $\Theta \Psi \Phi \Psi = \Theta \Psi L(11)$                          | 26 JA0  |    |
| 26JA0      | QZRT = QZL(11)                                                       | 26JA0   |    |
| OBAPO      | GO TO 1110                                                           | 26JA0   |    |
| 16440      | 1100 OXAT = OXLT                                                     | 26.JA0  |    |
| 151170     | GYRT - GYLT                                                          | 26.140  |    |
| 14870      |                                                                      | 26 140  |    |
| 14MYO      |                                                                      | 24 140  |    |
| 08400      |                                                                      | 26.340  |    |
| 16000      | COMMENT - CINCENTRATED LODE CALL COMED TO DISTRIBUTE CONCENTRATED    | 16440   |    |
| 28.440     | COMENT - CORENTRATED CORDS CALL CORED TO DISTRIBUTE CORENTRATED      | 19410   |    |
| 27340      |                                                                      | 19410   |    |
| 27,00      |                                                                      | LIFEO   |    |
| 26340      |                                                                      | LIFED   |    |
| ZEJAU      |                                                                      | 11760   |    |
| ZEJAU      |                                                                      | 26340   |    |
|            | 2100 CONTINUE                                                        | ZEJAO   |    |
|            | 211 = XL/TH + 2.0                                                    | ZEJAD   |    |
|            | 11 - 211                                                             | Z6 JAO  |    |
| SUBROUTINE | XI = II = TH                                                         | 26JA0   |    |
|            | 212 = XR/TH + 1.0                                                    | 26 JAO  |    |
|            | 12 = 212                                                             | 26JA0   |    |
|            | X2 = XR - 12+TH + TH                                                 | 26 JA0  |    |
| 11FE0      | NG = 12 - 11                                                         | 26JA0   |    |
| Z 22MYO    | COMMENT - DISTRIBUTION LUADS CALL LINLD TO DISTRIBUTE LOADS STATIONS | 15MY0   |    |
| 26JA0      | COMMENT - 11 TO 12                                                   | 15NYO   |    |
| 26 JAO     | IF {QXLT .EQ. 0.0 .AND. QXRT .EQ. 0.0} GO TO 2150                    | -11MY0  |    |
| 26JAO      | CALL LINLD ( 9xLT+ 9xRT+ 9x+ L1 )                                    | 11660   |    |
|            |                                                                      |         |    |

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| 2150      | IF IOYLT .E   | Q. 0.0 .AND.                  | OYRT .EQ.            | 0.0) GO TO 21  | 60          | 1 1MYO     |
|-----------|---------------|-------------------------------|----------------------|----------------|-------------|------------|
| CAL       | L LINL        | D I QYLT, QY                  | RT. QY. L1           | 3              |             | 11FE0      |
| 2160      | IF COLLT .E   | 0. 0.0 .AND.                  | QZRT .EQ.            | 0.01 GO TD 22  | 00          | 11MY0      |
| CAL       | L LINL        | DI OZLT. OZ                   | RT. QZ. LI           | 1              |             | 11FE0      |
| 2200      | CONTINUE      |                               |                      |                |             | 26.JA0     |
| 9000      | IF (11 .LT.   | NC6211 60 1                   | 0 1050               |                |             | 26JA0      |
| 9900      | CONTINUE      |                               |                      |                |             | 26JA0      |
| RE1       | URN           |                               |                      |                |             | 26JA0      |
| ENC       | )             |                               |                      |                |             | 26 JA0     |
| C         |               |                               |                      |                |             |            |
| L         | **********    | **********                    | **********           | ***********    | *********** | *********  |
| C         |               |                               |                      |                |             |            |
| C         | SUBROUTINE    | SUB                           | ROUTINE              | SUBROUT        | INE         | SUBROUTINE |
| c         |               |                               |                      |                |             |            |
| C         | *********     | **********                    | **********           | ***********    | *********** | *********  |
| c         |               |                               |                      |                |             |            |
| SUE       | ROUTINE MEHE  | 300 E M. FMM.                 | LA 1                 |                |             | OBAPO      |
| COMMENT - | - SUBROUTINE  | HENEND CALCU                  | LATES FORCE          | IS ON END OF M | EMBER USING | 15MY0      |
| COMMENT - | - DISPLACEMEN | ITS FOUND FRO                 | h member so          | AUTION         |             | 15MY0      |
| DIP       | EASLON FAMIS  | 1. W(L6)                      |                      |                |             | OBAPO      |
| CO        | WON /BLOCK7/  | F1 42}+                       | AE1 421+             | \$X( 42) +     | SY (42) +   | 26JA0      |
| 2         | 52( 42).      | QX( 42)+                      | QY1 421.             | QZ( 42)+       | AC 4274     | 26JA0      |
| 3         | 8( 42)+       | A11 427+                      | DI 42).              | DX( 42),       | DY( 42)+    | 26 JA0     |
| · •       | DZ(42)+       | U1(42).                       | V1(42)+              | W1(42).        | U21421+     | 1 3MR0     |
| 5         | V2(42).       | W2(42).                       | ERX(42),             | ERY (42) +     | ERZ(42)+    | 1 3MR0     |
| 6         | RX(42).       | AY(42).                       | RZ(42)               |                |             | 13MRO      |
| _COP      | MON /BLK1/    | KEEP2. KEEP3                  | • KEEP4• KE          | EPS, KEEP6, K  | EEPT.       | 26JA0      |
| 2         | ITYPE.        | HCD2+ HCD3+                   | HCD4+ HC             | D5. HCD6. A    | C07.        | 26JA0      |
|           | LABAN .       | IFORM. NH.                    | NJT+ NS              | To ALTO 1      | OL.         | 26JA9      |
| 4         | <b>N</b> •    | MP1. MPZ.                     | ISTT. LI             | Ta ITYPELA     | D1+         | 12FEO      |
|           | HLC,          | 1P9, 1P9,                     | 1P10                 |                |             | 13FED      |
| COP       | THAN /BLKZ/ R | L .XK.X1.XZ.I                 | 1.12.044.00.1        | H+HSQ+HCU+XZL  | •           | ZAJAO      |
| COP       | TON /BLKA/ S  | 11.512.513.5                  | 14+515+516           |                |             | ZGJAO      |
| COMPENT . | · COMPUTE ATI | AL END FORCE                  | 5                    |                |             | 15810      |
|           |               | DAL27 - DALA                  | ,<br>                |                | •           | 20340      |
|           | PDV -         | J = "ACL21"0<br>AV(10011 - 00 | UK/10 + 311<br>/w1   | -DALLY - VAL   |             | 26,00      |
|           |               |                               | 1777<br>Dow/714 + 61 |                |             | 20000      |
| comment - | - CONVERT DIS | DI ACTINENTE E                | DOM (81028           | INT TO LATER   |             | 15000      |
| COMMENT   | - RUTATIONAL  | DISPLACEMENT                  | S DY AND D           |                |             | 15MY0      |
|           | DY/11         | a W(1)                        | e e ,                | •              |             | 24.140     |
|           | 07(1)         | - W(2)                        |                      |                |             | 26.140     |
|           | DY (2)        |                               |                      |                |             | 26.380     |
|           | DZ ( 2 )      | . W(4)                        |                      |                |             | 26 JA0     |
|           | DY (M)        |                               |                      |                |             | 26.JAD     |
|           | DZ (#)        | = ¥(2+H)                      |                      |                |             | 26 JAD     |
|           | DY (HP)       | ) . W12*H +                   | 1)                   |                |             | ZAJAO      |
|           | DZ (1991      | ) = ¥(2** +                   | 2)                   |                |             | 26JA0      |
| COMMENT - | COMPUTE CUR   | VATURES                       |                      |                |             | 15MY0      |
|           | TAU1 .        | (DY12) - D                    | Y(1))/H - (          | 1.5402(1) + (  | +5+DZ(2))   | 26JA0      |
|           | TAU2 =        | -(DY(2) - D                   | Y(1))/H + 1          | 0.5+02(1) + 1  | +5+02(2))   | Z6JA0      |
| CONNENT - | - COMPUTE LAT | ERAL AND ROT                  | ATIONAL EN           | FORCES         |             | 15HYD      |
|           | FMN 42        | 1 - F121+17A                  | UZ - TAULIA          | HSQ + ST2*OV   | 1) - 07(1)  | 26JA0      |
|           | FHR (3        | )) = F(2)=( -                 | 1.5*TAU1 +           | 0.5*TAU217H 4  | ST3+DZ(1) - | 26JA0      |
| 2         |               | QZ(1)                         |                      |                |             | Z6JAD      |
|           | TAU1 -        | (DY(##1) -                    | DY (M) ) /H -        | - (1.5*DZ(M) 4 | 0.5+DZ(MP1) | 26JA0      |

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| TAU2 = -{DY(MP1) - DY(M)}/H + {0.5*DZ(M) + 1.5*DZ(MP1)}                | 26JA0      |
|------------------------------------------------------------------------|------------|
| FMM (5) = F(MP1)*(TAU3 - TAU2)/MSO + ST5*DY(MP1) -                     | ZEJAO      |
| 2 QY(NP1)                                                              | 26JA0      |
| FNM (6) = F(HP1)*( ~ 0.5*TAU1 + 1.5*TAU2)/H +                          | 26 JA0     |
| 2 ST6+D2 (NP1) - Q2 (NP1)                                              | 26JA0      |
| RETURN                                                                 | 26.JA0     |
| END                                                                    | 26.JA0     |
| c                                                                      |            |
| C ************************************                                 | *********  |
| C                                                                      |            |
| C SUBROUTINE SUBROUTINE SUBROUTINE                                     | SUBROUTINE |
| C                                                                      |            |
| C ************************************                                 | *********  |
| C                                                                      |            |
| SUBRUUTINE FSUBIL ( SUA, FF, LA, IHB )                                 | 25 JLO     |
| COMMENT - SUBROUTINE FSUBIL FURNISHES RIGHT SIDE OF SYMMETRIC STIFFNE  | 55 21MYO   |
| COMMENT - MATRIX SU AND LOAD TERM F TO GRIPZA FOR FRAME SOLUTION       | 21MY0      |
| COMMENT - SU IS UNE ROW OF STIFFNESS MATRIX AND F IS CORRESPONDING LO  | D 21MYO    |
| COMMENT - FSUBIL FORMS SEL (3 ROWS OF SU) AND FSS (3 LOADS) EVERY THIS | O SIMAO    |
| COMMENT - CALL FROM GRIPZA AND FURNISHES SU AND F FOR EACH CALL        | 21MY0      |
| DIMENSION SUA(LA)                                                      | 21MY0      |
| DIMENSION 500(3,3),505(3,3),00(3,3),00(13,3),733(3,3),                 | 21MYO      |
| 2 FMM(3) #FSS(3) #FMS(3)                                               | ZIMYO      |
| COMMUN /BLOCK1/ X( 75)+ Y( 75)+ OKX( 75)+ OYY( 75)+                    | 13FE0      |
| 2 GZZ ( 751. SAX ( 751. SYY ( 751. SZZ ( 751. DAX ( 751.               | 1 3F EO    |
| 3 DYY( 75)+ DZZ( 75)+ RXX( 75)+ RYY( 75)+ RZZ( 75)+                    | 13FE0      |
| 4 ERXX( 75) . ERYY( 75) . ERZZ( 75)                                    | 13FE0      |
| COMPLA /BLOCK2/ DXS( 50)+ DYS( 50), 2LS( 50), DC15( 50)+               | ZEJAO      |
| 2 DC25( 50) + PRF( 50) + PRAE( 50) - NCD5( 50) - TAXOPS( 50)           | ZEJAO      |
| 3 IOPOPE 501. [PINLE 501. IPINRE 501. NC51E 501. SMCE 50.13]           | 20040      |
| COMPAN /BLOCK3/ DAL( 50), DYL( 50), ZLL( 50), DCIL( 50),               | ZEJAD      |
| 2 DC2L( 501+ UGX( 501+ UGY( 501+ NCDL( 501+ 1AXOPL( 50)                | ZEJAD      |
| 3 AC61( 50)                                                            | ZEJAD      |
| COMICA /BLOCKA/ JT[(150], JT2(150), IST(150), LT(150),                 | ZEJAD      |
| 2 FORM(150-63                                                          | ZEJAD      |
| COMMON / BLOCIO / SSL (3:30)                                           | OBAPO      |
| CUMPUN /BLKI/ KEEP2, KEEP3, KEEP4, KEEP3, KEEP3, KEEP1,                | 26,140     |
| Z ITTES REDZ: RED3: RED3: RED3: RED3: RED3: RED3:                      | 26340      |
|                                                                        | 13660      |
|                                                                        | 12020      |
| ZOMMUN Z DI Z M M M A II                                               | 137 20     |
|                                                                        | OFARO      |
|                                                                        | OBAPO      |
|                                                                        | OBADO      |
|                                                                        | 34 140     |
| COMMENT - ST CHARTANTE IN FIRST CALL FROM GRIBTA                       | 21840      |
| INDEL A I                                                              | 24.140     |
|                                                                        | 26.140     |
| SHM(1,2) * SHM(1,3) * SHM(2,1) * SHM(3,13 * 0.0                        | 201110     |
| D(1) = D(2) = D(2) = D(1) = D(1) = D(1) = D(1) = D(1)                  | 26.JA0     |
| DCT(1,3) = DCT(2,3) = DCT(3,1) = DCT(3,2) = 0.0                        | 26JA0      |
| DC(3,3) = DCT(3,3) = 1.0                                               | 26.JA0     |
| COMMENT - CUMPUTE JOINT NUMBER FOR WHICH EQUATIONS ARE BEING FORMED    | 21MY0      |
| 1300 JTM = (1)A = 11/3 + 1                                             | 26.140     |
| COMMENT - SKIP FUR FUERY SECOND AND THIRD FOUNTION (CALL FROM GRIP2A)  | 21HY0      |
|                                                                        |            |

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| IF (J14 .NE, SHJTN - 2) GO TO 4000                                      | 26JA0   |
|-------------------------------------------------------------------------|---------|
| CONVERT - ZERO SSL AND PSS                                              | ZIMYO   |
| DO 1400 1 = 1 + 3                                                       | 26 JAO  |
| DO 1400 J = 1,1HBP1                                                     | 26JA0   |
| 1400 <b>SSL(1.J) = 0.0</b>                                              | 26 JAO  |
| $F$${1} = F$${2} = F$${3} = 0.0$                                        | 31JA0   |
| COMMENT - DO FOR EACH MEMBER - ADD ITS STIFFNESS MATRIX AND LOAD MATRIX | 21MY0   |
| CONMENT - INTO STRUCTURE STIFFNESS MATRIX SSL AND LOAD MATRIX FSS       | 21MY0   |
| DO 3509 1 = 1.NH                                                        | ZGJAO   |
| IF ( JT1(I) .NE. JTN .AND. JT2(I) .NE. JTN ) GO TO 3500                 | 26 JAO  |
| 1STT = 1ST(1)                                                           | 26JA0   |
| CONNENT - SKIP FOR HILL HEMBER                                          | 21MY0   |
| IF ( 15TT .EQ. 0 ) 60 TO 3500                                           | 29JA0   |
| CONNENT - FORM TRANSFORMATION MATRIX AND ITS TRANSPOSE                  | 21MY0   |
| DC(1,1) = DC(1,1)                                                       | 26.JA0  |
| DC(1,2) = DC2S(1STT)                                                    | 26 JA0  |
| DC(2+1) = - DC(1+2)                                                     | 26.JA0  |
| DC(2,2) = DC(1,1)                                                       | 26.JA0  |
| BCT(1)(1) + BC(1)(1)                                                    | 26.JA0  |
| B(T(1), 2) = B(2, 1)                                                    | 26.340  |
|                                                                         | 26.140  |
|                                                                         | 26.140  |
| 18 ( )T2(1) -FO. (TN) GO TO 2100                                        | 26 140  |
| COMMENT - SKIP FOR OFFSPRING                                            | 21MY0   |
| if ( MA - F01 ) GO TO 2250                                              | OSMRO   |
| COMMENT - FORM SIM FOR MEMORE WITH FROM JOINT AT JOINT JIN              | 21HYO   |
|                                                                         | 201110  |
| SMM(2.2) = SMC(1STT.)                                                   | 20MY0   |
|                                                                         | 20MY0   |
| SMM(3.2) = SMC(1STT.A)                                                  | 20440   |
| SIMILATION SHE LISTING                                                  | ZONYO   |
| CONVERT - FORM FOR MEMBER WITH FROM JOINT AT JOINT JTN                  | 21MY0   |
| 2250 FM(1) = FOM(1)1                                                    | 20HY0   |
| FIN(2) - FON(1.2)                                                       | ZOMYO   |
|                                                                         | 2011/0  |
| 60 TO 2500                                                              | 26.JA0  |
| 2300 CONTINUE                                                           | 27 JAO  |
| CONNENT - SELP FOR OFFSPRING                                            | 21MY0   |
| IF { HL4 .Eg1 } 69 TO 2350                                              | 05HR0   |
| CONVENT - FORM SHILF OR MEMBER WITH TO JOINT AT JOINT JTN               | 21MY0   |
| SH4(1+1) = SHC(1STT+10)                                                 | 20MYO   |
| $SH(\{2,2\}) = SHC(\{1,5,1,1\})$                                        | ZOMYO   |
| SMM(2,3) = SMC(1STT+12)                                                 | ZOMYO   |
| SHR(3,2) = SHC(1STT,12)                                                 | 20HYO   |
| S(0(3,3) = S(C(1STT+13))                                                | 20HY0   |
| CONNENT - FORM FMM FOR MEMBER WITH TO JOINT AT JOINT JTN                | S INAO  |
| 2350 FHH(1) = FONM(1,4)                                                 | 21MYO   |
| FMM(2) = FAMM(1+5)                                                      | 2 1MYO  |
| FM4(3) = FOM4(1+6)                                                      | 2 1 MYO |
| 2500 CONTINUE                                                           | 26 JAO  |
| IF ( MLA .20. ~1 ) 40 TO 2550                                           | 05HR0   |
| CONNENT - TRANSFORM SHM AND FHM TO STRUCTURE COORDINATES SHS AND FHS    | 21MY0   |
| CALL MATHES ( DCT+ SMM+ TS3)                                            | 20440   |
| CALL NATHER ( TEE DC+ SH5)                                              | ZONYO   |
| 2550 CALL MATHSI ( DCT+ FMM+ FMS)                                       | ZOMYO   |
| COMMENT - ADD (SUBTRACT) IN FMS TO STRUCTURE LOAD MATRIX FSS            | 2 1MYO  |

| SSL(1,15TP + 2) = SMS(1.3)<br>SSL(2,1STP) = SMS(2.1)<br>SSL(2,1STP + 1) = SMS(2.2)<br>SSL(3,1STP + 2) = SMS(2.3)<br>SSL(3,1STP) = SMS(2.3)<br>SSL(3,1STP + 1) = SMS(3.2)<br>SSL(3,1STP + 2) = SMS(3.3)<br>35U0 CUNTINUE<br>COMMENT - ATU IN JOINT (DADS<br>FSS(1) = FSS(1) + QXX(JTN)<br>FSS(2) = FSS(2) + QYY(JTN)<br>FSS(2) = FSS(3) + QZZ(JTN)<br>COMMENT - SKIP FUR OFFSPRING<br>IF ( ML4 .EQ1 ) GO TO 4000<br>COMMENT - ADD IN JOINT RESTRAINTS<br>SSL(2,2) = SSL(2,2) + SYY(JTN)<br>SSL(2,2) = SSL(2,2) + SYY(JTN)<br>SSL(2,2) = SSL(2,2) + SYY(JTN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| $\begin{array}{rcl} & & SSL(1,1,STP + 2) & = & SMS(1,3) \\ & & & SSL(2,1,STP) & = & SMS(2,1) \\ & & & SSL(2,1,STP + 1) & = & SMS(2,2) \\ & & & SSL(2,1,STP + 2) & = & SMS(2,3) \\ & & & & SSL(3,1,STP) & = & SMS(3,1) \\ & & & & & SSL(3,1,STP + 1) & = & SMS(3,2) \\ & & & & & & SSL(3,1,STP + 2) & = & SMS(3,2) \\ & & & & & & & SSL(3,1,STP + 2) & = & SMS(3,3) \\ & & & & & & & SSL(3,1,STP + 2) & = & SMS(3,3) \\ & & & & & & & \\ SSL(3,1,STP + 2) & = & & SMS(3,3) \\ & & & & & & \\ SSL(3,1,STP + 2) & = & & SMS(3,3) \\ & & & & & & \\ SSL(3,1,STP + 2) & = & & SMS(3,3) \\ & & & & & \\ SSL(3,1,STP + 2) & = & & SMS(3,3) \\ & & & & & \\ SSL(1,1,0,STP) & & \\ SSL(1,1,0$                 | 20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>26JA0<br>26JA0<br>21HY0<br>27JA0<br>21HY0<br>21HY0<br>05HR0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>21HY0<br>20HY0<br>21HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0<br>20HY0 |
| SSL(1,1,STP + 2) = SMS(1,3)<br>SSL(2,1STP) = SMS(2,1)<br>SSL(2,1STP + 1) = SMS(2,2)<br>SSL(3,1STP + 2) = SMS(2,3)<br>SSL(3,1STP + 2) = SMS(3,1)<br>SSL(3,1STP + 2) = SMS(3,2)<br>SSL(3,1STP + 2) = SMS(3,3)<br>35U0 CONTINUE<br>COMMENT - ADU IN JOINT (DADS<br>FSS(1) = FSS(1) + QXX(JTN)<br>FSS(2) = FSS(2) + QY(JTN)<br>FSS(2) = FSS(2) + QY(JTN)<br>FSS(2) = FSS(2) + QZ(JTN)<br>COMMENT - SKIP FUR OFFSPRING<br>IF ( ML4, EQ, -1) GO TO 4000<br>COMMENT - ADD IN JOINT RESTRAINTS<br>SSL(1,1) = SSL(1,1) + SXX(JTN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| SSL(1,15TP + 2) = SMS(1,3)<br>SSL(2,15TP) = SMS(2,1)<br>SSL(2,15TP + 1) = SMS(2,2)<br>SSL(2,15TP + 2) = SMS(2,3)<br>SSL(3,15TP + 2) = SMS(3,1)<br>SSL(3,15TP + 1) = SMS(3,2)<br>SSL(3,15TP + 2) = SMS(3,2)<br>SSL(3,15TP + 2) = SMS(3,3)<br>SSL(3,15TP + 2) = SMS(3,15TP + 2)<br>SSL(3,15TP + 2) = SMS(3,15TP + 2) = SMS(3,15TP + 2)<br>SSL(3,15TP + 2) = SMS(3,15TP + 2) = SMS(3,15 | 20MY0<br>20MY0<br>20MY0<br>20MY0<br>20MY0<br>20MY0<br>20MY0<br>20MY0<br>21MY0<br>27JA0<br>27JA0<br>27JA0<br>27JA0<br>27JA0<br>21MY0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SSL(1,1,STP + 2) = SMS(1,3)<br>SSL(2,1STP) = SMS(2,1)<br>SSL(2,1STP + 1) = SMS(2,2)<br>SSL(2,1STP + 2) = SMS(2,3)<br>SSL(3,1STP) = SMS(3,1)<br>SSL(3,1STP) = SMS(3,2)<br>SSL(3,1STP + 2) = SMS(3,2)<br>SSL(3,1STP + 2) = SMS(3,3)<br>3540 CONTINUE<br>COMMENT - ADD IN JOINT 10ADS<br>FSS(1) = FSS(2) + QX(JTN)<br>FSS(2) = FSS(2) + QX(JTN)<br>FSS(3) = FSS(3) + QZ(JTN)<br>COMMENT - SKIP FUR OFFSPRING<br>IF ( ML4, +EQ1 ) GO TO 4000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| SSL(1,15TP + 2) = SMS(1,3)<br>SSL(2,1STP) = SMS(2,1)<br>SSL(2,1STP + 1) = SMS(2,2)<br>SSL(3,1STP + 2) = SMS(2,3)<br>SSL(3,1STP + 2) = SMS(2,3)<br>SSL(3,1STP + 1) = SMS(3,2)<br>SSL(3,1STP + 2) = SMS(3,3)<br>35U0 CONTINUE<br>COMMENT - ADD IN JOINT (DADS<br>FSS(1) = FSS(1) + QXX(JTN)<br>FSS(2) = FSS(2) + QYY(JTN)<br>FSS(2) = FSS(2) + QYY(JTN)<br>FSS(3) = FSS(3) + QZZ(JTN)<br>COMMENT - SKIP FUR OFFSPRING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0 VH02<br>0 VH02<br>0 VH02<br>0 VH00<br>0 VH02<br>0                                                                                                                                                 |
| SSL(1+15TP + 2) = SMS(1-3)<br>SSL(2+15TP) = SMS(2+1)<br>SSL(2+15TP + 1) = SMS(2+1)<br>SSL(2+15TP + 2) = SMS(2+3)<br>SSL(3+15TP) = SMS(3+1)<br>SSL(3+15TP + 1) = SMS(3+2)<br>SSL(3+15TP + 2) = SMS(3+2)<br>SSL(3+15TP + 2) = SMS(3+3)<br>35+0 CONTINUE<br>COMMENT = ATU IN JOINT LOADS<br>FSS(1) = FSS(1) + QXX(JTN)<br>FSS(2) = FSS(2) + QYY(JTN)<br>FSS(3) + FSS(3) + QZ(JTN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| SSL(1+1STP + 2) = SMS(1-3)<br>SSL(2+1STP) = SMS(2+1)<br>SSL(2+1STP + 1) = SMS(2+2)<br>SSL(3+1STP + 2) = SMS(2+3)<br>SSL(3+1STP + 2) = SMS(3+1)<br>SSL(3+1STP + 1) = SMS(3+2)<br>SSL(3+1STP + 2) = SMS(3+3)<br>3540 CONTINUE<br>COMMENT - ADD IN JOINT LOADS<br>FSS(1) = FSS(1) + QXX(JTN)<br>FSS(2) = FSS(2) + QYY(JTN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| SSL(1,15TP + 2) = SHS(1,3)<br>SSL(2,15TP) = SMS(2,1)<br>SSL(2,15TP + 1) = SMS(2,2)<br>SSL(3,15TP + 2) = SMS(2,3)<br>SSL(3,15TP + 2) = SMS(3,1)<br>SSL(3,15TP + 1) = SMS(3,2)<br>SSL(3,15TP + 2) = SMS(3,3)<br>CUNTINUE<br>COMMENT = APU IN JOINT LOADS<br>FSS(1) = FSS(1) + QXX(JTN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| SSL(1+1STP + 2) = SHS(1+3)<br>SSL(2+1STP) = SHS(2+1)<br>SSL(2+1STP + 1) = SHS(2+2)<br>SSL(2+1STP + 2) = SHS(2+3)<br>SSL(3+1STP) = SHS(3+1)<br>SSL(3+1STP + 1) = SHS(3+2)<br>SSL(3+1STP + 2) = SHS(3+3)<br>3540 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| SSL(1,15TP + 2)       =       SMS(13)         SSL(2,1STP)       =       SMS(2,1)         SSL(2,1STP + 1)       =       SMS(2,2)         SSL(2,1STP + 2)       =       SMS(2,3)         SSL(3,1STP)       =       SMS(2,3)         SSL(3,1STP)       =       SMS(2,3)         SSL(3,1STP)       =       SMS(2,3)         SSL(3,1STP + 1)       =       SMS(3,2)         SSL(3,1STP + 2)       =       SMS(3,3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| SSL(1.15TP + 2) = SHS(1.3)<br>SSL(2.15TP) = SHS(2.1)<br>SSL(2.15TP + 1) = SHS(2.2)<br>SSL(2.15TP + 2) = SHS(2.3)<br>SSL(3.15TP) = SHS(3.1)<br>SSL(3.15TP) + 1) = SHS(3.2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| \$\$L(1.1STP + 2)       =       \$M\$(1.3)         \$\$L(2.1STP)       =       \$M\$(2.1)         \$\$L(2.1STP + 1)       =       \$M\$(2.2)         \$\$L(2.1STP + 2)       =       \$M\$(2.3)         \$\$L(3.1STP)       =       \$M\$(3.1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| SSL(2+15TP + 2) = SMS(1-3)<br>SSL(2+15TP) = SMS(2+1)<br>SSL(2+15TP + 1) = SMS(2+2)<br>SSL(2+15TP + 2) = SMS(2+3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| SSL(1+1STP + 2) = SNS(1+3)<br>SSL(2+1STP) = SMS(2+1)<br>SSL(2+1STP + 1) = SMS(2+2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| COMMENT - FURM SAM FOR MEMBER WITH TO JOINT AT JOINT JTN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| 5MM(3,3) * SNC(1STT+9)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| SHM(2+2) = SHC(1STT+5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| CONNENT - FURM SAM FOR MEMBER WITH FROM JOINT AT JOINT JTN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| CONVENT - SKIP FOR SHA WHICH ARE TO LEFT OF DIAGONAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| SSL(3+3) # SSL(3+3) + SMS(3+3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| SSL(2+3) + SSL(2+3) + SNS(2+3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| SSL(2+2) = SSL(2+2) + SMS(2+2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| SSL(1,3) = SSL(1,3) + SMS(1,3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| SSL(1+2) = SSL(1+2) + SHS(1+2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| $SSL(1 \circ 1) = SSL(1 \circ 1) + SMS(1 \circ 1)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| COMMENT - ADD IN SMS TO DIAGONAL SUBMATRIX OF SSL - SYMMETRICAL TERMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| IF { ML4 →EQ1 } GO TO 3500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| COMMENT - SKIP FOR OFFSPRING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| F55(3) = F55(3) - FM5(3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| F55(2) = F55(2) - FM5(2)<br>F55(3) = F55(3) - FM5(3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| COMMENT -                                                                                                                 | - UF SSL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         | 21HY0                                                                                                                                                                            |
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|                                                                                                                           | DO 3600 1 = 1+1H8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         | 27JA0                                                                                                                                                                            |
| 3600                                                                                                                      | 554(2.1) = 554(2.1 + 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         | 27JA0                                                                                                                                                                            |
|                                                                                                                           | DO 3700   = 1+1H81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         | 27JAD                                                                                                                                                                            |
| 3100                                                                                                                      | SSL(3.1) = SSL(3.1 + 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         | 27JAD                                                                                                                                                                            |
|                                                                                                                           | S\$L12.[HBP1) = SSL(3.]HBP11 = SSL(3.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | HRI = 0.0                               | 28JA0                                                                                                                                                                            |
| 4000                                                                                                                      | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                         | 26JAD                                                                                                                                                                            |
|                                                                                                                           | N123 = J14 - 3*JTN + 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         | 05MRD                                                                                                                                                                            |
|                                                                                                                           | IF ( ML4 .EQ1 ) GO TO 4400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         | 05MRD                                                                                                                                                                            |
| COMMENT -                                                                                                                 | - SKIP FOR OFFSPRING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         | 21MY0                                                                                                                                                                            |
| -D-C 057 5                                                                                                                | 15 - 1HBP1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         | 01.4.0                                                                                                                                                                           |
| CONNENT -                                                                                                                 | - FURK SU FROM ROWIN1231 OF SSL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         | 7 1NYO                                                                                                                                                                           |
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|                                                                                                                           | SUA(1) = SSL(N123+18)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                         | 01 JEO                                                                                                                                                                           |
| 4300                                                                                                                      | 16 = 18 - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         | 01.4.0                                                                                                                                                                           |
| 4490                                                                                                                      | FF + F55(8125)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         | 2 TJAO                                                                                                                                                                           |
| COMMENT -                                                                                                                 | - SKIP FOR ALL BUT OFFSPRING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         | 21 MYO                                                                                                                                                                           |
|                                                                                                                           | LF (ML4 .GT1 1 GO TO 4450                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         | 05080                                                                                                                                                                            |
| CONNENT -                                                                                                                 | - CHECK FOR UNDEFINED DISPLACEMENT IN PARENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | OF THIS OFFSPRING                       | ZIMYD                                                                                                                                                                            |
|                                                                                                                           | 1F ( N121 .FO. 1 .AND. OXX(JTN) .FO. 1.0F9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 9 1 60 10 4480                          | ORAPO                                                                                                                                                                            |
|                                                                                                                           | IF ( N121 .FO. 2 .AND. OYYIJTH) .FO. 1.0F9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 9 1 60 10 4480                          | ORAPO                                                                                                                                                                            |
|                                                                                                                           | IF ( N123 .EQ. 3 .AND. DZZIJTN) .EQ. 1.0E9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 9 1 60 10 4480                          | OBAPO                                                                                                                                                                            |
|                                                                                                                           | GO TO 4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         | 05MRD                                                                                                                                                                            |
| 4450                                                                                                                      | K IMBP1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         | OSMRC                                                                                                                                                                            |
|                                                                                                                           | LF (SUM(K) -HF- 0-0) 50 TO 4500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         | 05MR0                                                                                                                                                                            |
| COMMENT -                                                                                                                 | - ZERO ON DIAGONAL OF MATRIX - DISPLACEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | UNDEFINED - SET                         | ZINYO                                                                                                                                                                            |
| COMMENT -                                                                                                                 | - DISPLACEMENT EDUAL TO 1.0F+99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         | 21MY0                                                                                                                                                                            |
|                                                                                                                           | SIM(E) = 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         | 0.0.000                                                                                                                                                                          |
|                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                         | Unimation                                                                                                                                                                        |
| 4480                                                                                                                      | FF = 1-0F99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                         | OSMRO                                                                                                                                                                            |
| 4480                                                                                                                      | FF = 1.0E99<br>CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         | 05MR0                                                                                                                                                                            |
| 4480<br>4500 RET                                                                                                          | FF = 1.0E99<br>CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         | 05MR0<br>05MR0<br>26JA0                                                                                                                                                          |
| 4480<br>4300<br>RET<br>END                                                                                                | FF + 1.0E99<br>CONTINUE<br>TURN<br>D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         | 05MR0<br>05MR0<br>26JA0<br>26JA0                                                                                                                                                 |
| 4480<br>4300<br>RET<br>END                                                                                                | FF = 1.0E99<br>CONTINUE<br>TURN<br>D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         | 05MR0<br>05MR0<br>26JA0<br>26JA0                                                                                                                                                 |
| 4480<br>4300<br>RET<br>END<br>C                                                                                           | FF = 1.0E99<br>CONTINUE<br>TURN<br>D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         | 05MR0<br>05MR0<br>26JA0<br>26JA0                                                                                                                                                 |
| 4488<br>4300<br>RET<br>END<br>C<br>C                                                                                      | FF = 1.0E99<br>CONTINUE<br>TURN<br>D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                         | 05MR0<br>05MR0<br>26JA0<br>26JA0                                                                                                                                                 |
| 4488<br>4300<br>RET<br>END<br>C<br>C<br>C                                                                                 | FF + 1.0E99<br>CONTINUE<br>TURN<br>D<br>***********************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | **************************************  | 05MR0<br>05MR0<br>26JA0<br>26JA0                                                                                                                                                 |
| 4488<br>4300<br>RET<br>END<br>C<br>C<br>C                                                                                 | FF + 1.0E99<br>CONTINUE<br>TURN<br>D<br>+=P4===================================                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 9860011NE                               | 05HR0<br>05HR0<br>05HR0<br>26JA0<br>26JA0                                                                                                                                        |
| 4488<br>4300 RET<br>END<br>C<br>C<br>C<br>C<br>C                                                                          | FF + 1.0E99<br>CONTINUE<br>TURN<br>D<br>+===================================                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | BROUTINE :                              | 05MR0<br>05MR0<br>26JA0<br>26JA0<br>SUBROUTINE                                                                                                                                   |
| 4488<br>4300 RET<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C                                                                | FF + 1.0E99<br>CONTINUE<br>TURN<br>D<br>Papersonances and a subroutine su<br>subroutine subroutine su                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BROUTINE :                              | DSHRD<br>DSHRD<br>OSHRD<br>26JAD<br>26JAD<br>SUBROUT I NE                                                                                                                        |
| 4480<br>4300 RET<br>END<br>C<br>C<br>C<br>C<br>C<br>S<br>UB                                                               | FF + 1.0E99<br>CONTINUE<br>TURN<br>D<br>+=P4000000000000000000000000000000000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 880y11NE                                | 05HR0<br>05HR0<br>05HR0<br>26JA0<br>26JA0<br>5008R0UT 1 ME                                                                                                                       |
| 4480<br>4309<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C        | FF + 1.0E99<br>CONTINUE<br>TURN<br>D<br>+==================================                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | BROUTINE                                | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                                                                                                      |
| 4480<br>4300<br>RET<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | CONTINUE<br>TURN<br>D<br>Paperson SubRoutine SubRoutine SubRoutine SubRoutine SubRoutine SubRoutine SubRoutine SubRoutine Multiplies A 3X3 MATRIX ,A<br>- XX3 MATRIX ,BM, TO PRODUCE A 3X3 MATRIX ,A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | BROUTINE<br>STOLES A                    | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                                                                                    |
| 4480<br>4509<br>RET<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | FF + 1.0E99<br>CONTINUE<br>TURN<br>SUBROUTINE SUBROUTINE SU<br>BROUTINE MATH33 ( AM. BM. (M )<br>- THIS SUBROUTINE MULTIPLIES A 3X3 MATRIX "A<br>- SX3 MATRIX "BM. TO PRODUCE A 3X3 MATRIX "C<br>HENSION AN(3,3) JBM(3,5) -CM(3,5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | BROUTINE :                              | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                                                                                    |
| 4480<br>4509<br>RET<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | CONTINUE<br>CONTINUE<br>CONTINUE<br>SUBROUTINE<br>SUBROUTINE<br>BROUTINE MATM33 ( AM. BM. (M )<br>- THIS SUBROUTINE MOLTIPLIES A 3X3 MATRIX ,A<br>- 3X3 MATRIX ,BM. TO PRODUCE A 3X3 MATRIX ,C<br>NEMSION AM(3,3) BM(3,3) +CM(3,3)<br>DO 23 [ + 1,3]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | BROUTINE<br>N. TIMES A<br>M             | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                                                                           |
| 4480<br>4300<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | BRUUTINE MATHINE (AM. BM. CH.)<br>SUBROUTINE SUBROUTINE SU<br>BRUUTINE MATHINE (AM. BM. CH.)<br>- THIS SUBROUTINE MULTIPLIES A 3X3 MATRIX "A<br>- SX3 MATRIX "BM. TO PRODUCE A 3X3 MATRIX "C<br>NEMSION AM(3,3) "BM(3,3) "CM(3,3)<br>DO 23 I = 1.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | BROUTINE<br>N. TIMES A<br>M             | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                                                         |
| 4480<br>4509<br>RET<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | FF + 1.0E99<br>CONTINUE<br>SUBROUTINE<br>SUBROUTINE<br>BROUTINE MATH33 ( AN. BN. CH )<br>- THIS SUBROUTINE MULTIPLIES A 3X3 MATRIX ,A<br>- THIS SUBROUTINE MULTIPLIES A 3X3 MATRIX ,A<br>- SX3 MATRIX ,BM. TO PRODUCE A 3X3 MATRIX ,C<br>DO 23 I = 1.3<br>DO 23 I = 1.3<br>DO 23 I = 1.3<br>CM (1.J) = 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | BROUTINE :<br>M. TINES A                | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                                       |
| 4480<br>4300<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | FF + 1.0E99         CONTINUE         SUBROUTINE         SUBROUTINE | BROUTINE<br>N. TIMES A<br>M             | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                                       |
| 4480<br>4300<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | GRUTINE       SUBROUTINE       SUBROUTINE       SUBROUTINE         SUBROUTINE       SUBROUTINE       SUBROUTINE       SUBROUTINE         BRUUTINE       MATHINE       SUBROUTINE       SUBROUTINE         SUBROUTINE       MULTIPLIES       A 333       MATRIX         SUBROUTINE       MULTIPLIES       A 333       MATRIX         SUBROUTINE       MULTIPLIES       A 333       MATRIX         DO       23       I       I       3         DO       23       J       I       I         DO       23       J       I       I         CMII       J       O.D       UU       S       K       I         CMII       J       AMIL       I       I       I       I                                                                                                                                                                                                                  | BROUTINE<br>N. TIMES A                  | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                                              |
| 4480<br>4509<br>RET<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | FF + 1.0E99           CONTINUE           SUBROUTINE           CONTINE           SUBROUTINE           CONTINUE                                                                 | BROUTINE :                              | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                            |
| 4480<br>4300<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | CONTINUE<br>CONTINUE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>SUBROUTINE<br>AND ANTAXA<br>SUBROUTINE<br>MULTIPLIES A 3X3 MATRIX ,A<br>A 3X3 MATRIX ,BM, TO PRODUCE A 3X3 MATRIX ,A<br>SX3 MATRIX ,BM, TO PRODUCE A 3X3 MATRIX ,C<br>NENSION ANTAXA, 31,50M(3+5)+CM(3+5)<br>DO 25 I + 1+3<br>CM(1+J) + 0+D<br>CONTINUE<br>CONTINUE<br>CONTINUE<br>CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | BROUTINE S                              | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                   |
| 4480<br>4300<br>RET<br>EHD<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | GRUTINE       SUBROUTINE         SUBROUTINE       SUBROUTINE         SUBROUTINE       SUBROUTINE         BRUUTINE       MATHINE         SUBROUTINE       SUBROUTINE         SUBROUTINE       MULTIPLIES         ANTRIX       SH         TO       23         LO       23         CO       1         DO       23         CM       1         CM       1         CONTINUE       OU         CONTINUE       CONTINUE         D       D         D       D         D       D         CONTINUE       CONTINUE         D       D         D       D         D       D                                                        | BROUTINE<br>N. TIMES A                  | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0 |
| 4480<br>4509<br>RET<br>END<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C | Generation         Generation         SUBROUTINE         BRUUTINE         MATRIX         SUBROUTINE         SUBROUTINE         SUBROUTINE         MATRIX         SUBROUTINE         SUBROUTINE         SUBROUTINE         MATRIX         BRUTINE         SUBROUTINE         CM(Is)         CONTINUE         TURN         D         CONTINUE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE                     | BROUTINE                                | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0          |
| 4480<br>4300<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | FF + 1.0E99<br>CONTINUE<br>SUBROUTINE<br>SUBROUTINE<br>BRUUTINE MATM35 ( AM. BM. (M )<br>- THIS SUBROUTINE MULTIPLIES A 3X3 MATRIX .A<br>- THIS SUBROUTINE MULTIPLIES A 3X3 MATRIX .C<br>MENSION AM(3,3).0EM(3.5).CM(3.5)<br>DO 25 J = 1.3<br>CM(1.J) = 0.0<br>U 45 K = 1.3<br>CM(1.J) = 0.0<br>UU 45 K = 1.3<br>CM(1.J) = AM(1.K)=8M(K.J) + (M(1.J)<br>CONTINUE<br>TURN<br>D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | BROUTINE<br>M. TIMES A<br>M             | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0                   |
| 4480<br>4500<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | FF + 1.0E99         CONTINUE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         CONTINE         SUBROUTINE         BRUUTINE         SUBROUTINE         SUBROUTINE         BRUUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         BRUUTINE         DO         CO         UU         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE         SUBROUTINE                         | BROUTINE<br>M. TIMES A<br>M             | 26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0          |
| 4480<br>4300<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C<br>C                    | FF + 1.0E99           CONTINUE           SUBROUTINE                                                                                                                                                                                                                                                                                                                                                                                                                                 | BROUTINE<br>M. TIMES A<br>N<br>BROUTINE | 05MR0<br>05MR0<br>05MR0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0<br>26JA0          |

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| c         | *******     | •••••       |                                 |                 |              |            |
|-----------|-------------|-------------|---------------------------------|-----------------|--------------|------------|
| SUB       | CULTINE MAT | NOT 1 AN.   | BY. (Y)                         |                 |              | 26.140     |
| CUMMENT - | THIS SUBRO  | UTINE MULT  | IPLIES A NYS                    | NATRIX .AN. TI  | NES A        | 26 140     |
| COMMENT - | 3X1 MATRIX  | BY TO PR    | ODUCE A MAL I                   | ATRIX .CV       |              | DALAS      |
| DIN       | INSION AND  | +31 -BV(31. | (VII)                           |                 |              | 26.150     |
| 100000    | DO 25 1 .   | 1.1         |                                 |                 |              | 76 140     |
|           | CYLL        | . 0.0       |                                 |                 |              | 26.140     |
|           | D0 75 K .   | 1.4         |                                 |                 |              | ZAJAD      |
|           | CY(1)       | . AN(T.K)   | BUIKI . CVI                     | 11              |              | 01.4.0     |
| 25        | CONTINUE    |             | All Contraction and Contraction |                 |              | 26.JA0     |
| RET       | IRN         |             |                                 |                 |              | 26.JA0     |
| END       |             |             |                                 |                 |              | 26.140     |
| c         |             |             |                                 |                 |              |            |
| č         |             |             |                                 |                 |              |            |
| c         |             |             |                                 |                 |              |            |
| ć         | SUBROUTINE  | *           | SUBROUTINE                      | SUBROUT         | INE          | SUBROUTINE |
| c         |             |             |                                 |                 |              |            |
| č         |             |             |                                 | **************  | ***********  | *********  |
| c         |             |             |                                 |                 |              |            |
| SU/B      | ROUTINE SUM | 1           |                                 |                 |              | 17FEO      |
| COMMENT - | SUBROUT INE | SUN1        | DOES SUPERPD                    | SITION SOLUTION | FOR FRAME    | ZAAPO      |
| COMMENT - | JUINT DISP  | LACEMENTS   | AND REACTION                    | S FOR FAMILY PR | OBLEMS       | 24AP0      |
| CUM       | WWW /BLUCKI | / X1 751.   | Y1 751.                         | OXXI 751.       | DYY1 751.    | 13FEO      |
| 2         | VZ21 151.   | SAXI 751    | . SYYI 751                      | . SZZI 751.     | OXX1 751.    | 13FEO      |
| 3         | DYY1 151.   | 0221 751    | . RXXI 751                      | RYYI 751.       | RZZ1 751.    | 13FEO      |
| 4         | ERXX1 751.  | ERYYI 75    | I. ERZZI 75                     | )               |              | 13FE0      |
| CUN       | AN ISLUCKA  | / JT1(150)  | . JT241501                      | . IST(1501.     | LT(150).     | 26JAO      |
| 2         | FOHM1150+6  | 1           |                                 |                 |              | ZEJAD      |
| CUM       | HUN /BLUCKS | / NP121+21  | . ZM(21)                        |                 |              | D9JE0      |
| CUM       | MUN /BLA1/  | KEEPZ. KE   | EPJ, KEEPA.                     | KEEPS, KEEPS, K | EEP7.        | 12FEO      |
| 2         | ITYPE.      | NCD2. NO    | D3. NCD4.                       | NCDS. NCDS. N   | CD7.         | IZFED      |
| 3         | IABAN.      | IFORM. NP   | NJT I                           | NST. NLT. T     | OL .         | 12FEO      |
| 4         | Ma          | MP1, MP     | 2. 1511.                        | LTT. ITYPEL.I   | DJ,          | 12FE0      |
| 5         | ALC.        | IP8. IP     | 9. 1P10                         | •               |              | 13FFD      |
| REW       | 1 NO 1      |             |                                 |                 |              | 16JFO      |
| COMMENT - | SEHO JOINT  | DISPLACE    | ENTS . REACTIO                  | NS.AND LOADS    |              | ZOMYN      |
|           | DU 1130 1   | = 1, NJT    |                                 |                 |              | 12FEO      |
|           | DXXII       | ) . DYY(I)  | . DZZ(1) .                      | 0.0             |              | 124 1.0    |
|           | RXXII       | 1 = RYY(1)  | • R22(1) =                      | 0.0             |              | 12FEC      |
| 1100      | OXXII       | 1 = QTY(1)  | • QZZ(1) =                      | 0.0             |              | 12FE0      |
| COMMENT - | DU FOR EAC  | H PRUBLEM   | RESULTS ARE                     | STORED FOR      |              | ZOMYO      |
|           | DO ZACE J   | = 1. NLC    |                                 |                 |              | 17FEO      |
| COMMENT - | CRXX.ENYY.  | LASS AND P  | OMM ARE NUT                     | NEEDED FOR TYPE | 4 PROBLEM AN | D ZOMYO    |
| COMMENT - | ARE USED A  | S DUMMIES   | TO READ IN Y                    | ALUES OF DISPLA | CEMENTS.     | ZOMYO      |
| COMMENT - | REACTIONS   | AND LOADS   | FROM TAPF                       |                 |              | ZOMYO      |
| KLA       |             | KARLEN ER   | TYTTT ENCLU                     | D. FUMM(1.1).   | POMP(1+Z1+   | 16.320     |
| 2         | TUMP(1+31+  | FORUIT .4   | . FOMM(1.51.                    | FURPE(1+6) + [  | • 1.NJT 1    | ISPEC      |
| COMPENS - | SKIP FUR Z  | ERU MULT()  | LIER                            |                 |              | 20410      |
|           | IF L ZM(J)  | .20. 0.01   | GO TU 2400                      |                 |              | 12710      |
| COMMENT - | AULIPLY A   |             |                                 |                 |              | 13550      |
|           | 00 2100 1   | - 15 AJT    |                                 |                 |              | 1.37 2.0   |
|           | DAXLI       | I = DAX(I)  | + (HIJ)*EKX                     |                 |              | 13460      |
|           | 01111       |             | - INCUSERT                      |                 |              | 1 SPED     |
|           | DEECI       | I . DELTE   | - ENUITERE                      |                 |              | 13720      |
|           | MYXLI       | I = KANTI   | A THIRIALOW                     |                 |              | 12120      |

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0.00

|                                                                                                                 | 131                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                         |                 |                       |               |             |                   |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------|-----------------------|---------------|-------------|-------------------|
|                                                                                                                 | RYYEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ) = RYYFI) +                                            | 2N(J) +FOHMIT   | •2)                   |               | 12FE0       | CUMMUN /BL        |
|                                                                                                                 | RZZIE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 = RZZ(1) +                                            | TINHO 44 ( LING | .31                   |               | 12FED       | COMMUN /BL        |
|                                                                                                                 | CXXII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 . QXX(1) +                                            | TIMED TH (L) MS | +47                   |               | 12FEB       | COMMON /BL        |
|                                                                                                                 | GAALT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 = QYY(1) +                                            | THEO SHIT       | .51                   |               | 12FE0       | COMMUN / R        |
| 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - | 92211                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 = 022(1) +                                            | ZHIJ) #FOMMII   | +61                   |               | 12FE0       | N                 |
| 2100                                                                                                            | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                         |                 |                       |               | 12FE0       | M                 |
| 2460                                                                                                            | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                         |                 |                       |               | 1 2FEO      | M                 |
| RETU                                                                                                            | RM .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                         |                 |                       |               | 12FEO       | IF (JJ            |
| END                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |                 |                       |               | 12FEO       | 1                 |
|                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.2                                                     | 199 15          |                       |               |             | L                 |
|                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 46969696969666666                                       | *********       |                       |               | ********    | 1F ( 1            |
|                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 200                                                     |                 |                       |               |             | LF (JJ            |
|                                                                                                                 | PORMON I MIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 208                                                     | NOUTINE         | SUBROUT               | 1 ME          | SUBROUTINE  | IF (15            |
|                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |                 |                       |               |             | COMMENT - SKIP F  |
|                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 486 F <del>6 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 </del> | *********       |                       | ************  | ********    |                   |
|                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                         |                 |                       |               |             |                   |
| Property of                                                                                                     | OUT THE REPO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | NES ( DR. J.).                                          | KK, KH, KU.     | B: 5L: 50:            | MPROB. ARZ. L | 1.08APD     | 60 10             |
| 2                                                                                                               | L3. L4. L6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 17 1                                                  |                 |                       |               | OBAPO       | 1360 CONTIN       |
| OPPREAT -                                                                                                       | 24840011ML                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | HERRES COMPU                                            | ILS REPORT R    | ESULIS FOR A          | LL PENBERS    | ZAAPU       | COMMENT - SET TE  |
| OPPERT -                                                                                                        | IN FRAME.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SUB INALIS APP                                          | NUPKIAIE PER    | BER END FURC          | ES TO COMPLET | L ZOAPU     | 1                 |
| CHARTER -                                                                                                       | CALCOLATIO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | a de poter se                                           | OF 10 GRADIE?   | AND PRINTS            | OUT REPORT    | ZAAPU       | 1                 |
| UPPERI -                                                                                                        | NESOLIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                         |                 |                       |               | 24400       |                   |
|                                                                                                                 | HEIGH ANTL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Secore Rulles                                           | · FLOID SLI     | 13.41                 |               | OBAPU ABAPU | P                 |
| DIRE                                                                                                            | NOIDA DUI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.311 0001(31)                                          | DHS1371 DHI     | L'PB'                 |               | DIMPO       |                   |
| 91-6                                                                                                            | ASTON PLAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 314 - 20131                                             |                 |                       |               | 21,000      |                   |
| DIFE                                                                                                            | NO AND ANY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 18) . APRUSIZI                                          | V4 741          | WY 1 781-             | OWN A TEL     | 1150        |                   |
|                                                                                                                 | ATT THE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                         | EVVI 761.       | C77/ 781.             | 0774 751.     | 13450       |                   |
| -                                                                                                               | OWWA TEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 5277 751.                                               | DV              | BYNI 781.             | B731 751.     | 11650       |                   |
| 1 1                                                                                                             | FRWEI 781.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ERYVI TAL                                               | ER771 751       |                       | MLET 1214     | 11550       |                   |
| C 0000                                                                                                          | LAN AND OFX 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | / DXSC 501.                                             | 0751 501.       | 21 51 501.            | DC144 501.    | 26.140      |                   |
| 7                                                                                                               | DC251 501.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PRFI 501.                                               | PRAFI SOL       | BCDS( 50).            | TAXOPSI SOL.  | 74.140      | TE LNC            |
|                                                                                                                 | 100001 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | . (PINL) 501.                                           | 1PIMEL 501.     | NC514 501.            | 5861 50.111   | ZONYA       | CUMMENT - PRISMA  |
| COM                                                                                                             | WI /BLOCKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | / DEL( 50).                                             | DYL 1 501.      | ZLL1 50).             | DC11 ( 591.   | 26.340      | 00 230            |
| 2                                                                                                               | DC2L1 501.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | WOR( 50).                                               | UQV1 501.       | HCDL( 50).            | TAXOPLE SOF.  | 26.JA0      | 5                 |
| 3                                                                                                               | RCA1( 50)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                         |                 |                       |               | 26 JAO      |                   |
| CON                                                                                                             | WE /BLOCKA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | / JT1(150).                                             | JT211501.       | 15T(150).             | LT(15D).      | ZEJAO       | 2300 F            |
| 2                                                                                                               | FOHMI 150-6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                       |                 |                       |               | ZGJAD       |                   |
| COM                                                                                                             | WA /BLOCKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | / XLS( 751.                                             | XRSt 751.       | FL( 751.              | AEL: 751.     | ZOJAD       | 60 TO .           |
| 2                                                                                                               | 510.1 751.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | STLI 751.                                               | SZLI TSI        |                       |               | ZEJAD       | COMMENT - HUNPRI  |
| COND                                                                                                            | ON /BLUCKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | / XLL(150).                                             | XRL(150),       | QXL(150).             | QTL (150).    | ZEJAO       | 2400 CALL         |
| 2                                                                                                               | 021 (150)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                         |                 |                       |               | 26JAD       | 2500 CONTEM       |
| COM                                                                                                             | OR /BLOCKT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | / FL 421+                                               | AE1 421.        | SX1 421.              | 571421+       | 1 3MR0      | COMMENT - STORE   |
| 2                                                                                                               | SEL AZI.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | QX( 421.                                                | QY1 421.        | 021 421.              | AI 421+       | 1 3MR0      | 5                 |
| 3                                                                                                               | 81 421+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | A11 421.                                                | DI 421.         | DX1 421.              | DY1 421.      | 1 3MR0      | 5                 |
| •                                                                                                               | DZIAZ)+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | UT (A21.                                                | ¥1(A2).         | W11423+               | UZ1471+       | 1 MPO       | 5                 |
| 5                                                                                                               | ¥21421.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | WZ(42).                                                 | ERX(42).        | ERY (421,             | ERZ (42) .    | 1 JMRO      | 51                |
| 6                                                                                                               | RX4421+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RY1423 .                                                | R2 (42)         |                       |               | 1 3M/RO     | 51                |
| COM                                                                                                             | WH /BLOCKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | / T(21).                                                | V(21).          | BM(21).               | DXT (21) .    | 16MRO       | 5                 |
| 2                                                                                                               | DYT (21) +                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DET(21)                                                 |                 |                       |               | 16MRO       | M                 |
| COM                                                                                                             | WH /BLK1/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | KEEP2, KEEPS                                            | . KEEPA, KEE    | PS, KEEP6, R          | EEP7.         | 1 MARO      | M                 |
| 2                                                                                                               | LTYPE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NCD2. NCD3.                                             | NCD4 NCD        | 5. NCD6. N            | C07.          | 1 3MIRO     | COMMENT - SET HE  |
| 3                                                                                                               | I ABAR .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IFORM, NH.                                              | AUT, NST        | . ALT. T              | QL.           | 1 3MIRO     | COMMENT - SOLUTIO |
| •                                                                                                               | м.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MP1, MP2,                                               | ISTT. LTT       | . ITYPELI             | 0J+           | 1 3PRO      | 5                 |
| 5                                                                                                               | MLCo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 108. IP9.                                               | TP10            |                       |               | 1 3HR0      | 51                |
|                                                                                                                 | and the second se |                                                         |                 | and the second second |               |             | - 1               |

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| 1    | 2F E0        | CUMMUN /BLK3/ MNJT,MNST,MHLT,MNM,MNCS,MHC6,MDJT,MNLC                   | 1 3MR0           |
|------|--------------|------------------------------------------------------------------------|------------------|
| 1    | 2FED         | COMMUN /BLK4/ 511+512+513+514+515+516                                  | 1 3MRO           |
| 1    | ZFEB         | COMMON /BLK5/ NFSUB                                                    | OBAPO            |
| 1    | 2#E0         | COMMON / RI / NL, HL, J1                                               | DBAPO            |
| 1    | ZFEO         | NP22 = HP2/2                                                           | 16490            |
| 1    | 2FE0         | MP221 = MP22 - 1                                                       | 2 DMRO           |
| 1    | ZFEQ         | MM() = M - 1                                                           | 1 TMRO           |
| 1    | ZFEO         | IF (JJ .GT. NH) GO TO 5100                                             | 16MR0            |
| 1    | 2FED         | [LL]12[ = 112]                                                         | 16MR0            |
|      |              | LTI = LT(JJ)                                                           | 16MR0            |
|      | 4924748      | IF I 15TT .EQ. 0 1 GO TO 5100                                          | 1 3MRO           |
|      |              | LF (JJ .EQ. 1) GO TO 1300                                              | 16MRO            |
| SUB  | ROUTINE      | IF (1STT .HE, 1ST(JJ - 1) ) GO TO 1300                                 | 16MRO            |
|      |              | COMMENT - SKIP FOR MEMBER WHICH HAS SAME STIFFNESS TYPE AS LAST MEMBER | 16MYO            |
|      | ******       | ML = -1                                                                | 17MR0            |
|      |              | MLT = -1                                                               | 17MR0            |
| L1.0 | SAPO         | GO TO 2700                                                             | 1 7MRO           |
| 0    | SAPO         | 1360 CONTINUE                                                          | 1 3MRO           |
| 2    | AAPO         | COMMENT - SET TEMPGRARY CONTROL CONSTANTS                              | 16MYD            |
| TE 2 | 4APO         | IPINLT + IPINL(ISTT)                                                   | 134R0            |
| 2    | AAPO         | IPIMRT + (PIMR(ISTT)                                                   | 134R0            |
| 2    | AAPO         | 2L = 2LS(ISTI)                                                         | 1 JMRO           |
| 0    | BAPO         | PRFT = PRF(1STT)                                                       | 1 JMRO           |
| 0    | BAPQ         | PRAET = PRAE(15TT)                                                     | 1 3MR0           |
| 2    | IMRO         | NCDST # NCDS([STT)                                                     | 1 JMRO           |
| 1    | 1,500        | NC517 = NC51(15T7)                                                     | 1 3MR0           |
| 1    | 3FEQ         | TH . ZL/R                                                              | 1 3MRD           |
| 1    | 3FE0         | и = 0,3•тн                                                             | 1 JMRO           |
| 1    | ¥FE0         | HSQ = H <sup>a</sup> H                                                 | 1 3MR0           |
| 1    | WE0          | NCU = H\$0 <sup>4</sup> M                                              | 1 3MR0           |
| 2    | 6JAG         | ML 4 2010P1                                                            | 13MR0            |
| I, Z | 6JA0         | IF INCDST .NE. 01 GO TO 2400                                           | 1 MRO            |
| Z    | CHYO         | CUMMENT - PRISMATIC MEMBER DISCRETIZE MEMBER STIFFNESS DATA            | 1 6M 40          |
| 2    | 6JAO         | DU 2300   = 1.MPZ                                                      | 1 3MR0           |
| . 2  | 6JA0         | 5X(1) = 5Y(1) = 52(1) = 0.D                                            | 1 3MRO           |
| 2    | GALA         | AE(]) = PRAET                                                          | 1 3MR0           |
| 2    | 6JAD         | 2300 F(1) = PRFT                                                       | 1 3MR0           |
| 2    | GALA         | AE(1) = F(1) = AE(MP2) = F(MP2) = 0.0                                  | 1 3480           |
| 2    | 6JAD         | 60 TO 2530                                                             | 1 3MRO           |
| 2    | 6JAO         | COMMENT - HUMPRISMATIC MEMBER OISCRETIZE MEMBER STIFFNESS DATA         | 16MY0            |
| 2    | OAL          | 2400 CALL DISCST I NCSIT. NCDST. ZL . L1 )                             | 1 3MR()          |
| 2    | OAL O        | 2500 CONTINUE                                                          | 1 3MR0           |
| 3    | 3MRO         | COMMENT - STORE MEMBER-END-RESTRAINTS ST1 - ST6                        | 16MYD            |
| 3    | 3MR0         | ST1 = SX(1)                                                            | 1 3MRO           |
| 1    | 3MRO         | ST2 = 5Y(1)                                                            | 1 3MR0           |
| 1    | IMPO         | 513 = 52/11                                                            | 1 3MRO           |
| 1    | MRO          | ST4 = 5x(HP1)                                                          | 1 3HR0           |
| 1    | 3MARO        | 515 - 5Y(MP11                                                          | 1 34R0           |
| 3    | 6MRO         | 5T6 - SZ(MP1)                                                          | 1 3MRO           |
| 1    | 6MR0         | HL + 1                                                                 | 1 3MR D          |
| 1    | MRO          | HLT = 1                                                                | 134480           |
| 3    | MIRO         | COMMENT - SET MEMBER-END-RESTRAINTS EQUAL TO 1.0E+99 FOR FINAL MEMBER  | 16MYO            |
| 1    | 3MORD        | COMMENT - SOLUTION                                                     | 16MYD            |
|      |              |                                                                        |                  |
| i    | 3MRC         | SX(1) = SX(MP1) = 1.0E99                                               | 1394RO           |
| i    | 3HR0<br>3HR0 | SX(1) = SX(MP1) = 1+0E99<br>SY(1) = SY(MP1) = 1+0E99                   | 1 3MR0<br>1 3MR0 |

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| COMMENT - ZERO PINNED END ROTATIONAL RESTRAINTS                     | 16440   |
|---------------------------------------------------------------------|---------|
| 1F (1PINLT .EQ. 1) SZ(1) = 0.0                                      | 1 3MRO  |
| IF (IPINRT .EQ. 1) SZ(MP1) = 0.0                                    | 1 3MR0  |
| COMMENT - SET UP MEMBERS TRANSFORMATION MATRIX DC                   | 16MY0   |
| DC(1+3) = DC(2+3) = DC(3+1) = DC(3+2) = 0+0                         | 1 3MR0  |
| DC(3,3) = 1.0                                                       | 1 3MR 0 |
| DC(1+1) = DC(1)(1)                                                  | 1 3MR0  |
| DC(1+2) = DC2S(1STT)                                                | 1 3MRO  |
| DC(2+1) = -DC(1+2)                                                  | 1 3MRO  |
| DC(2,2) = DC(1,1)                                                   | 1 3MR0  |
| 2700 CONTINUE                                                       | 1 3MR0  |
| IF (LTT .NE. 0 ) GO TO 2750                                         | 1 3MR0  |
| CONNENT - ZERO REPER LOADS FOR LOAD TYPE ZERO                       | 1 DHYO  |
|                                                                     | 17MRO   |
| 2720 GATTI = GTTI = GZTI = 0.0                                      | 1 3MR0  |
|                                                                     | 1 3480  |
| 2780 LOVE - LOVE CONSTANTS                                          | IDATO   |
|                                                                     | 1 3/480 |
|                                                                     | 1 SHWU  |
|                                                                     | 1 3480  |
|                                                                     | 1 3480  |
| COMMENT - INTEGEN V LOADED MEMBER DISCRETIZE MEMBER LOADS           | 16400   |
| DO 2000 1 = 2 M                                                     | 13480   |
|                                                                     | 1 3MPA  |
|                                                                     | 13480   |
|                                                                     | 1 3480  |
| DE (MP2) = OV(MP2) = O2(MP2) = 0.0                                  | 1 3480  |
| $Q_{X}(1) = Q_{X}(MP1) = Q_{X}(2XT^{*}TM)$                          | 1 1480  |
|                                                                     | 1 3480  |
| $Q_{2}(1) = Q_{2}(1) = 0.6$                                         | 1 3480  |
| 60 TO 1000                                                          | 1 3480  |
| CONVENT - DISCRETIZE GENERAL HENDER LOADS                           | L 6MYO  |
| 2900 CALL DISCLD ( NCAIT . NCDLT . ZL . L1 )                        | 1 3MR0  |
| 3000 CONTINUE                                                       | 1 3480  |
| COMMENT - STORE MEMBER-END-LOADS QT1 -QT6                           | 16MY0   |
| QT1 = QX(1)                                                         | 1 3MR0  |
| 072 = 07(1)                                                         | 13MR0   |
| QT3 = QZ(1)                                                         | ) 3MR0  |
| QT4 = QX(HP1)                                                       | 1 3MR0  |
| QTS = QY(MP1)                                                       | 1 3MRD  |
| QT6 = QZ(HP1)                                                       | 13480   |
| JII = JI(JJ)                                                        | DBAPO   |
| COMMENT - SET MEMBER-END-DISPLACEMENTS IN STRUCTURE COORDINATES DMS | 16MY0   |
| COMMENT - EQUAL TO STRUCTURE JOINT DISPLACEMENTS AT FROM JOINT      | 16MY0   |
| DMS(1) = DXX(J11)                                                   | DBAPO   |
| DMS(2) = DMA(TI)                                                    | OBAPD   |
| DP(S(3)) = DZZ(J)II                                                 | DBAPO   |
| COMMENT - TRANSFORM DAS TO DAM AT FROM JOINT                        | 16MY0   |
| CALL MATHOI (DC+DHS+DHH)                                            | 1 34480 |
| CONVENT - SET MEMBER END-LOADS TO 1.0E+99 TIMES DIM AT FROM JOINT   | 16440   |
| $\omega \mathcal{K}(1) = DWW(1) = 1.0099$                           | 1 3MR0  |
| GT[1] = DHH(2)=1.0E99                                               | 1 3MR0  |
| IF (IFINLT .CG. 1) GO TO 3120                                       | 16480   |
| LL(1) = DHH(3)=1.0E99                                               | 1 JMRO  |
| OU 10 3130                                                          | 16MR0   |
|                                                                     |         |

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| 3120 QZ(1) = 0,0                                                | 16HR0    |
|-----------------------------------------------------------------|----------|
| 3150 CONTINUE                                                   | 16MR0    |
| COMMENT - REPEAT ABOVE FOR TO JOINT                             | 16MY0    |
| J2I = I2(JJ)                                                    | OBAPO    |
| DMS(1) = DXX(J2I)                                               | OBAPO    |
| DMS(2) - DYY(J21)                                               | OBAPO    |
| DMS(3) = DZZ(JZ1)                                               | OBAPO    |
| CALL MATM31 (DC+DMS+DMN)                                        | 134R0    |
| QX(MP1) = DMM(1)=1.0E99                                         | 1 3MR0   |
| QY(HP1) = DHH(21=1.0E99                                         | 1 3MR0   |
| IF (IPINRT .EG. 1) GO TO 3220                                   | 16MR0    |
| QZ(MP1) = DMM(3)=1.0E99                                         | 1 3480   |
| GO TO 3250                                                      | 16MR0    |
| 3220 OF (NP1) = 0-0                                             | 16480    |
| 3250 CONTINUE                                                   | 16480    |
| CUMMENT - FINAL ATTAL COLUTION OF MEMBER                        | 16440    |
|                                                                 | 13000    |
|                                                                 | ORADO    |
| COMMENT - FINAL LATERAL COLUTION OF MEMBER                      | 14840    |
| CALL CALENCE OF DIA N. C. CI. 13. 14. 14. 3                     | 15440    |
| COMMENT - CET MEMBER I AND AND ADTATIONAL ATEDIATE CONT         | 10 10    |
| COMMENT - SCH NENDER CATERAL AND ADTATIONAL DISPLACEMENTS EQUAL | 10 10410 |
| COMPENT - SOLUTION VECTOR & FROM GRIPZE                         | IGHTO    |
|                                                                 | 1 DMR()  |
| J = 2-1                                                         | 16MRU    |
|                                                                 | 16MRU    |
|                                                                 | 1 GANKU  |
| DZ(1) = W(3)                                                    | 10MRO    |
| U1(1) = U1(HP2) = U2(1) = U2(HP2) = 0.0                         | 13480    |
| $v_1(1) = v_1(\mu_2) = v_2(1) = v_2(\mu_2) = 0.0$               | 1 34460  |
| W1(1) = W1(0P2) = W2(1) = W2(0P2) = 0.0                         | 13440    |
| COMMENT - DO FOR EACH INTERIOR STATION                          | 16440    |
| DO 3400 1 + 2, MP1                                              | 1 3MR0   |
| 1P1 = 1 + 1                                                     | 1 3MR0   |
| IMI = I - I                                                     | 1 3MR0   |
| COMMENT - COMPUTE AXIAL SHORTENING                              | 16MY0    |
| DDX = DX(1) - DX(1M1)                                           | 01,010   |
| COMMENT - COMPUTE AXIAL FORCES ON ENDS OF ELEMENTS              | 16MY0    |
| U2(1) = AE(1) = ODX/TH                                          | 01,01,0  |
| U1(1) = -U2(1)                                                  | 1 3MR0   |
| COMMENT - CUMPUTE CURVATURES                                    | 16MY0    |
| TAUL = (DY(1) = DY(1M1))/H = (1.5=DZ(1M1))                      | + 13MRO  |
| 2 0+5*DZ(1))                                                    | 1 3MRO   |
| TAU2 = -(DY(1) - DY(1M1))/H + (0.5*DZ(1M1))                     | + 13MRO  |
| 2 1•5*DZ([])                                                    | 1 3MRO   |
| COMMENT - CUMPUTE SHEARS AND MOMENTS ON ENDS OF ELEMENTS        | 16MY0    |
| WILL) = F(L)=(-1.5*TAU1 + 0.5*TAU2 )/H                          | 1 3MR0   |
| W2(1) = F(1)*(-0.5*TAU1 + 1.5*TAU2 )/H                          | 1 3MRC   |
| V2(1) = F11)*(TAU1 - TAU2 1/HSQ                                 | 1 3MR0   |
| $v_1(1) = -v_2(1)$                                              | 1 3MR0   |
| COMMENT - COMPUTE STATION REACTIONS                             | 16440    |
| RX([M1) = -SX([M1)*DX([M1)                                      | 1 3MR0   |
| RY(IMI) = -SY(IMI)+DY(IMI)                                      | 1 3MR0   |
| RZ(IM1) = -SZ(IM1) = DZ(IM1)                                    | 1 3MR0   |
| COMMENT - CUMPUTE STATION EQUILIBRIUM ERRORS                    | 16MY0    |
| ERX(IM1) = QX(IM1) +RX(IM1) - U2(IM1) - U1(I1                   | 1 3MR0   |
| ERY(IMI) = OY(IMI) + RY(IMI) - V2(IMI) - V1(I)                  | 1 3MR0   |
|                                                                 |          |

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|               | ERZ(IN1) = QZ(IN1) +RZ(IN1) - W2(IN1) - W1())                 | 1 3MR0    |
|---------------|---------------------------------------------------------------|-----------|
| 3400          | CONTINUE                                                      | 13MRO     |
| COMMENT       | - REPEAT ABOVE FOR END STATIONS                               | 16MY0     |
|               | U1121 = U1(2) + ST1=DR(1) - BT1                               | 23MR0     |
|               | VI(2) = VI(2) + ST2=DV(1) - GT2                               | 2 3MRO    |
|               | W1(2) = W1(2) + \$T3=02(1) - OT3                              | 2 3MR0    |
|               | UZ(1001) = U2(1001) + STA+DX(1001) - GTA                      | 2 3MRO    |
|               | ASIMBTI = ASIMBTI = 212+DAIMBTI - 012                         | 2 3MR0    |
|               | W2(MP1) = W2(MP1) + \$T6+D2(MP1) - QT6                        | 2 3MR0    |
|               | 1 • 2                                                         | 1 7MRO    |
| COMMENT       | - DO FOR EVERY SECOND INTERIOR STATION                        | 16440     |
|               | DO 3600 IM = 2,MP221                                          | ZOMRO     |
|               | 1 = 1 + 2                                                     | 17MR0     |
|               | $1P_1 = 1 + 1$                                                | 17MRO     |
| COMMENT       | - COMPUTE AVERAGE AXIAL FORCE, SHEAR , AND BENDING MOMENT     | 16MY0     |
|               | T([M] = 0.54(U2(1) - U1([P]))                                 | 1 7MR0    |
|               | A(1H) = -0*3*(AS(1) ~ AJ(1b1))                                | 171480    |
|               | $B^{(1)} = 0.5^{(1)} - 31(1P1)$                               | 17HR0     |
| COMMENT       | - OUTPUT DISPLACEMENTS                                        | 16MYO     |
|               | ORT(IN) = DX(I)                                               | 1 7MR0    |
|               | DYT(IM) - DYII)                                               | 17MR0     |
|               | DZT(IH) = DZ(I)                                               | 1 7MR0    |
| 3600          | CONTINUE                                                      | 1 THRO    |
| COMMENT       | - REPEAT ABOVE FOR END STATIONS                               | 16440     |
|               | T(1) = -U(2)                                                  | 2 3MRQ    |
|               | V(1) - V1(2)                                                  | 2 3440    |
|               | BM(1) = -W1(2)                                                | 7 3MR0    |
|               | $\mathbf{D}\mathbf{X}\mathbf{T}(1) = \mathbf{D}\mathbf{X}(1)$ | THE       |
|               | BTT(1) = DT(1)                                                | 1 7MRO    |
|               | $DZ T \{1\} = DZ \{1\}$                                       | 1 THRO    |
|               |                                                               | S 2marco  |
|               |                                                               | 2 3440    |
|               |                                                               | 2 34180   |
|               | DAI (1922) - DAI 1917                                         | 1 // 10   |
|               | briter22) = briter1                                           | T VIEWO   |
|               |                                                               | 1 / 1000  |
| Consecution   |                                                               | 20000     |
|               |                                                               | 3 34480   |
|               |                                                               | 23000     |
|               |                                                               | 33480     |
|               |                                                               | 2 3 4 4 4 |
|               | Contai - Bailadool                                            | 23480     |
| COMMENT.      | - STREATTINE AN ITER TRANSFORME MEMORE THE FORCES AND STREATS | 16MYO     |
| COMMENT       | - FROM KINT FOUL TRATIN FROMS TO ACCIDENTATE SOUTH TARTING    | 16470     |
| COMMENT.      | - FROMS FOR FRAME                                             | LANYO     |
| Constant I    |                                                               | IMRO      |
| ,             | DC25(ISTI) I                                                  | 2 3NR0    |
| COMMENT       | - COMPUTE MAXIMUM EQULIBRIUM ERROR IN NEMBER                  | 16410     |
|               | STAFRE = 0.0                                                  | 174R0     |
|               | No 1800 1 . 2.M                                               | 17480     |
|               | ERR = ABS(ERX(1))                                             | 1 7MR0    |
|               | IF LERR .LE. STAERR) GO TO STAD                               | 1 74RO    |
|               | STAERR - ERR                                                  | 1 7MR0    |
| 3740          | ERR - ABS(ERY(1))                                             | 17MR0     |
| 1003110-005-0 | IF LERR .LE. STAERRI GO TO 3760                               | 17MR0     |
|               |                                                               |           |

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|           | (TACDO - C80        |                  |                            | 1 7.45 6   |
|-----------|---------------------|------------------|----------------------------|------------|
| 1740      | STALKR P EKK        | 115              |                            | 1 79960    |
| 3180      | TE ICAR I ADDICALI  | CO TO -700       |                            | 17MRO      |
|           | AT TERM ALES STREAM | 00 10 3100       |                            | 17MRO      |
| 1780      | STAERR - ERR        |                  |                            | LTRIKO     |
| 3700      | CONTINUE            |                  |                            | I MARCO    |
| 3000      | CONTINUE            |                  |                            | LINKU      |
| COMMENT.  | ON 16 STUBACE MARIA |                  | TO OFFICE TO               | 1 /MICO    |
| COMPENS - | DA 15 STURAGE VARIA | BLE FOR SIX MEN  | BER RESULTS                | 1 CHEYO    |
|           | 00 100 IH 1102      | 4                |                            | [ /MARCO   |
|           |                     |                  |                            | 1 THRO     |
|           | UNIT JAAR - DA      | 11110            |                            | 1 7MRG     |
|           | 12 - 12 - 1         |                  |                            | 1 79480    |
|           | DHILI JAKKI - DT    | 11100            |                            | 170000     |
|           | 13 . 13 . 1         |                  |                            | 1 7PORO    |
|           | DHELJSKEL # DZ      | TCIMI            |                            | 17MRO      |
|           | 13 • 13 • 1         |                  |                            | 1 THRO     |
|           | DHEIJSKKI . TE      | 1611             |                            | 1 714940   |
|           | 13 + 13 + 1         |                  |                            | 171480     |
|           | DHILT-KET + AL      | 103              |                            | 179410     |
|           | 11 = 11 + 1         |                  |                            | 1 THIRD    |
| 4100      | DH(IJACK) = BH      | (1)0)            |                            | 1 THERO    |
|           | 17 = 17 + 1         |                  |                            | 1 THRO     |
|           | DH([JJKK] = ST      | AEMA             | 2. 2019 1917               | 1 THRO     |
| COMMENT - | PRINT TABLE 9 MEMOE | A RESULTS IF REC | DUESTED                    | 16MYO      |
|           | IF (IPY .EQ. 11 GO  | 10 9990          |                            | ZSMRO      |
| CAL       | L PRINTS (DAL)      | L7, ARZ. JJ. K   | C NPROB I                  | 25 480     |
| 1000      | GO TO 9900          |                  |                            | 171480     |
| 9100      | CONTINUE            |                  |                            | 1 77440    |
| COMMENT - | ZERU MEMBER RESULTS | FOR ZERO STLEFT  | NESS TYPE AND DUPHY NEMBER | 5 16MY0    |
| COMMENT - | USED TO FILL OUT GR | DOPS OF SIX      |                            | 16440      |
|           | DO 5200 1J = 1+L7   | 2                |                            | 17MRO      |
| 9200      | DM(IJ+KK) = 0.      | 0                |                            | 1 TMRO     |
| 99-0      | CONTINUE            |                  |                            | 1 7MRO     |
| RET       |                     |                  |                            | I SHIRO    |
| END       |                     |                  |                            | 134480     |
| ç         |                     |                  |                            |            |
| ç         |                     |                  |                            | ********** |
| S         |                     |                  |                            |            |
| C .       | SUBROUTINE          | SUBROUTINE       | SUBROUTINE                 | SUBMOUTINE |
| c         |                     |                  |                            |            |
| 5         |                     |                  |                            |            |
| C 4100    |                     |                  |                            |            |
| SUB       | COTTAL AUDIER IFINS | -24. J1. J2. 0   |                            | 23440      |
| LONDERT - | SUBROUTINE ADJIER I | RANSFURNS MEMOLI | R-END-FORCES TO STRUCTURE  | 20410      |
| COMMENT - | COURDINATES AND SUB | TRACIS FROM APPI | CONCINTE JOINT EQUILIBRIUM | 20440      |
| COMPERT - | EXROR FOR FRAME     |                  |                            | 20410      |
| 0114      | ENSION FINISTS F2MI | 11. FISISI. F25  |                            | ZIMRD      |
| 010       |                     | VI 761           | Over 181. Over 141         | 1100       |
|           |                     | 11 1314          | GAAL 7716 GTTE 7916        | 1 SPEC     |
| 5         | Stat /31, 3441 /9   | DE STTT (3)+     | SELL (7)   DAX( 1914       | ISPED      |
|           | CITI 131. 0421 19   | 11 RALE /311     | RTT1 /311 R44( /3)4        | ISPEC      |
| -         | LRAAL 751. ERTTI 7  | 51+ EKZ21 75)    |                            | LAPED      |
| COMPLET . | TUNH TRANSPUSE OF M | FURTH INVERTORM  | ATTEN MATRIX               | 20440      |
|           | DCTT1133 = DCT      | (2+3) * DC1(3+1  | - OCI13+2) = 0+0           | ZIMRO      |
|           | DL113+31 * 1+D      |                  |                            | 4 IMRO     |
|           |                     |                  |                            |            |

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| DCT(1+2) = -DC2                                                       | ZIMRO      | DO 225            |
|-----------------------------------------------------------------------|------------|-------------------|
| OCT12+11 = DC2                                                        | 2 1MR0     | 225 WRITE (3)     |
| OCT(2:2) = OC1                                                        | 2 1MR0     | REWIND 3          |
| COMMENT - TRANSFORM MEMBER-END-FORCES AT FROM JOINT TO STRUCTURE COO  | RD ZONYO.  | N                 |
| CALL MATHS1 (DCT+F1M+F15)                                             | 21MR0      | A)                |
| COMMENT - ACCUMULATE JOINT EQUILIBRIUM ERROR AT MEMBERS FROM JOINT    | ZOMYO      | COMMENT - DU FOR  |
| ERXX(J1) = ERXX(J1) - F15(1)                                          | 2 3MRO     | DG 319            |
| ERYY(J1) - ERYY(J1) - F15(2)                                          | 7 3HR0     | COMMENT - SET SHI |
| ER22(J1) = ER22(J1) - F15(5)                                          | 2 3MR0     | LF CH2            |
| COMMENT - TRANSFORM MEMBER-END-FORCES AT TO JOINT TO STRUCTURE COORD  | ZDHYO      | N3                |
| CALL NATION I LOCT +F2N+F2SI                                          | 2 3MR0     | N2                |
| COMMENT ~ ACCUMULATE JOINT EQUILIBRIUM ERROR AT MEMBERS TO JOINT      | 20440      | GO TO 2           |
| ERXX(J2) = ERXX(J2) - F25(1)                                          | 2 3HRO     | 230 M2            |
| ERYY(J2) - ERYY(J2) - F25(2)                                          | 2 34470    | N3                |
| ERZ2(J2) - ERZ2(J2) - F25(3)                                          | 2 3MR0     | 235 CONTINU       |
| RETURN                                                                | 21MR0      | DO 260            |
| END                                                                   | ZIMRO      | COMMENT - READ RE |
| c                                                                     |            | READ 141          |
|                                                                       |            | DO 240            |
| c                                                                     |            | 00 240            |
| C SUBROUTINE SUBROUTINE - SUBROUTINE                                  | SURROUTINE | COMMENT - MULTIPL |
| c                                                                     |            | 240 04            |
| ( ************************************                                |            | COMMENT - READ SU |
|                                                                       |            | AEAD INSI         |
| SUBRUITLNE SURE (DH+DHT+LT+NA6+ARE+NPROB )                            | 25MR0      | DO 260            |
| COMMENT - SUBROUTIME SUME DOES SUPERPOSITION SOLUTION FOR MEMBER      | 5 24APO    | DO 245            |
| COMMENT - FOR FAMILY PROBLEMS+SUBTRACTS APPROPRIATE MEMBER END FORCES | 5 24APO    | CONNENT - ADD TO  |
| COMMENT - TO COMPLETE CALCULATION OF JOINT EQUILIBRIUM ERROR AND PRIM | TS 24APO   | DP                |
| COMMENT - MEMBER RESULTS                                              | 24APO      | 245 CONTINU       |
| COMMENT - RESULTS OF PREVIOUS PROBLEMS ARE STORED ON TAPE &           | 10-160     | COMMENT - SKEP UN |
| COMMENT - TAPES 2 AND 3 ARE USED TO INCREASE EFFICIENCY OF TAPE       | 16760      | 18 (3             |
| COMMENT - OPERATIONS                                                  | 20440      | 1F (1)            |
| D1MEM510N DM(L7,61+ DM7(L7+6)                                         | 20480      | ىل.               |
| D1MEMSION F14(3)+ F24(3)                                              | 2 ) MRO    | SF 1JJ            |
| OIMENSION ANZ(18) + MPROB(2)                                          | 11760      | 15                |
| COMMON /BLOCK2/ DIS( 50), DYS( 30), ZLS( 50), DC15( 50),              | 26 JAO     | IF CIST           |
| 2 DC25( 30)+ PRF( 30)+ PRAEL 501+ MCDS( 50)+ 1AXOPS( 50               | 1. 26JAD   | נר                |
| 3 10POPt \$03, 1PIALE 501, IPIARE 501, MC51E 501, SHME 50+13          | 1 1IFEO    | 12                |
| COMMUNA /BLOCK4/ JT1(150), JT2(150), IST(150), LT(150),               | 26JA0      | DC                |
| 2 FCH4(150+6)                                                         | 26JA0      | DC                |
| COMPUN /BLOCKS/ NP (21,2) + 2H(21)                                    | 09.460     | FI                |
| COMMUN /BLR1/ KEEP2: KEEP3: KEEP4: KEEP5: KEEP6: KEEP7;               | ZOHRO      | F 1               |
| 2 17TPE MCD2 MCD3 MCD4 MCD5 MCD6 MCD7                                 | ZOMIRO     | F1                |
| 3 TABAR, TFORM, MM, HJT, MST, MLT, TOL,                               | ZOMIRO     | 72                |
| A No MP1, MP2, 1STT, LTT, 1TYPEL, IOJ,                                | 20480      | F 2               |
| 5 MLC. 199, 199, 1910                                                 | 200400     | F2                |
| L7H1 • L7 - 1                                                         | 2 LMRO     | COMMENT - ACCUMUL |
| 1712 = 17 - 2                                                         | 21MR0      | CALL              |
| L7H3 = L7 - 3                                                         | 2 1 MRO    | COMMENT - PRINT T |
| REVIND 2                                                              | 20440      | 17 (199           |
| REWIND 3                                                              | ZONRO      | CALL              |
| REWIND 4                                                              | 16.000     | 240 CONTINU       |
| COMMENT - CLEAR TAPE 3                                                | 20440      | IF 1.J •          |
| DO 220 [J + 1 +L7                                                     | 204920     | COMMENT - WRITE S |
| 00 220 KK = 1.4                                                       | 20460      | WRITE (N2)        |
| 220 DM(IJ-KK) = 0.0                                                   | ZOMRO      | 200 CONTINU       |
|                                                                       |            |                   |

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| DO 225 II = 1+NH6                                   | 2 OMR(         |
|-----------------------------------------------------|----------------|
| 225 WRITE (3) (IDHI[JaKK1: 1J = 16L7), KK = 16)     | 2 OHR(         |
| REWIND 3                                            | 2 OMR (        |
| N2 = 3                                              | 2 0HeR (       |
| A3 = 2                                              | 2 OMR          |
| COMMENT - DU FOR PACH PROBLEM WITH RESULTS STORED   | 2 0417         |
| DO SID J . LINLC                                    | 7 OHeR (       |
| COMMENT - SET SWITCHES TO OPTIMIZE HANDLING OF TAPE | 5 2 AND 3 20HV |
| IF (N2 .FD. 21 60 TO 230                            | 2 (1992)       |
|                                                     | 2 040          |
| M3 - 7                                              | 2 (100)        |
| 60 TO 215                                           | 2048           |
| 790                                                 | 2 0140         |
|                                                     | 20481          |
|                                                     | ZOMRU          |
| 235 CONTINUE                                        | 204460         |
| DO 200 [] = 1,AM6                                   | 2 3MR          |
| COMMENT - READ RESULTS FROM TAPE & FOR SIX MEMBERS  | 16JE0          |
| READ (4) ((DM(EJ-KK), IJ = 1-LT), KK = 1.           | 6) 16JE(       |
| DQ 240 KK = 1.6                                     | 2 0HR          |
| 00 240 IJ = 1.LT                                    | 2 OMR          |
| COMMENT - MULTIPLY RESULTS FOR SIX MEMBERS BY MULTI | PLIERS 20MY    |
| 240 DMT(JJEKS = ZH(J)=DM(TJEK)                      | 2 OHR (        |
| COMMENT - READ SUM OF OFF TAPE 2 OR 3 FOR SIX MEMBE | RS 19NY(       |
| AEAD INSI (IDM(IJ+KE)+ (J = 1+LT)+ KK = 1+6         | 1 2 0HR0       |
| 00 260 KK . L.6                                     | 2 3HR          |
| 00 245 1J = 1.LT                                    | 20MR8          |
| CONMENT - ADD TO SUN                                | - 19MYC        |
| DM([JAKK) = DM([JAKK] + DMT([JAKK)                  | 21MRC          |
| 245 CONTINUE                                        | 211486         |
| COMMENT - SKIP UNTIL LAST LOAD CASE                 | 1947           |
| IF IJ ALT. MLCT GO TO 260                           | 2 1 MR         |
| IF 111 .EQ. 1 .AND. KK .EQ. 1 1 JJ = 0              | 2 10080        |
|                                                     | 2100           |
| IF 1.1 GT. MM1 GO 10 260                            | 2 548          |
| 15TT # 15T(4)                                       | 21,000         |
| LE LISTT                                            | 25,488         |
|                                                     | 2100           |
|                                                     | 11480          |
|                                                     | 1 100          |
|                                                     | 2 1 1 1 1 1    |
|                                                     | 2 1 44         |
|                                                     | 2 3 4 4 4      |
|                                                     | 2 3 4 4 1      |
| FIN(3) · -DNIBJERI                                  | 2 3000         |
| FEMILE & DMILINSER                                  | 2.5476         |
| F2H(2) = -DHILTH2+KK1                               | 2 30480        |
| F2H(3) + DHILTHIERS                                 | Z SING(        |
| COMMENT - ACCUMULATE JOINT EQUILIBRIUM ERRORS       | 1947           |
| CALL ADJTER ( FIN, F2N, J1, J2, DC1, DC             | 2 3444         |
| CUMMENT - PRINT TABLE & MEMBER RESULTS IF REQUESTED | 1 944          |
| IF (1P9 .EQ, 11 GO TO 260                           | 1 9MY          |
| CALL PRINTS ( DN, L7, ANZ, JJ, KK , NPR             | D5 1 25498(    |
| 240 CONTINUE                                        | 2348           |
| IF IJ .EO. MLCI GO TO 280                           | 25MR           |
| COMMENT - WRITE SUM ON TAPE 2 OR 3 FOR ALL BUT LAST | LOAD CASE 19HY |
| WRITE (N2) ((DM()J+KK)) [J + 1+L7)+ KK = 1+6        | 1 23MR(        |
| 200 CONTINUE                                        | 2 3MR          |
|                                                     |                |

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| REVIND       | 2          |                   |                        |                | 20440                      |
|--------------|------------|-------------------|------------------------|----------------|----------------------------|
| 110 00       | TIME       |                   |                        |                | 20480                      |
| er Turka     |            |                   |                        |                | 20480                      |
| E.HD         |            |                   |                        |                | 20000                      |
|              |            |                   |                        |                | SOMIKO                     |
| Č ++         | ********   | ***************   | **************         |                | *********                  |
| č            |            |                   |                        |                | din 0.170.2020.000.000.000 |
| લ કપ         | BROUT 1 ME | SUBROUTIN         | E SUBROU               | TINE           | SUBROUTTNE                 |
| c .          |            |                   |                        |                |                            |
|              |            |                   | *******                | ************   | *******                    |
| SUBROU       | TINE PRINT | DH. LT. ANZ.      | JJ, KK , MPROB 1       |                | 25HR0                      |
| COMMENT - SU | BROUTINE P | RENTS PRINTS MENE | ER RESULTS FOR AL      | L HEMBERS      | 19970                      |
| CONNENT - PR | INTO IS CA | LLED FOR EACH IND | IVIDUAL MEMBER IN      | UNBER JJI      | 19410                      |
| DIMENS       | LOR DHILT  | .4)               |                        |                | 02MYO                      |
| DIMENS       | ON ANZITE  | I. NPROBIZI       |                        |                | 11JEO                      |
| COMPOS       | /BLOCK2/   | DESI SOLA DYSI    | 501. 71.51 501.        | DC151 501-     | 26.160                     |
| 2 DC         | 25( 50).   | MREI SOLS PRAFI   | 501. NCDS( 50).        | 1AXOP5( 501.   | 26 JA0                     |
| 3 10         | POPI 501-  | PTALC SOL. IPING  | 1 501. MC511 501.      | SHOLE 50-111   | 11FEO                      |
| COMMON       | /DLOCKA/   | JT111501. JT211   | 501. ISTI1501.         | LT(150).       | 26 JA0                     |
| 2 FO         | 14.06114   |                   |                        |                | 24 140                     |
| COMPACIA     | ABLENA K   | F\$2. EFF91. EFFP | A. KEEPA. KEEPA.       | EFFD7.         | 2 34800                    |
| 2            | ITYPE . M  | 02. MCD3. NCD4    | NOS. NOA.              | MCD7.          | 2 31480                    |
|              | TABAN. I   | FORM. MM. MUT.    | NST. MIT.              | TOP            | 2 34800                    |
|              | No. H      | P1. HP2. ISTT     | . LTT. LTYPEL.         | 10             | 2 34800                    |
|              | M.C. 1     |                   |                        |                | 7 344000                   |
| 11 FORMAT    | 4 5411     |                   | -7818 1                |                | 25480                      |
| 14 FORMAT    | 11/11 74   | PROP (CONTO).     | /6K. Al. AA. 5V.       | 1784- 47- // 1 | 1 AMER O                   |
| SI FORMAT    | 1 100      | TABLE & - MEN     | TR REAL TE . ///)      |                | 25480                      |
| 52 FORMAT    | 4.000      | TABLE & - MEND    | ER RESISTE ACONTO      |                | 300000                     |
| AL FORMAT    | 1 184      | MEMORE MANAGE     | IL-IGH STIRE           | TYPE . 15.     | 300000                     |
| 3            | 35.4       | LOAD TYPE . LA    | 3110                   |                | 300000                     |
| AT FORMAT    | 1 184      |                   |                        |                |                            |
| TI FORMAT    |            | LENGTH - FILL     | 1. 1. M. AL DUA        |                |                            |
| 11 1000001   | 1 1 445    |                   | Si Ism Acria           |                | 30000                      |
| AL FORMAT    | 1 204      |                   | T. 16                  |                | JEMPO                      |
| AL FORMAT    | 201        | CUIRENT DISTANC   |                        | 14 11 21       | 2 2000                     |
| AT LONGING   | 1 900      |                   | ES ARE FROM SOLAT      | . 121          | 23140                      |
| BA FORMAT    | 2 201 4    |                   |                        |                | 231980                     |
| TE FUNDAL    | 1 3001     | CONTRACT DISTANC  | ES ARE FROM DUINT      | . 12.          | 304400                     |
|              |            |                   | E ATAKISI.             |                | 2 5 440                    |
| A2 LONDAL    | 5 300      | OUTPUT DISTANC    | ES ARE FRUM JUINT      | . 13.          | 30000                      |
| 101 FORMAT   | 2711 A     | ALL OUTDUT FOR    | E T-AXID               |                | 25000                      |
| Tot round    |            | ALL COIPUI FOR    | CES AND DISPLACEN      | CHID ARE MITH  | 239960                     |
|              | JOH R      | ENTELL TO THE MEN | BER AXES STITL         |                | 25000                      |
| 3 20         | DA. 17H 0  | ISPLALEMENTS + 21 | A PH FUREESITT         | 0074710441     | 23MRD                      |
| 2            | 2015       | DISTANCE          | AXIAL LATERAL          | NOTATIONAL     | + 25HHCO                   |
| 7            | NON        | ARIAL SPREAK      | HUNERI .//             |                | 23440                      |
| 111 FORMAT   | 5X.7E1     |                   |                        |                | 25180                      |
| TOT FORMAT   | 1 4801     | ALL DUIPUT FOR    | CED ARE WITH RESP      | CI TO IME      | 25440                      |
| 4            | 1 241 14   | LANDLA ALLA I //  | * 1784                 |                | 25480                      |
|              | TOM Y      |                   | AN LUM AT JUINT .      | 131//1524      | 25440                      |
| 2            | 1741 A     | TIAL PORCE - SEII | -317X. 194 AXIAL       | FUNCE + +EII+  | 3.25440                    |
| 2 / •        | DA. IDH S  | HEAR = •E11       | .3.78. 15H SHEAR       | • •E11-        | 3,30480                    |
| • /•         | 9X. 15H M  | -E11              | • 3 • 5 X + 1 5H HOHEK | • .611.        | 3124AP0                    |
| SOI FORMAT   | (/.500     | THE MAXIMUM ED    | OILISKING ERKOR IN     | TENAL TO THE   | 25MR0                      |

| THE REPORT OF A DECEMPENT OF A DECEMPENT OF A DECEMPENT            |                            |
|--------------------------------------------------------------------|----------------------------|
| 2 10H MEMBER 15+ E11+3+ ///)                                       | 25480                      |
| MP22 = MP2/2                                                       | 25MR0                      |
| L7ML = L7 - 1                                                      | 25MRO                      |
| L7H2 = L7 - 2                                                      | 25MR0                      |
| L743 = LT - 3                                                      | 251480                     |
| CONNENT - SKIP FOR COMPLETE OUTPUT                                 | TOWYD                      |
| IF ( 10POP(1STT)                                                   | 25480                      |
| IF ( JJ -F0- 1 ) 60 TO 1500                                        | 25480                      |
| COMMENT - PRINT PARTIAL RESULTS FOR 3 HEMATRS ON ) SHEFT           | 1 Service                  |
| IF ( 10PL -NF- 1 ) 60 TO 1500                                      | 25480                      |
|                                                                    | 2 3 4 4 6                  |
|                                                                    | 2 2440                     |
|                                                                    | ZOMRU                      |
| 60 10 2100                                                         | 25480                      |
|                                                                    | 25MRO                      |
| 1600 CONTINUE                                                      | 25MRO                      |
| COMENT - PRINT HEADINGS                                            | 19MYO                      |
| PRINT 11                                                           | 25MRO                      |
| PRINT 16, MPROB, (AN2(11), 11 = 1, 18)                             | 03760                      |
| IF [ JJ .EG. 1 ) GO TO 1100                                        | 25MR0                      |
| PR(N1 52                                                           | 25MR0                      |
| GO TO 2100                                                         | 25MR0                      |
| 1700 PRINT 51                                                      | 25HRO                      |
| 2100 CONTINUE                                                      | 25MR0                      |
| IF ( ITYPE .NE. 4 ) GO TO 2500                                     | 25MR0                      |
| PRINT 62. J. ISTT                                                  | JOHRO                      |
| 60 70 2600                                                         | 25MRO                      |
| 2500 PRINT 61. JJ. 1511. LTT                                       | SOMRO                      |
| 2600 CON1 INUE                                                     | 25MR0                      |
| PRIMI T1. ZLS([ST1]). DC1S([ST1]). DC2S([STT])                     | 30HR0                      |
| PRINT MI. JTIL J. JT21 JJ 1                                        | 25HR0                      |
| 18 1 10POP(1STT) .FO. 1 1 60 TO 5100                               | 25480                      |
| TAYOPT - TAYOPS(ISTT)                                              | 254000                     |
| GO TU ( 2800, 2900, 1000 ) . LAVORT                                | 25480                      |
| 7860 PRINT 01. ITTE ILL                                            | 25.600                     |
|                                                                    | 25480                      |
|                                                                    | 25000                      |
|                                                                    | 25480                      |
|                                                                    | ZOMRU                      |
| 3000 PRINT 73. JII( JJ 1                                           | 25480                      |
|                                                                    | 25480                      |
| DD13 = 2.0-2L3131117H                                              | 25/40                      |
| IF (IARDPS(ISTI) .EO. 2) DDIS = DCIS(ISTI)=DDIS                    | ZAAPO                      |
| COMMENT - CONVERT OUTPUT DISTANCES TO BE COMPATIBLE WITH STIPFNESS | IMPOTISHYO                 |
| IF (TARDESTISTI) .EC. ST DDIS = DE2STISTIS-DDIS                    | ZAAPO                      |
| DIS = - DDIS                                                       | 25#R0                      |
| 1.4 = 0                                                            | 25MRD                      |
| 00 3600 [ • ] • MP22                                               | 25MR0                      |
| DIS = DIS + DDIS                                                   | 25MR0                      |
| 1J1 = 1J6 + 1                                                      | 2 5 MRO                    |
| $1J_2 = 1J_1 + 1$                                                  | 25MR0                      |
| 1 + 5L] + 5L]                                                      | 254R0                      |
| 1J4 = 1J3 + 1                                                      | 25MR0                      |
| 1 = 4L1 = 7L1                                                      | 25HR0                      |
| $1J_6 = 1J_5 + 1$                                                  | 25MR0                      |
| COMMENT - PRINT CUMPLETE MEMBER RESULTS                            | 19MY0                      |
| PRINT 111.015. DM(1)1.KK1. DM(1/2.KK1. DM(1/3.KK1. DM(1/4.KK)      | 1, 25MR0                   |
| 2 DH(1J5,KK), DH(1J6,KK)                                           | 25MR0                      |
|                                                                    | State of the second second |

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|-----------|-----------------------------------------|------------------------------|--|
| 3600      | CONTINUE                                | 25MR0                        |  |
|           | GO TO 7100                              | 25MR0                        |  |
| 5100      | CORTINUE                                | 75MRC                        |  |
| COMMENT - | PRINT PARTIAL MEMBER RESULTS            | 10440                        |  |
| PRI       | MT 201, JT1( JJ ), JT2( JJ ), DM(4,KK). | DH(L7M3+KK)+ DH(5+KK)+ 75MR0 |  |
| 2         | OMILTH2 .KK1. DMIG.KE), DMILTH1.KK)     | 25MR0                        |  |
| 7100      | CONTINUE                                | 25MR0                        |  |
| PRI       | NT 301. DHILT.KKI                       | 25MR0                        |  |
|           | IOPL = IOPOP(ISTT)                      | 25MR0                        |  |
| RET       | URN                                     | 2.5MRC                       |  |
| END       |                                         | 25MRO                        |  |
|           |                                         |                              |  |
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APPENDIX 6

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INPUT FOR EXAMPLE PROBLEMS

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| DENTIFICATION                                | EXAMPLE                         | PROBLEMS                                                                                                                                               | CODED BY C. D. H.    | _ MIEDZ JULY 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0 mar 5 or 11                |
|----------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| ┟╷╷┥                                         |                                 |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 74 74 64                     |
|                                              | 1 2.9605+04                     | I INSO C                                                                                                                                               | <b>    2381.   0</b> | ╈┼╋╋┟┨┊┲┤╿┥╎╎┼                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ┦┼┿╎╌┝┧┥┿┿┿┥                 |
| <b>                                     </b> | 2 2-960E104                     | 300.0                                                                                                                                                  | <b>20.</b> α         | ╅┿┽┿┽┿╋┥┿┿                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |
| ┟╺┥╤┥╸╸╸╸                                    | 3 2.960E+04                     | 1050.0                                                                                                                                                 | 23.0                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              | 4 2.9605+04                     | 1050.0                                                                                                                                                 | 22.0                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                            |
|                                              | 5 2. 9605+04                    | 0.000.00                                                                                                                                               | 24.0                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              | 6 2. 960EHON                    |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              | 0.0                             | 900d 0                                                                                                                                                 | 70.0                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              |                                 | 63.6 5400.0                                                                                                                                            | Na.o                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              | 63.6                            | 1 SK. 0 3400.0                                                                                                                                         | 4ia. a               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              | 186.0                           | 28N.0 Sood.0                                                                                                                                           | Ko. D                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              | 204.0                           |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
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| ╽┰╊┟┥┝╋╤╋╸                                   |                                 |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              |                                 |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              | 960                             |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
| ┝┥┥┥┥                                        |                                 |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              |                                 |                                                                                                                                                        |                      | ┪╌┶┥╢╘┥╴                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |
|                                              | 1                               |                                                                                                                                                        |                      | I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | a∎a at                       |
|                                              |                                 |                                                                                                                                                        |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              |                                 | AMPLE PROBLE                                                                                                                                           | MS coord             | C.D.H.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 02 JULY 10 mar 6 or 11       |
|                                              | IDENTIFICATION EX               | AMPLE PROBLE                                                                                                                                           | <u>MS</u>            | av <u>C.D.H.</u> Dat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 02JULY10 6 or 11             |
|                                              | кентикаткан ЕХ<br>, d d         | AMPLE PRØBLE                                                                                                                                           | <u>MS</u>            | ₽7 <u>C.D.H.</u> №1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <u>, 02 JULY 1</u> 0 <u></u> |
|                                              | сент <i>и</i> катом ЕХ<br>, d d | AMPLE PROBLE                                                                                                                                           |                      | ■ <u>C.D.H.</u> ■<br>■<br>■<br>■<br>■                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |
|                                              |                                 | AMPLE PRØBLE<br>                                                                                                                                       |                      | ₽ <u>C.D.H.</u> №<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |
|                                              |                                 | AMPLE PRØBLE                                                                                                                                           |                      | ev <u>C.D.H.</u> ext<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |
|                                              |                                 | AMPLE PRØBLE<br>                                                                                                                                       |                      | ■ <u>C.D.H.</u> ■<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |
|                                              |                                 | AMPLE PRØBLE<br>4 4 4<br>222.01 223.01<br>324.01 223.01<br>324.01 223.01<br>324.01 223.01<br>122.01 122.01<br>122.01 122.01<br>329.01 122.01<br>329.01 | MS coars             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |
|                                              |                                 | AMPLE PRØBLE<br>                                                                                                                                       | MScoord<br>          | ■ <u>C.D.H.</u> ■<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬<br>¬                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       |                      | BY     C. D. H.     Dat       III     IIII     IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MS                   | ■7 <u>C_D.H.</u> ■47<br>-10<br>-10<br>-10<br>-10<br>-10<br>-10<br>-10<br>-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MS corr<br>          | ■7 C. D. H ■ =<br>■                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MS                   | ■v <u>C. D. H.</u> ==================================                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MS corr<br>          | BY C. D. H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MS                   | ■v C. D. H ==============================                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MScome<br>           | BY C. D. H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MS                   | Image: CD.H.     Image: CD.< |                              |
|                                              |                                 | AMPLE PROBLE<br>                                                                                                                                       | MS                   | BY C. D. H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |

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# APPENDIX 7

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## SELECTED OUTPUT FOR EXAMPLE PROBLEMS

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02 JULY 78 - COH - HM EXAMPLE PROBLEMS FOR REPORT

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### PROB

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1101 TRUSS WITH UNSYMT LOADS - PO 270 STRUCTHRAL ANALYSIS - MCCORMAC

NUMBER OF CARDS

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# TABLE 1 - PROBRAM CONTROL DATA PROBLEM TYPE 1

TABLE

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TABLE SUPPRESS OUTPUT NUMBER (1 = YES, . = NO)

OUTPUT TABLES

LAST PROBLEM

### PROB (CONTU)

1101 TRUSS WITH UNSYMT LOADS - PG 270 STRUCTURAL ANALYSIS - MCCORMAC

TABLE ? - FRAME GEUNETRY UATA

NUMBER OF JOINTS IN FRAME = 12 REFERENCE JOINT IS JOINT 1 AT X # 0. AND Y = 0. JOINT TOLEHANCE IS 5.000E-0Z

### INPUT OF JOINT OFFSETS

| MOR4<br>Triol | X-OFFSET     | -OFFSET   | TO<br>Joint | 10 | TO | TO | ΪO | TO | 10 |
|---------------|--------------|-----------|-------------|----|----|----|----|----|----|
| 1             | 2.400E+02    | 0.        | 3           | 5  | 7  |    | 11 | 12 |    |
| 1             | 2.4082.02    | 50.3004.5 | 2           |    |    |    |    |    |    |
| 2             | 2.400E+UZ    | 0.        |             | 6  | 8  | 10 |    |    |    |
| 10            | 2.4002.42 -2 | 50+3004.5 | 12          |    |    |    |    |    |    |

### COMPUTED JOINT COONDINATES

JOINT A

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| 1  | Q.        | 0.        |
|----|-----------|-----------|
| 2  | Z.+00E+02 | 2.400E.02 |
| 3  | 2.4002+02 |           |
|    | 4.800E+02 | 2.400E+02 |
| 5  | 4.800E*02 |           |
|    | 7.200E+02 | 20+3004.5 |
| 1  | 7.200E+02 |           |
| ٠  | 9.6082+82 | 2.4002.02 |
|    | 9.4905+02 | 0.        |
| 1. | 1.2002+03 | 2.4096+02 |
| 11 | 1.2002+03 | 0.        |
| 12 | 1         | 0.        |

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| 1101       TAUSS WITH UNSTWIT LOADS - PE 270 STRUCTURAL ANALYSIS - RECORMAC       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PROB (    | CONTD)       |           |             |              |                               |                 |         | 17           |                  | 2 •           |              |             | 2.400F                                    | *07           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------|-----------|-------------|--------------|-------------------------------|-----------------|---------|--------------|------------------|---------------|--------------|-------------|-------------------------------------------|---------------|
| 1       1       1       2       7       0       1       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       2       0       0       2       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1101      | TRUSS        | NITH      | UNSYNT LOAD | 5 - P6 270   | STRUCTURAL                    | ANALYSIS - M    | CCORMAC | 18           | 5                | • •           | 0 2.4000     | .02 0.      | 2.4000                                    |               |
| TARE 3 - REMARP LOCATION DATA       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1       #1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PCW1 070  |              |           |             |              | 1 1 T C 1 2 1 T N D N D N D T | 200 200 200     |         | 19           | 7                | 4             | 0 2.4006     | 20.         | 2.400E                                    | +02           |
| TARKE 3 - NEWBER LOCATION DATA       21       11       10       0       2.4002402 0, 2.4002402 0, 2.4002402         NAMES 0' NEWBER LOCATIONS       **** COMUTED NUMBER LOAD TYPES * * *       ****       PROB. (CONTO)       100111       TARKE 4 - JOINT DATA         INNUT OF NEWBER LOAD TYPES * * *       ****       ****       COMUTED NUMBER LOAD TYPES * * *       ****         INNUT OF NEWBER LOAD TYPES * * *       ****       ****       COMUTED NUMBER LOAD TYPES * * *       ****         INNUT OF NEWBER LOAD TYPES * * *       ****       ****       JOINT TYPE TYPES ****       ****       ****         INNUT OF NEWBER LOAD TYPES ****       *****       ************************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |              |           |             |              |                               |                 |         | 20           | ¥                |               | # Z.4006     | .0 10.      | 2.4000                                    | -02           |
| TABLE 3 - REDREP LOCATION DATA         Immedia of REDREP LICENTION LOAT         Immedia of REDREP LICENTION BATA         Immedia of REDREP LICENTION         Immedia REDREP LICENTION         Immedi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |              |           |             |              |                               |                 |         | 21           | 11               | 10 +          | 0 2.4008     | . 0 20+     | 2.00DE                                    | *02           |
| HUMBER OF REMER SIGNALS STORES THES * *       **** COMPUTED MEMBER NOT NOT SADEE VITH LEST PROPIES ****         HUMBER OF REMER LOCATIONS       INFORM SIGNALS TORES *****       ************************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TABLE     | 3 - MEMBE    | A LOCI    | ATION DATA  |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| Number of Nember STIPPLES TYPES +         +           IAPUT OF NEMBER LOGITIONS         IAPUT OF NEMBER LOGITIONS         TAUSS WITH UNSTAT LOADS - PB 210 STRUCTUREL ANALYSIS - RECORDER           IAPUT OF NEMBER LOGITIONS         IAPUT OF NEMBER LOGITIONS         TAUSS WITH UNSTAT LOADS - PB 210 STRUCTUREL ANALYSIS - RECORDER           IAPUT OF JOINT         STIPPLOD         To         TO <tdt< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>٠</td><td>** Co#PU</td><td>TEO MEMBER</td><td>NUMBERS MAY</td><td>NOT AGREE</td><td>WITH LAST P</td><td>ROBLER</td><td></td></tdt<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |              |           |             |              |                               |                 | ٠       | ** Co#PU     | TEO MEMBER       | NUMBERS MAY   | NOT AGREE    | WITH LAST P | ROBLER                                    |               |
| NUMBER OF REMORE LOGATORS       PRODUCTOR         INPUT OF MEMBER LOGATIONS       INPUT OF MEMBER LOGATIONS         PROME STIFF LOAD       TO       <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Million P | OF 107 100.5 | R 8114    | FRESS TIPES |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| LAPUT OF MEMBER LOCATIONS         TABLE 4 - JOINT DATA           FROM STIFF LOAD         To                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NUNDER    | -07 HEHBE    | R LOAD    | TYPES .     | •            |                               |                 |         | PROB<br>1101 | (CONTU)<br>Truss | 5 #ITH UNSTAT | LOADS - PO   | 210 STRUCT  | TRAL ANALYS                               | IS - MCCORMAC |
| PROM         STIFF LOAD         TO         TO <thto< th=""> <thto< th="">         TO</thto<></thto<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |              |           |             | ENBER LOCAT  | 1045                          |                 |         | TABLE        | + - JOINT        | DATA          |              |             |                                           |               |
| JOINT       TYPE TYPE       JOINT       TYPE TYPE       JOINT       DIAT       DIAT       DIAT         1       1       3       5       7       6       1       1       1       2       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <td>FROM</td> <td>STIFF</td> <td>Load</td> <td>To</td> <td>To To</td> <td>TO TO T</td> <td>o ÷o †0</td> <td>to To</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | FROM      | STIFF        | Load      | To          | To To        | TO TO T                       | o ÷o †0         | to To   |              |                  |               |              |             |                                           |               |
| 1       1       2       7       6       11       12         1       1       2       7       6       11       12         1       1       2       7       6       11       12         1       1       2       1       12       1       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10 <t< td=""><td>HOTHE</td><td>TYPE</td><td>TYPE</td><td>JO INT</td><td>10 10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | HOTHE     | TYPE         | TYPE      | JO INT      | 10 10        |                               |                 |         |              |                  |               |              |             |                                           |               |
| 1       1       2       5       7       0       13       12         2       1       0       2       10       12       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |              | 6.000.000 |             |              |                               |                 |         |              |                  | INPUT         | OF JOINY DA  | ATA         |                                           |               |
| 1       1       2       5       7       0       13       16         1       3       1       7       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |              |           |             |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| 2       1       0       4       0       10         3       0       7       0       1       0       1       0       1       0       1       0       1       0       1       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1         | 1            |           | 3           | 5 7          | • ii                          | 32              |         |              |                  |               |              |             |                                           |               |
| 1       2       3       1         1       3       12       3       12         1       3       12       3       12         1       3       12       3       12         1       3       12       3       12         1       3       12       3       12         1       3       12       3       12         1       3       12       3       12         1       4       10       10       10       10         1       1       1       1       1       1       1         1       1       1       1       1       1       1       1         1       1       1       1       1       1       1       1       1         1       1       1       1       2       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2         | 1            |           | •           | 6 8          | 10                            |                 |         |              |                  | Foner ( 4)    |              | £           | en al la | Colline (7)   |
| 1       3       1         1       3       1         1       3       1         1       3       1         1       3       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1         1       1       1       1         1       1       1       1       1       1       1         1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1         | 1            | •         | 2           |              |                               |                 |         | 30101        | FORCE (A)        | I POWCE (T)   | NONENI (Z)   | 2hm [MB (K) | ZDH [MB (Y)                               | 2DHING(1)     |
| 1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1         |              |           |             |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| 1       3       1       0       1.000000 + 00       1.000000 + 00       1.000000 + 00       -0.0         3       0       1       0       0       0       0       0       -0.0         3       0       1       0       0       0       -0.0       -0.0       -0.0         11       0       1.000000 + 00       -0.0       -0.0       -0.0       -0.0       -0.0         11       0       1.000000 + 00       -0.0       -0.0       -0.0       -0.0       -0.0         11       0       1.00000 + 00       -0.0       -0.0       -0.0       -0.0       -0.0         11       0       1.00000 + 00       -0.0       -0.0       -0.0       -0.0       -0.0         11       0       1.00000 + 00       -0.0       -0.0       -0.0       -0.0       -0.0         11       0       1.00000 + 00       -0.0       -0.0       -0.0       -0.0       -0.0         12       0       1.00000 + 00       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0       -0.0 <td></td> <td></td> <td></td> <td>1</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |              |           | 1           |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| 1       3       -1       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2       -2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5         |              |           | -           |              |                               |                 |         | 1            |                  | -             |              | 1.0005.00   | 1.0005.99                                 | -0-           |
| 3       4       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       6       7       7       6       7       7       7       6       7       7       6       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.        |              | : I       | 12          |              |                               |                 |         |              |                  | -2.0002.01    | -0.          | -8.         |                                           | -0.           |
| 3       4       6       7       6       -2       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0       -0 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-8.</td> <td>-2.0001-01</td> <td>-0.</td> <td>-8.</td> <td>-0.</td> <td>-0-</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |              |           |             |              |                               |                 |         |              | -8.              | -2.0001-01    | -0.          | -8.         | -0.                                       | -0-           |
| 7       4       6       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0.       -0. <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Ť</td> <td>-0.</td> <td>-2,0002.01</td> <td>-0.</td> <td>~0.</td> <td>-0+</td> <td>-0.</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |              |           |             |              |                               |                 |         | Ť            | -0.              | -2,0002.01    | -0.          | ~0.         | -0+                                       | -0.           |
| 9       6       0       11       -0.       -1.000E*01       -0.       -0.       -0.         11       -0.       10       10       -0.       -0.       -0.       -0.       -0.         COMPUTED MEMBER MUNDERS.LEMDING.AND OFFSETS         ACCUMULA ATED JOINT DATA         MEMBER FROM TO SIJEF LOAD LENGTH X-OFFSET       SAME AS IMPUT FOR THIS PHUBLEM         1       3       1       0.2.000E+02       2.400F+02       0.         2       3       5       1       0.2.000E+02       2.400F+02       0.         2       3       5       1       0.2.000E+02       2.400F+02       0.         3       5       1       0.2.000E+02       2.400F+02       0.       1101       THUSS #1TH UASTHT LDADS - P0 270 STHUCTHRAN ANALYSIS - MCCORMAC         4       5       1       0.2.400F+02       2.400F+02       0.       1101       THUSS #1TH UASTHT LDADS - P0 270 STHUCTHRAN ANALYSIS - MCCORMAC         4       1       1       2.400F+02       2.400F+02       0.       1101       THUSS #1TH UASTHT LDADS - P0 270 STHUCTHRAN ANALYSIS - MCCORMAC         4       1       1       2.400F+02       2.400F+02       0.       1101       THUSS #1TH UASTHT LDADS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ī         |              |           | 4           |              |                               |                 |         | 9            | -0.              | -1.080E*01    | -0.          | -0.         | -0 -                                      | -0-           |
| 11       4       0       12       -0.       1.000E.99       -0.         COMPUTED MEMBER HUMBERS.LEMBINS, AND OFFSETS         ACCUMPLATED JOINT DATA         ACCUMPLATED JOINT DATA         MEMBER FROM TO STIFF LOAD LEMETH X-OFFSET V-DFSET         SAME AS IMPUT FOR THIS PHUBLEM         I I I I I I I I I I I I I I I I I I I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 9         | •            |           |             |              |                               |                 |         | 11           | -0.              | -1.000E.01    | -0.          | -8.         | -0-                                       | -0.           |
| COMPUTED MEMBER HUMBERS.LEMBINS.AND OFFSTS       ACCUMALATED JOINT DATA         MEMBER FROM TO VIEW VIEW       TO FRAFT V-DFFST       SAME AS IMPUT FOR THIS PMUBLEM         1       1       3       1       0.0005-002       2.4007-02       0.         2       3       5       1       0.24007-02       0.       PROG (CONTO)         2       3       5       1       0.4002-02       2.4007-02       0.         3       7       1       0.24007-02       0.0007-02       0.       101       TRUSS H1TH UASTHT LDAOS - P0 2TO STRUCTURAL ANALISTS - MCCOMMAC         4       7       9       1       0.24007-02       0.0007-02       0.       1101       TRUSS H1TH UASTHT LDAOS - P0 2TO STRUCTURAL ANALISTS - MCCOMMAC         4       1       2.4002-02       2.4007-02       0.       1101       TRUSS H1TH UASTHT LDAOS - P0 2TO STRUCTURAL ANALISTS - MCCOMMAC         4       1       2.4002-02       2.4007-02       0.       1101       TRUSS H1TH UASTHT LDAOS - P0 2TO STRUCTURAL ANALISTS - MCCOMMAC         4       1       2.4002-02       2.4002-02       0.       FAHE 5 - MEMBER STIFFALSS UATA         5       1       1       2.4002-02       2.4002-02       TANE       CARUS ONT ONT ONT FRM TO         10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 11        |              |           | 10          |              |                               |                 |         | 12           | -8.              | -8,           |              | -0.         | 1.0005.99                                 | -8.           |
| COMPUTED MEMBER NUMBERS-LEMBING, AND OFFSETS         ACCUMULATED JOINT DATA           MEMBER FROM<br>NUMB         TO<br>JOINT         STIFF LOND<br>TYPE TYPE         Lembth<br>Numbers         Noffset<br>Lembth         V-DPFSET         Same as IMPUT FOR THIS PHUBLEM           1         1         3         1         0         Z.400F+02         Z.400F+02         0           2         3         5         7         1         0         Z.400F+02         Z.400F+02         0           3         5         7         1         0         Z.400F+02         Z.400F+02         0           3         5         7         1         Z.400F+02         Z.400F+02         0         1101         THUSS #1TH         UASTHT         LDA0S - P8 270         STRUCT-IRAI         AHAI YS1S - MCCORHAEC           3         5         7         1         Z.400F+02         Z.400F+02         0         1101         THUSS #1TH         UASTHT         LDA0S - P8 270         STRUCT-IRAI         AHAI YS1S - MCCORHAEC           4         1         Z.400F+02         Z.400F+02         0         1101         THUSS #1TH         UASTHT         LDA0S - P8 270         STRUCT-IRAI         AHAI YS1S - MCCORHAEC           1         1         Z.400F+02         Z.400F+02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |              |           |             |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| COMPUTED MEMBER NUMBERS-LEMBING, AND OFFSETS<br>MEMBER FROM TO SIIFF LOND LEWETH X-OFFSET Y-DFFSET SAME AS IMPUT FOR THIS PHUBLEM<br>NUMB JOINT JOINT TYPE YPE<br>1 1 3 1 0 2.480E+02 2.480F.02 0.<br>2 3 5 1 0 2.480E+02 2.480F.02 0.<br>3 7 1 1 2 2.480E+02 2.480F.02 0.<br>4 7 0 1 1 2 2.480E+02 2.480F.02 0.<br>5 9 11 1 0 2.480E+02 2.480F.02 0.<br>6 11 12 1 0 2.480E+02 2.480F.02 0.<br>7 2 4 1 0 2.480E+02 2.480F.02 0.<br>7 2 4 1 0 2.480E+02 2.480F.02 0.<br>1 1 1 2 2 2 0 3.394E+02 2.480F.02 0.<br>1 1 1 2 2 2 0 3.394E+02 2.480F.02 0.<br>1 1 1 2 2 2 0 3.394E+02 2.480F.02 0.<br>1 2 1 0 2.480E+02 2.480F.02 0.<br>1 3 0 10 1 0 2.480E+02 2.480F.02 0.<br>1 3 0 10 1 0 2.480E+02 2.480F.02 0.<br>1 3 0 10 1 0 2.480E+02 2.480F.02 0.<br>1 4 2 5 3 3 0 3.394E+02 2.480F.02 0.<br>1 5 0 1 3.394E+02 2.480F.02 0.<br>1 6 10 12 0 3.394E+02 2.480F.02 0.<br>1 7 7 2 4 1 0 2.480F.02 2.480F.02 0.<br>1 8 2 5 3 0 3.394E+02 2.480F.02 0.<br>1 9 0 0 0 F PRISMATIC PHISMATIC MU AXIS ONITPUT PTH PTH<br>1 9 0 0 2.480F.02 2.480F.02 0.<br>1 9 0 0 2.480F.02 2.480F.02 0.<br>1 9 0 0 0 F RISMATIC PHISMATIC MU AXIS ONITPUT PTH PTH<br>1 0 1 2 0 2.480F.02 2.480F.02 0.<br>1 9 0 0 0 0 0 1 0 1 0 0.<br>1 9 0 0 0 0 0 0 0.000F.00 -0 1 0 1 1 0.<br>3 8.800F.00 4.6800F.00 -0 0 1 0 1 1 0.<br>3 8.800F.00 4.6800F.00 -0 0 0.00F.00 -0 0.00F.00 -0 0.<br>3 8.800F.00 4.6800F.00 -0 0.00F.00 -0 0.<br>3 8.800F.00 4.6800F.00 -0 0 1 0 1 0.<br>3 8.800F.00 4.6800F.00 -0 0 1 0 1 0.<br>3 8.800F.00 4.6800F.00 -0 0.00F.00 -0 0.00F.00 -0 0.<br>1 1 1 1.<br>3 8.800F.00 |           |              |           |             |              |                               |                 |         |              |                  | ACCUM         | A ATED JOINT | DATA        |                                           |               |
| NEWDER       PROM       TO       STIFF       LOAD       LEWBTH       X-OFF NFT       Y-DFFSET       SAME AS IMPUT FOR THIS PHUBLEM         1       3       1       2.400E+02       0.40E+04       101       THUES #]TF HOU DF       PRISMATIC       PAISMATIC       PAISMATIC       PAISMATIC       PAISMATIC       PAISMATIC       PAIMATIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           | COMPUTED     | MEMORI    | HUMBERS .L  | ENDTHS , AND | OFFSETS                       |                 |         |              |                  |               |              |             |                                           |               |
| NUMB       JOINT       JOINT       TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | F800 1       | 0         | TIFF LOAD   | LEMITH       | No. NE ART                    | V-DEFEET        |         | SAME         | AS INPUT         | TOR THIS PHOA | LEN          |             |                                           |               |
| 1       3       1       8       2.480E+02       2.400F+02       0.         2       3       5       1       8       2.400F+02       2.400F+02       0.         3       5       7       1       8       2.400F+02       2.400F+02       0.         3       5       7       1       8       2.400F+02       2.400F+02       0.         4       7       9       1       8       2.400F+02       2.400F+02       0.         5       9       1       1       8       2.400F+02       2.400F+02       0.         6       11       1       2.400F+02       2.400F+02       0.       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MI MARK   | MINI J       | THE       | TYPE YYPE   | ef an lu     | A-OFF AFT                     | 1-041 361       |         |              |                  |               |              |             |                                           |               |
| 1       3       1       0       2.4007.02       0.         2       3       5       1       0       2.4007.02       0.         3       5       7       1       0       2.4007.02       0.         3       5       7       1       0       2.4007.02       0.         5       7       1       0       2.4007.02       0.         5       11       1       0       2.4007.02       0.         6       11       12       1       0       2.4007.02       0.         7       2       1       2.4007.02       0.       14444         6       1       1       2.4007.02       0.       14444         7       2       1       2.4007.02       0.       14444         8       4       1       2.4007.02       2.4007.02       0.         9       0       1       2.4007.02       2.4007.02       0.         11       2       2       0.30040.02       2.4007.02       0.         12       7       8       2       0.3004.02       2.4007.02       0.         13       10       1       2.4007                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |              |           |             |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| 1       1       3       1       0       2.4000+02       2.4000+02       0.         2       3       5       1       0       2.4000+02       0.       1101       TRUSS #1TH UASIMT LDADS - P0 270 STRUCT-IRAL ANAL YSIS - MCCORMAC         3       5       7       1       0       2.4000+02       0.       1101       TRUSS #1TH UASIMT LDADS - P0 270 STRUCT-IRAL ANAL YSIS - MCCORMAC         4       7       9       1       0       2.4000+02       0.       1101       TRUSS #1TH UASIMT LDADS - P0 270 STRUCT-IRAL ANAL YSIS - MCCORMAC         4       7       9       1       0       2.4000+02       0.       1101       TRUSS #1TH UASIMT LDADS - P0 270 STRUCT-IRAL ANAL YSIS - MCCORMAC         5       11       1       2.4000+02       2.4000+02       0.       14414       14414       14414         7       2       6       1       0       2.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02       0.4000+02 <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |              |           |             |              |                               |                 |         |              |                  |               |              |             |                                           |               |
| 2       3       3       1       8       2.4002.02       2.4002.02       0.       PAGE (CONTO)         3       5       7       1       8       2.4002.02       0.       1101       TRUSS #]TH UASTHT LDAOS - P0 2TO STRUCTURAL ANALYSIS - HCCORHAC         4       7       1       8       2.4002.02       2.4007.02       0.       1101       TRUSS #]TH UASTHT LDAOS - P0 2TO STRUCTURAL ANALYSIS - HCCORHAC         5       11       1       8       2.4002.02       2.4007.02       0.       1601       TRUSS #]TH UASTHT LDAOS - P0 2TO STRUCTURAL ANALYSIS - HCCORHAC         6       11       1       8       2.4002.02       2.4007.02       0.       1741         7       2       1       1       8       2.4007.02       0.       1741         9       0       1       2.4002.02       2.4007.02       0.       1741         10       1       2.4007.02       2.4007.02       0.       1741       1741         11       1       2.4007.02       2.4007.02       STIFF       HOU DF       PRISHATIC       PHISMATIC       NAIS ONTPUT       PTH PTH         12       7       2       3.39645.02       2.4007.02       TYPE       STIFF       1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1         | 1            | 3         |             | 2.4005+02    | 2.4000.02                     | •.              |         |              |                  |               |              |             |                                           |               |
| 3       5       7       1       8       2.4880E+82       2.4880E+82       0.         4       7       8       1       1       8       2.4880E+82       2.4800F+82       0.         5       9       1       1       8       2.4800E+82       2.4800F+82       0.         6       11       12       1       8       2.4800E+82       2.4800F+82       0.         7       2       4       1       8       2.4800E+82       2.4800F+82       0.         9       8       1       8       2.4800E+82       2.4800F+82       0.         10       8       1       8       2.4800F+82       0.         11       1       2       2       8       3.394E+82       0.         11       1       2       2       3.394E+82       2.480F+82       0.         12       7       8       2       3.394E+82       2.480F+82       2.480F+82         13       9       18       3.394E+82       2.480F+82       2.480F+82       7.480F+82         14       2       3       3.394E+82       2.480F+82       2.480F+82       1         14       2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2         | 3            | 2         |             | 2.4002+02    | 2.4087.82                     |                 |         | PHOS         | (CONTO)          |               |              |             |                                           |               |
| *       *       *       *       *         *       *       *       *       *         *       *       *       *       *         *       *       *       *       *         *       *       *       *       *         *       *       *       *       *       *         *       *       *       *       *       *         *       *       *       *       *       *       *         *       *       *       *       *       *       *       *         *       *       *       *       *       *       *       *       *         *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *       *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           | •            | 1         | 1 1         | 2. ABOL . 02 | 2.4002.02                     |                 |         | 1101         | 16023            | 2 with mysimi | LDAUS - PE   | 210 STRUCT  | IRAI ANAL 13                              | 13 - HCCOHMAL |
| 6       11       12       1       8       2.4000:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:02       0.400:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |              |           | - i I       | 2            | 2.4442.42                     |                 |         |              |                  |               |              |             |                                           |               |
| 7       2       4       1       8       2.400E+02       2.400E+02       0.         9       6       1       8       2.400E+02       2.400E+02       0.         9       6       1       8       2.400E+02       2.400E+02       0.         10       1       1       2       2       0       3.304E+02       2.400E+02       2.400E+02         11       1       2       2       0       3.304E+02       2.400E+02       2.400E+02       STIFF       MGU OF       PRISMATIC       PHISMATIC       HU AX1S       MITPUT       PTH       PTH         13       0       10       2       3.304E+02       2.400E+02       STIFF       MGU OF       PRISMATIC       PHISMATIC       HU AX1S       MITPUT       PTH       PTH         13       0       10       2       3.304E+02       2.400E+02       TYPE       ELAST       1       A       CARUS       OPT       not       FROM       TO         14       2       3       0       3.304E+02       2.400E+02       2.400E+02       2.300E+00       4.000E+00       -0       1       1       1         16       10       12       3       0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | 11           | 12        |             | 2.4005+92    | 2.4005.02                     | 0.              |         | TANK E       | 5 - MENH         | EN STIFFALSS  | UATA         |             |                                           |               |
| 4       4       1       8       2.4002+02       9.         9       8       1       8       2.4002+02       9.         10       8       1       8       2.4002+02       9.         11       1       2       2       9.0002+02       2.4002+02       9.         11       1       2       2       9.394E+02       2.4002+02       2.4002+02       8.         12       7       8       2       9.394E+02       2.4002+02       2.4002+02       ST1FF       MOU DF       PRISMATIC       NU AX1S       0017PUT       PTM       PTM         13       8       3.394E+02       2.4002+02       2.4002+02       TYPE       ELAST       I       A       CARUS       OPT       OPT       PTM       PTM <th>i i</th> <th>12</th> <th></th> <th>1 1</th> <th>2.4885.482</th> <th>2.4887.487</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>5.5</th> <th></th> <th></th> <th></th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | i i       | 12           |           | 1 1         | 2.4885.482   | 2.4887.487                    |                 |         |              |                  |               | 5.5          |             |                                           |               |
| 0       0       0       1       0       2×4007+02       0.         10       0       1       0       2×4007+02       0.         11       1       2       0       0.0002+02       2×4007+02       0.         11       1       2       0       0.0002+02       2×4007+02       2×4007+02       0.4007+02         12       7       0       2       0       0.3042+02       2×4007+02       2×4007+02       TYPE       ELAST       1       A       CAHUS       OHT       PTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | 4            | 4         | 1 .         | 2.4001.02    | 2.408E+92                     |                 |         |              |                  |               |              |             |                                           |               |
| 10       0       1       0       2 + 400E+02       2 + 400E+02       0         11       1       2       0       3 - 394E+02       2 + 400E+02       2 + 400E+02       0         12       7       0       2       0       3 - 394E+02       2 + 400E+02       STIFF       MOU OF       PRISMATIC       MU AX15       OUTPUT       PTH       PTH       PTH         13       0       10       2       0       3 - 394E+02       2 + 400E+02       TYPE       ELABT       1       A       CARUS       OPT       OPT       FROM       TO         14       2       3       0       3 - 394E+02       2 + 400E+02       -2 + 400E+02       TYPE       ELABT       1       A       CARUS       OPT       OPT       FROM       TO         14       2       3       0       3 - 394E+02       2 + 400E+02       -2 + 400E+02       1       3 - 000E+00       + 400E+00       -0       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <th></th> <th></th> <th></th> <th>1 0</th> <th>2.4802+82</th> <th>2.4007.02</th> <th>•.</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |              |           | 1 0         | 2.4802+82    | 2.4007.02                     | •.              |         |              |                  |               |              |             |                                           |               |
| 11       1       2       2       0       3-3965-02       2-6007-02       2-6007-02       2-6007-02       STIFF       HGU OF       PRISMATIC       PHISMATIC       HGU GF       PHISMATIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10        |              | 10        | 1 .         | 2-408E-02    | 2 -4882 -42                   |                 |         |              |                  |               |              |             |                                           |               |
| 12       7       8       3-394E+02       2-400E+02       2-400E+02       3-1111       FT111       FT1111       FT111                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 11        | 1            | 2         | 2 0         | 3.394 [.08   | 2-4002-02                     | 2.4082.02       |         | **.**        |                  | Bolders Tic - |              |             |                                           |               |
| 13       0       10       2       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       0       0       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12        | 1            |           | 4           | 3+3942+02    | 2-4047-02                     | 2.4005.05       |         | 21166        |                  | PHISHALIC P   | -134411C 4   | NO 6114 UN  |                                           |               |
| 10       2       3       3       3       3       3       3       3       3       3       1       1         15       4       7       3       0       3       3       0       3       3       0       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <th>13</th> <th></th> <th></th> <th></th> <th>3. 3445+85</th> <th>2,4007,42</th> <th>2,4897+02</th> <th></th> <th>1776</th> <th>ELAD1</th> <th>1</th> <th>A CA+</th> <th>03 091 0</th> <th>n i suiOm</th> <th>10</th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 13        |              |           |             | 3. 3445+85   | 2,4007,42                     | 2,4897+02       |         | 1776         | ELAD1            | 1             | A CA+        | 03 091 0    | n i suiOm                                 | 10            |
| 13       7       J       U       J-3796E-002       Z-600E-02       1 3.000E004       -000E-00       -0       1       1       1         16       10       12       3       3.394E-02       2 3.000E-04       -0       1       1       1         16       10       12       3       3.000E-04       -0       1       1       1         16       10       12       3       3.000E-04       -0       1       1       1         10       3       3.000E-04       1.000E-04       -0       1       1       1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 14        | 2            |           |             | 3.3442+02    | 2.4882.02                     | -6.4802+92      |         |              |                  |               |              |             |                                           |               |
| ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ##       ## <td< td=""><td>15</td><td>10</td><td>12</td><td></td><td>3.3941.02</td><td>2-4002-02</td><td>-2.4681.42</td><td></td><td></td><td>3.0485.04</td><td></td><td>. 400F . 8n</td><td>-0 1</td><td>i 1</td><td>1</td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 15        | 10           | 12        |             | 3.3941.02    | 2-4002-02                     | -2.4681.42      |         |              | 3.0485.04        |               | . 400F . 8n  | -0 1        | i 1                                       | 1             |
| 3 3.000E+04 4.250E+09 3.000E+08 -0 1 1 1 1<br>4 3.000E+04 1.000E+00 2.000E+08 -0 1 1 1 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10        | 10           |           |             | 113445.45    | e tendé tês                   | -e . a Bor . of |         | ;            | 1.00010.04       | 2.25n£+00 1   | .000E+04     | -0 1        | i i                                       | ĩ             |
| 4 3,000E+04 1,000E+00 2,000E+00 -0 1 1 1 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |              |           |             |              |                               |                 |         |              | 3. BUUE . 44     | 2.250E .09 3  | .000E+0.     | -0 i        | i i                                       | 1             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |              |           |             |              |                               |                 |         |              | 3.0002+04        | 1.800E+80 2   | .000E+0s     | -0 1        | i i                                       | 1             |

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| INT | DISP(A)    | 0[\$P(Y)   | ROTATION(Z)  | REACT (1)  | REACT (Y)  | REACT (Z) | THE MAXIMUM EQUILINGIUM ERRON INTERNAL TO THE MEMBER IS 1.0665-09 |
|-----|------------|------------|--------------|------------|------------|-----------|-------------------------------------------------------------------|
| ,   | 1-507-118  | -4.5007-01 | 1.000-000    | -1-1-27-11 | 4.5005.01  |           | WENNED MUMMED & STIFF TYDE 1 1040 THEF                            |
| :   | 8.9475-01  | -9 3415-81 | 1            |            |            |           |                                                                   |
|     | A AAAF-01  |            | 1.000000.000 |            |            | 0.        |                                                                   |
|     | a* 0e05-04 | -1"0165.40 | B 1.0001.44  |            | 0.         | 0.        | BOES FROM JOINT & TO JOINT Y                                      |
|     | 4.567E-81  | -1.561E.0  | 1.0007.90    |            | 0.         | 0.        | ALL OUTPUS FONCES ARE BITM MESPECT TO THE MEMBER ANES             |
| 5   | 1.800E-01  | -1.541E+0  | 1.000F.99    |            | ô.         | 0.        |                                                                   |
|     | 3.0675-01  | -1.736E    | 1.000r.00    |            | <b>*</b> • | ô.        | T JULUT > THTOL TA                                                |
| ĩ   | 3.2005-01  | -1.730E+0  | 1.0005.99    | 0.         | 0.         | 0.        |                                                                   |
|     | 1.5475-01  | -1.4595+4  | 1.4045.99    | 0.         |            |           | ARIAL FONCE . 7.000E+01 ARTAL FORCE . 7.000E+01                   |
| -   | 4.4448-01  | -1 1005.44 | 1.00000      |            |            |           |                                                                   |
|     |            | -1         | 1.0445.44    |            | 0.         | 0.        | 3-Can                                                             |
| 10  | 3.047E-02  | -8.0732-0  | 1 1.0002.99  | 0.         | A.         |           | HOMENT = -2+662E-11 MDWENT = 3.610E-18                            |
| 11  | 5.190E-81  | -8.4732-6  | 1.0005.00    | 0.         |            | 0.        |                                                                   |
| 12  | 5.8002-01  | -J.500E-9  | 1.000g+99    | 0.         | 3.5002.01  | 0.        | THE MALIMUM EQUILIBRIUM ERROH INTERNAL TO THE MEMARR 15 1.2557-49 |

|       | DISPLACENENTS |          |             |           | REACTIONS |          |  |  |  |
|-------|---------------|----------|-------------|-----------|-----------|----------|--|--|--|
| JOINT | D[\$P(1)      | (1) 4210 | ROTATION(Z) | REACT (1) | REACT (Y) | REACIUZI |  |  |  |

|               | 1 |           |  |
|---------------|---|-----------|--|
| DISPLACEMENTS |   | REACTIONS |  |

PROB (CONTD) 1101 TRUSS WITH UNSYMT LOADS - PS 270 STRUCTURAL AMALYSIS - MCCORMAC

NO DATA

TABLE T - COMPILATION TABLE

TABLE . - JOINT DISPLACEMENTS AND REACTIONS

PROS (CONTD) 1101 TRUSS WITH UNSTAT LOADS - PO 278 STRUCTURAL ANALYSIS - MCCORMAC

NO DATA

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TABLE & - MEMBER LOAD DATA

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PROS (CONTD) TRUSS WITH UNSYNT LOADS - PE 2TO STRUCTURAL ANALYSIS - HCCORMAC 1101

| ARIAL FONC | ε | 7.000E+01  | ATTAL FORCE |   | 7.00.2.01 |
|------------|---|------------|-------------|---|-----------|
| SHEAR      |   | -8-200E-10 | SHEAR       |   | 5.715E-18 |
| NOMENT     |   | -2-002E-11 | NOWENT      | • | 3.6162-18 |

MEMBER NUMBER 2 STIFF TYPE 1 LOAD TYPE P LENGTH = 2.440E+02 ALPHA = 1.000E+00 BETA = 0. 0025 FHOM JOINT 3 TO JOINT 5 ALL OUTPUT FORCES ARE LITH RESPECT 70 THE MEMBER 4XES

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THE MAXIMUM EWUILIGRIUP ERROR INTERNAL TO THE MEMOR IS 4.6412-10

SHEAR

HOMENT

AT JOINT

AXIAL FORCE = 4.50-E+01

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A. 139E-10

. 1.465E-10

| ATIAL FORCE |   | 4.500E+u1  | ATTAL FORCE | 4.500E.01 |
|-------------|---|------------|-------------|-----------|
| SHEAR       | • | -1-036E-10 | SHEAR       | 1.865E-10 |
| MOMENT      |   | -4.441E-12 | MOWENT      | 4.441E-11 |

MEMBER NUMBER 1 STIFF TYPE 1 LOAD TYME 0 LENGTH = 2.400E+02 ALPHA = 1.000E+00 RETA = 0. 400ES FROM JOINT 1 TO JOINT 3 ALL DUTPUT FORCES ARE .ITH RESPECT TO THE HEMBER ARES THIDL IA 1 AT JOINT 1

TABLE 4 - MEMBEN RESULTS

AT JOINT

. -5.240E-10

= -5-329E-11

AXIAL FORCE . A.SOOE+UI

L.

SHEAR

NOMENT

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PROB (CONTU) 1101 TRUSS WITH UNSYNT LOADS - PG 270 STRUCTURAL ANALYSIS - MCCORMAC

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ALL DUTPUT FORCES ARE WITH RESPECT TO THE NEMBER AKES T THIDL TA AT JOINY . AXIAL FORCE . 6.8882-81 ARTAL FORCE . A. BODE+81 -T-268E-18 SHEAR SHFAR = A.824E-10 HOMENT # -A.485E-10 MONENT = 7.034E-18 THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER IS 1.0335-09 MEMBER NUMBER 5 STIFF TYPE 1 LOAD TYPE 0 LENGTH = 2.4892+92 ALPHA = 1.8892+80 BETA = 6025 FROM JOINT 9 TO JOINT 11 ٥. ALL OUTPUT FORCES ARE WITH RESPECT TO THE NEMBER AXES TRIDL TA AT JOINT 13 AXIAL FORCE . 3.508E+01 ARTAL FORCE # 1.580E+01 = 3.271E-10 SHEAR # -5.773E-19 SHEAR -2.3985-10 HOWENT HOMENT 1.221E-10 THE MAXIMUM EQUILIBRIUN ERROR INTERNAL TO THE MEMOR 15 1.0085-04 HENBER NUMBER & STIFF TYPE 1 LOAD YVPE n LENGTH = 2.4006.02 ALPHA = 1.6008.00 BETA = GOES FROM JOINT 11 TO JOINT 12 ALL OUTPUI FORCES ARE HITH RESPECT TO THE HENGER AXES A ...

MEMBER NUMBER & STIFF TYPE 1 LOAD YVPE LENGTH # 2:400E+02 ALPHA = 1:00DE+00 BET

TRUSS WITH UNSYNT LOADS - PE 270 STRUCTURAL ANALYSIS - MCCORNAC

BETA .

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PROS (CONTO)

TABLE . - MEMBER RESULTS (CONTD)

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AT JUINT 11 AT JOINT 12 ALIAL FORCE . 3.500E+01 ANTAL FORCE = 3.580E+01

SHEAR = -3.249E-18 SHEAR A. 845E-11 · -T-327E-11 NOMENT MONENT A.106E-12 .

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER 15 4.563E-10

TABLE . - MENDER RESULTS (CONTO)

SHFAR

SHIF AR

HOMENT

SHEAR

THE MALINUM EQUILIBRIUM CHAUN THTERNAL TO THE MEMBER 15 1.0100-04

HOWENT

THE NAXIMUM EQUILIBRIUM ERAGE INTERNAL TO THE MEMAER IS 1.002E-09

PENNER NUMBER & STIFF TYPE 1 LOAD TYPE N LENGTH = 2.400E4U2 ALPMA = 3.000E400 BETA = 0. GDES FROM JOINT 6 TO JOINT B

ALL OUTPUT FONCES ARE WITH RESPECT TO THE WEMBER LYES

THE HARINUM EQUILIBRIUM ERROR INTERNAL TO THE MEMPER IS 1.004E-09

MEMBER NUMBER & STIFF TYPE I LOAD TYPE N LENGTH # 2.4802.02 ALPHA # 1.8002.00 BETA # 0. 6025 FROM JOINT & TO JOINT & All output forces are with respect to the member ings

NOMENT

PENBER NUMBER 7 STIFF TYPE L LOAD TYPE LENGTH = 2.4000E+82 ALPHA = 1.800E+80 BETA 80ES FROM JOINT 2 TO JOINT A

ALL OUTPUT FORCES ARE WITH RESPECT TO THE MENNER AXES

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AT JUINT

AT JOINT

AT JUINT

AT'AL FONLE - -T. SOOE+UI

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= 1.497E-11

· -0.293E-10

· 1-807E-11

AITAL FORCE = -7.500E+U1

· -1.066E-10

AX141 FORCE = -7.000E+01

SHEAR

MOMENT

SHEAR

HOMENT

SHEAR

HOMENT

PROS (CONTD) 1101 TRUSS WITH UNSYNT LOADS - PO 270 STRUCTURAL ANALYSIS - MCCORMAC

AT JOINT

AT JOINT

AT JOINT

AX1AL FORCE . -7.50%E+01

.

= 5.647E-10

. 3.370E-10

= 5.642E-10

4.211E-10

AXTAL FORCE = -7.000E+01

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BETA . D.

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= A.989E-10

= A.186E-19

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PROB (CONTU) TRUSS WITH UNSYMT LOADS - PO 2TO STRUCTURAL ANALYSIS - MCCORNAC 1101

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MEMBER NUMBER 10 STIFF TYPE 1 LOAD TYPE . .

TABLE . - MEMBER RESULTS (CONTD)

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LENGTH = 2.400E402 ALPHA = 1.000E400 GETA = adgs from Joint & To Joint 10 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AXES

AT JOINT AT JOINT 10 .

AXIAL FORCE = -6.000E+01 AXIAL FORCE . -A. BOUE+01 . 3.664E-10 SHEAR -6-5652-10 SHEAR HOWENT NOMENT · -1.0888E-10 . 2.420E-10

HENBER NUMBER 11 STIFF TYPE 2 LOAD TYPE 0 LENGTH = 3.3946.02 ALPHA = T.0TLE-01 92TA = T.0TLE-01 0025 FROM JOINT 1 TO JOINT 2 ALL OUTPUT FORCES ARE NITH RESPECT TO THE MEMBER 4XES

AT JOINT . AT JOINT AXIAL FORCE # -6.364E+01 SHEAR 5-329E-11 SHEAR = -7.22 X-11 HONTHT -1.766E-12 HOMENT . 1.457E-10

THE MAXINUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER 18 5-8395-10

STIFF TYPE 2 HENDER NUMBER 12 LOAD TYPE 9 LENGTH = 3.394E+02 ALPHA = 7.071E-01 AFTA = 7.071E-01 BOES FROM JOINT 7 TO JOINT B ALL OUTPUT FORCES ARE WITH RESPECT TO THE HEMBER ARES

> AT JOINT 7 AT JOINT .

| AXIAL FORCE | 2-1212+01  | AXTAL FORCE | 7,121E+01  |
|-------------|------------|-------------|------------|
| SHEAR       | 1-8392-10  | SHEAR       | -1.655E-10 |
| HOMENT      | -4-860E-11 | HOWENT      | 7.60AE-31  |

THE MAXIMUM EQUILIBRIUM ERROA INTERNAL TO THE MEMBER 15 2.300E-10

PROB (CONTU) TRUSS WITH UNSYNT LOADS - PO 270 STRUCTURAL ANALYSIS - MCCORMAC 1101

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TABLE 9 - MENBEN RESULTS (CONTO)

MEMBER NUMBER 13 STIFF TYPE 2 LOAD TYPE 0 LENGTH = 3.3948-02 ALPHA = 7.0718-01 BETA = T.0718-01 8085 FROM JOINT 9 TO JOINT 10 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AKES

AT JOINT 9 AT JOINT 10 AxIAL FORCE = 3.5366+01 AXIAL FORCE = 3.536E+01 SHEAR = 1.374E-10 SHEAR = -1.039E-10 NOMENT = -T+065E-12 HOMENT = 7.728E-11

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMOR IS 2.343E-10

STIFF TYPE 3 LOAD TYPE MENBER NUMBER 14 LENGTH & 3.394E-02 ALPHA & 7.071E-01 BETA BOES FROM JOINT 2 TO JOINT S ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AXES SETA = -7.0711-01

> AT JOINT 2 AT JOINT 5

| ALIAL FORCE | 3-5342++1 | ANTAL FORCE | 3.5362+01  |
|-------------|-----------|-------------|------------|
| SHEAR       | 6-287E-11 | SHEAR       | -9.263E-11 |
| POMENT      | T.065E-12 | HOMENT      | 5.785E-11  |

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER IS 2.2622-10

MEMBER NUMBER 15 STIFF TYPE 3 LOAD TYPE LENGTH = 3.3946+02 ALPHA = 7.071E-01 BETA = -7.071E-01 BOES FROM JOINT 4 TO JOINT T ALL OUTPUT FORCES ARE WITH RESPECT TO THE HENGER AXES

| FRIDE 14   |     |            | AT JOINT 7    |            |  |
|------------|-----|------------|---------------|------------|--|
| ATTAL FORC | ε = | 7.0712+38  | ATTAL FORCE . | 7.071E+00  |  |
| SHEAR      |     | 1-0628-10  | SHEAR =       | -1.090E-10 |  |
| POMENT     | -   | -1.082E-11 | HOMENT .      | 1.156E-10  |  |

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THE MAXIMUM EQUILIBRIUM ENROW INTERNAL TO THE MEMBER IS 2-261E-10

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PROB (CONTO) 1101 TRUSS WITH UNSYNT LOADS - P6 270 STRUCTURAL ANALYSIS - MCCORMAC TABLE . - MENBER RESULTS (CONTD) MEMBER NUMBER 16 STIFF TYPE 3 LOAD TYPE n LENGTH = 3.3946.02 ALPHA = 7.0712-01 BETA = -7.071E-01 GOES FROM JOINT 12 TO JOINT 12 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AKES AT JOINT 10 AT JOINT 12 ATIAL FORCE = -4.950E+01 AXIAL FORCE = -4.950E+01 SHEAR = 2.248E-11 SHEAR # 8.431E-12 HOMENT = -1.413E-11 HOMENT = -2,318E-11 THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER IS 1+132E-10 STIFF TYPE 4 HEHBER HUNGER 17 LOAD TYPE ÷. LENGTH - 2.400E+02 ALPHA - 0. BETA = 1.000E+08 COES FROM JOINT 3 TO JOINT 2 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AKES AT JOINT 3 AT JOINT 2 AXIAL FORCE # 2.000E+01 ANTAL FORCE . 2.000E+01 -2.4428-11 SHEAR SHEAR = 3.6952-11 = 3.428E-11 MONENT = -0. HOMENT THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER IS 2.842E-10 HENGER MUNUER 18 STIFF TYPE 4 LENGTH = 2.400E+02 ALPHA = 0. COES FROM JOINT 5 TO JOINT 4 LOAD TYPE . BETA = 1.000E.00 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AXES AT JOINT 5 AT JOINT . AXIAL FORCE . -5.888E+88 # -2.877E-11 SHEAR SHEAR = 3.247E-11 = -8-604E-12 HOMENT HOMENT = 2.567E-11

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THE MAXIMUM EQUILIBRIUM EAROR INTERNAL TO THE MENNER IS 3.553E-10

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PROB (CONTU) 1101 TRUSS #ITH UNSYMT LOADS ~ P6 270 STRUCTURAL ANALYSIS - RCCORMAC

SHFAR

HOMENT

SHFAR

MOMENT

SHEAR

HOMENT

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMAER IS 1.421E-14

THE MAXIMUM EQUILIBRIUP ERRON INTERNAL TO THE MEMBER IS 2.842E-10

STIFF TYPE 4

GORS FHOM JOINT 11 TO JOINT 10 ALL OUTPUT FURCES ANE NITH MESPECT TO THE MEMBER AKES

THE MALINUM EQUILIBRIUP ERROR INTERNAL TO THE MEMPER IS 3-553E-10

LOAD TYPE 6

= 3.101E-11

LOAD TYPE

.

= 7.239E-11

LOAD TYPE

1.360E-11

10

= 1.527E-11

= 7,48CE-12

= 2,944E-11

AT JOINT

AXTAL FORCE = -1.492E-09

AT JOINT

ANTAL FORCE = -1.500E+01

AT JOINT

AXTAL FORCE . 1.000E+01

BETA = 1.0001+00

META = 1.000E+00

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BETA = 1.0006.00

STIFF TYPE 4

ALL OUTPUT FORCES ARE WITH RESPECT TO THE HEMRER AND

ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AXES

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TABLE 9 - MEMBEN RESULTS (CONTD)

BOES FROM JOINT 7 TO JOINT

AT JOINT

ALTAL FORCE = 2.132E-C9

AxIAL FORCE = -1.500E+01

AXIAL FONCE = 1.000E+01

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HENBER NUMBER 21

LENGTH = 2.400E+02 ALPHA = 0.

= -4+441E-11

1-112E-11

MEMBER NUMBER 20 STIFF TYPE 4 LENGTH = 2.4008.02 ALPHA = 0. GOES FROM JOINT = TO JOINT =

FINIOL TA

= -4.746E-11

= 2.776E-13

LENGTH = 2.400E+02 ALPHA = 0.

AT JCINT II

= -4.959E-11

· -1.554E-11

MEMBER NUMBER 19

SHEAR

MOMENT

SHEAR

POMENT

SHEAR

POMENT

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PROB (CONTO) 1101 TRUSS WITH UNSYNT LOADS - PE 270 STRUCTURAL ANALYSIS - MCCORHAC

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TABLE 10 - JOINT EQUILIBAIUM ERRORS

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| JOINT | ERR(1)<br>FORCE | ERR(T)<br>Force | ERA 12)<br>NOMENT |  |   |
|-------|-----------------|-----------------|-------------------|--|---|
|       | 4 2207-11       | 1               | -4 907- 19        |  |   |
| -     | APERAL-IF       | 7. 344E-10      | -0-5016-15        |  |   |
| ~     | -5-2115-64      | 2.338L~87       | -2-1425-16        |  |   |
| 3     | -4.0042-10      | 2.0146-09       | -9.770F-11        |  |   |
|       | -3.4472-09      | 4.034E-00       | -4.2017-10        |  |   |
| 5     | -1.904E-09      | 4.124E-09       | -2.3747-10        |  |   |
|       | -1-417E-09      | 2.8866-89       | -1.4755-10        |  | * |
| 7     | -1.498E-49      | 5.126E-09       | -9.6287-10        |  |   |
|       | 1.9242-10       | 3.191E-09       | -0.1954-10        |  |   |
|       | -1.1328-09      | 3.3828-09       | -4.5007-10        |  |   |
| 10    | -1.5262-10      | 2.0435-09       | -3.3557-10        |  |   |
| 11    | -2.3442-09      | 1.495E-09       | -2.1097-10        |  |   |
| 12    | -1.397E-09      | 4.818E-10       | 1.7002-11         |  |   |

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OF JULY 78 - COM - MM Example problems for report

#### PROB

1102 EFFECT OF RIGID CONNECTIONS ON TRUSS

TABLE 1 - PROGRAM CONTROL DATA PROBLEM TYPE 1

INPUT TABLES

| · | NUMBER | HOLD DATA FROM<br>LAST PROBLEM | NUMBER OF CARDS |
|---|--------|--------------------------------|-----------------|
|   |        | (] = YES+0 = NO)               | PROBLEM         |
|   | 2      | 1                              | -0              |
|   | 3      | 1                              | -0              |
|   | •      | 1                              | -0              |
|   | 5      | -0                             | •               |
|   | 6      | -0                             |                 |
|   | 7      | -0                             | -9              |
|   |        | OUTPUT TABLES                  |                 |
|   | TABLE  | SUPPRESS OUTPUT                |                 |
|   | NUMBER | (1 = YES.0 = NO)               |                 |
|   |        | -0                             |                 |
|   | _      |                                |                 |

9 -0 10 -0 PRON (CONTU) 1102 EFFECT OF AIGLU CONNECTIONS UN TRUSS

HOLDING DATA FHOM THE PREVIOUS PROBLEM PLUS THE FALLOWING

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TABLE 2 - FRAME GEOMETRY DATA

NONE

1 0. 0. 2 2.400E+02 2.400E+02 3 2.400E+02 0. 4 4.800E+02 2.400E+02 5 4.800E+02 2.400E+02 5 7.200E+02 0. 8 9.600E+02 0. 8 9.600E+02 0. 9 9.600E+02 0. 10 1.200E+03 0. 12 1.440E+03 0.

COMPUTED JOINT COORDINATES

JOINT A

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PROM (CONTU) 1102 EFFECT OF RIGIU CONNECTIONS UN TRUSS

TANLE 3 - MEMBER LOCATION DATA

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MOLDING DATA FHOM THE PHEVIOUS PHONLEN PLUS THE FALLOWING

NONE

COMPUTED MEMBER AUMBERS .LENGTHS . AND OFFSETS

| MEMAER | FROM  | TU    | STIFF | LOAD | LENGTH | X-OFFSFT | Y-OFFSET |
|--------|-------|-------|-------|------|--------|----------|----------|
| NUHB   | JOINT | JUINT | TYPE  | TTPE |        |          |          |

| 1  | 1  | 3  | 1 | 0 | 2.4005.02 | 2.4007.02 | 0.         |
|----|----|----|---|---|-----------|-----------|------------|
| 2  | 3  | 5  | 1 | 0 | 2.4006.02 | 2.4005.02 | 0.         |
| 3  | 5  | 7. | 1 | 0 | 2.4002+02 | 2.4005.02 | 0.         |
|    | 7  | 9  | 1 | 0 | 2.410E+02 | 2.4005.02 | 0.         |
| 5  | 9  | 11 | 1 | 0 | 2.4002.02 | 2.4005.02 | 0.         |
| 6  | 11 | 12 | 1 | 0 | 2.400E+02 | 2.400F.02 | 0.         |
| 7  | 4  | 4  | 4 | 0 | 2.4002+02 | 2.4005.02 | 0.         |
|    |    | 6  | 1 | 0 | 2.4002+02 | 2.400F.02 | 0.         |
| 9  | 6  |    | 4 | 0 | 2.4002.02 | 2.4007.02 | 0.         |
| 10 |    | 10 | 1 | 0 | 2.400E.02 | 2.4005.02 | 0.         |
| 11 | 4  | 2  | £ | 0 | 3.394E+UZ | 2.4005.02 | 2.4006.02  |
| 12 | 7  |    | 2 | 0 | 3.394E+02 | 2.4005.02 | 2.4nuE+02  |
| 13 | 9  | 10 | 2 | 0 | 3.3948+02 | 2.4005.02 | 2.400F+02  |
| 14 | 2  | 5  | 3 | 0 | 3.3942+02 | 2.4001.02 | -2.400E.02 |
| 15 | •  | 7  | 3 | 0 | 3.394E+02 | 2.4004.02 | -2.4002+92 |
| 16 | 10 | 12 | ٤ | 0 | 3.394E+02 | 2.4005.02 | -2.400E.02 |
| 17 | 3  | 2  | • | 0 | 2.4005.02 | 0.        | 2.4005.02  |
| 18 | 5  | •  | • | 0 | 2.4006.92 | 0.        | 2.400F+02  |
| 19 | 1  | 6  |   | 0 | 2.4002.02 | 0.        | 2.4005.07  |
| 20 |    |    | • | 0 | 2.4002+02 |           | 2.4005.42  |
| 21 | 11 | 14 | • | 0 | 2.4002.02 | 0.        | 2.+00F+02  |

--- COMPUTED MEMBER NUMBERS AGREE WITH LAST PROBLEM ....

.

| 1  | 0.  | ٥.         | c. | 1.0002.99 | 1.000E.99 | 0.  |
|----|-----|------------|----|-----------|-----------|-----|
| 3  | G • | -2.000E*01 | 0. | 0         | ñ •       | 0 . |
| 5  | 0.  | -2.000E.01 | 0. | 0.        | 0.        | 0.  |
| 7  | 0.  | -2.0006.01 | 0. | 0.        | 9.        | 0.  |
| 9  | 0.  | -1.0006+01 | 0. | 0.        | 0.        | 0.  |
| 11 | э.  | -1.000E.01 | 0. | 0.        | 9.        | 0.  |
| 12 | 0.  | 0.         | 0. | 0.        | 1.0006.99 | 0.  |

JOINT FONCE(A) FORCE(Y) MOMENT(Z) SPRING(A) SPHING(Y) SPHING(Z)

ACCUMULATED JOINT DATA

PROU (CONTU)

1102 EFFECT OF RIGIU CONNECTIONS UN TRUSS

TABLE 5 - MEMULH STIFFNESS DATA

| STIFF | HOU OF       | PRISMATIC | PHISMATIC  | NU    | AXIS | OUTPUT | PTN  | PTN |
|-------|--------------|-----------|------------|-------|------|--------|------|-----|
| TYPE  | ELAST        | I         |            | CARUS | OPT  | 0#T    | FROM | TU  |
| 1     | 3.0005.04    | 4.000E+00 | 4.0002.00  | - 0   | ī    | ī      | -0   | -0  |
| 2     | 3.000E.04    | 2.2506.00 | 3.000E.00  | -0    | 1    | 1      | - 0  | = U |
| 3     | 3.0002.04    | 2.250E+00 | 3.000E.00  | -0    | 1    | 1      | = P  | - 0 |
|       | 3. UUVE . De | 1.000E.0U | 4.000E +00 | 0     | 1    | 1      | -0   | - 2 |

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HOLDING DATA FHUM THE PHENIOUS PHORLEM PLUS THE FALLOWING

TABLE . - JOINT DATA

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PROB (CONTU) 1102 EFFECT OF RIGIU CONNECTIONS ON TRUSS

198

MEMBER NUMBER 1 STIFF TYPE I LOAD TYPE LENGTH = 2.4006.02 ALPHA = 1.0000000 AFTA . ... GOES FHOM JOINT 1 TO JOINT 3

ALL OUTPUT FORCES ARE WITH MESPECT TO THE WEMBER AKES AT JUINT 1 AT JOINT 1

1162 EFFECT OF RIGIU CONNECTIONS ON TRUSS

PROB (CONTU)

TABLE Q - MEMBER HESULTS

!

| ALTAL FONCE |   | 4.499E+01  | AXTAL FORCE | 4.49YE+01 |
|-------------|---|------------|-------------|-----------|
| SHEAD       |   | 1-1298-02  | SHEAR       | 1.129E-02 |
| MOMENT      | - | -7.4516- 1 | HUNFNT      | 1.953E+00 |

THE MEATHON EQUILIBRIUS CHAUR INTERNAL TO THE MEMOER IS 3.775F-10

MEMBER NUMBER 2 STIFF TYPE 1 LOAD TYPE LENGTH = 2.4002+02 ALPHA = 1.000E+00 BETA . Π. SOES FHOM JOINT & TO JUINT 5 ALL OUTPUT FONCES ARE WITH HESPECT TO THE MEMAER AND AT JUINT .1 ATTAL FONCE = 4.500E+-1 TOAD TYPE SHEAD = -3.96LE RETA . 1.0005-00 MOMENT  $\sim$ R TH HESPECT TO THE HEMRER AXES THE JUINT 4 AT JOINT R TALAL FUNLE = -1.498E.1 AXTAL FURCE = -1.49-5+01 SHEAR = +++23E-+J SHFAN # 4.473E-03 NOMENT = -5.221E- 1 NUMENT 5. 39 E-01

THE MAXIMUM EWILLIGHTUM ENNUR INTEONAL TO THE MEMOER IS 2.ROZE-10

| MEMBER NUMBER 21     | STIFF TYPE     | •          | LOAD TYPE   | 1           |
|----------------------|----------------|------------|-------------|-------------|
| LENGTH = 2.4UUE+UZ   | ALPHA #        | <b>)</b> . | HFIA        | # 1.ANUL+UC |
| GOES FHOM JOINT 11   | TC JUINI 10    |            |             |             |
| ALL OUTPUT FORCES AN | E ALTH MESPECT | TO IME     | HEMRER SXES |             |

|             | IJ | UINE II    | AT JOIN       | T 10       |
|-------------|----|------------|---------------|------------|
| AXIAL FORUE | -  | 9.9918+06  | ARTAL FORCE . | 0_991E+0J  |
| SHEAD       |    | 4.747E-03  | SHFAR #       | 4.74/E-0.1 |
| MOMENT      | -  | -0+016F-01 | MUNENT .      | 5. 37/E-01 |

THE MAXIMUM EWILLIGHTUM CHAUM INTERNAL TO THE MEMORA IS 1.7765-14

PROB (CONTU) 1102 EFFECT OF RIGIU CONNECTIONS UN TRUSS

TABLE # - JOINT UISPLACEMENTS AND REACTIONS

DISPLACEMENTS REACTIONS

| 1  | 4.343-110  | -4.500t-90   | -4.391r-03 | -4.343F-11 | 4.5J0E.01 | ۰.  |
|----|------------|--------------|------------|------------|-----------|-----|
| 2  | 5.966E-UL  | -9,359E-01   | -2.6705-03 | 0.         | 2.        | 0.  |
| 3  | 8. YYBE-U2 | -1.016E.0u   | -3.1725-03 | 0.         | 0.        |     |
| ٠  | 4.566E-01  | -1.561E+00   | -1.68303   | 0.         | n.        |     |
| 5  | 1.800E-01  | -1.5418+00   | -1.513F-03 | 0.         | 1.        |     |
| 6  | 3.066E-01  | -1.735E*00   | 2.2465-04  | 0.         | 0.        | n • |
| 7  | 3.200E-01  | -1.735E+U0   | 2.7025-04  | 0.         | 0.        | · • |
| 8  | 1.567E-01  | -1.459E+00   | 1.9225-03  | 0.         | n.        |     |
| 9  | 4.400F-01  | -1. 3991 .00 | 1.853-03   | 0.         | 0.        | 2.  |
| 10 | 3.0078-02  | -8.072E-01   | 2.0045-03  | 0.         | 0.        | n . |
| 11 | 5.100E-01  | -8.472E-01   | 2.8596-03  | 0.         | 0.        | 0.  |
| 12 | 5.799E-ul  | -3.500E-98   | 3.5965-03  | 0.         | 3.5005.01 | 0.  |

JOINT DISP(x) UISP(Y) NOTATION(2) REACT(x) REACT(Y) REALT(2)

TABLE 7 - COMPILATION TABLE

PROB (CONTU) EFFECT OF RIGIU CONNECTIONS UN TRUSS 1102

NO DATA

NO DATA

PROB (CONTU)

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TABLE & - MEMBER LUAD DATA

1102 EFFECT OF RIGIU CUNNECTIONS UN TRUSS

EAR (Y)

FORCE

EAN(Z)

HOMENT

JOINT ERRIXI

FORCE

#### TABLE 10 - JOINT EQUILIBRIUM ERRORS

PROB (CONTO) 1102 EFFECT OF RISID CONNECTIONS ON TRUSS

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AZ JULY TO . COH - HM EXAMPLE PROBLEMS FOR REPORT

#### PROB

<u>,</u>

1103 EFFECT OF RIGID CONNECTIONS AND ROLLER FREEZING ON TRUSS

TABLE 1 - PROGRAM CONTROL DATA PROBLEM TYPE 1

> INPUT TABLES TABLE HOLD DATA FROM NUMBER OF CARING NUMBER ADDED FOR THIS LAST PROBLEM 11 . YES.0 . NOT PROBLEM 2 1 -10 3 -0 1 ě, 3 1 5 ī -9 -8 -9 6 1 1 - O OUTPUT TABLES TABLE SUPPRESS OUTPUT NUMBER (1 . YES,0 . NO)

8 -9 ---Q --0 10

PROB (CONTU) 1103

NONE

JUINT

TABLE 2 - FRAME GEOMETRY DATA

EFFECT OF HIGH LUNNECTIONS AND ROLLER FREEZING UN TRUSS

HOLDING DATA FHOM THE PREVIOUS PRODLEM PLUS THE FALL WING

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1 ٥. Ô. 2.+00E+02 2.400E+02 2 2.400E+02 0. 3 \*.848E+02 2.400E+02 ÷. 4.890E+02 0. 5 \$0+3004.5 \$0+3005.T ٠ 7.200E+02 0. \$..... \$0+300+.5 \$0+3440.8 9.0096+02 0. 10 1.200E+03 2.400E+02 11 1.200E+03 0. 12 1.4+02+03 0.

COMPUTED JOINT COORDINATES

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#### PROS (CONTO)

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1103 EFFECT OF RIBID CONNECTIONS AND ROLLER FREEZING ON TRUSS

NOLDING GATA FROM THE PREVIOUS PROALEN PLUS THE FOLLOWING

And the state of the state of the same state of the

TABLE 3 - MEMBER LOCATION DATA

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.... COMPUTED MENGEN NUMBERS AGREE NITH LAST PROBLEM ....

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PROB (CONTU)

1103 EFFECT OF AIGIU CONNECTIONS AND ROLLER FREEZING ON TRUSS

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TABLE . . JOINT DATA

HOLDING DATA FHOM THE PREVIOUS PROGLEM PLUS THE FALLOWING

INPUT OF JOINT DATA

JOINT FORCE(X) FORCE(Y) MOMENT(Z) SPRING(X) SPRING(Y) SPRING(Z)

JOINT FONCE (X) FORCE (Y) MOMENT (Z) SPHING (X) SPHING (Y) SPRING (Z)

1.0002.99 -0.

1.00000+90 1.00000.99 0.

**A** •

1.0002+99 1.0002+99 0.

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ACCUMULATED JOINT DATA

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1103 LEFECT OF RIGIU CUNNECTIONS AND ROLLER FREEZING ON TRUSS

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TABLE 4 - MEMBEN STIFFAESS DATA

-2.000E.01 0. -2.000E.01 0.

-2.000E-01 0.

-1.000E.01 U.

0.

MOLDING DATA FHOM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

-1.0008\*01 0.

12 -0.

. . . . . . .

30.

7 0.

11 0.

12 0.

PAOS (CONIU)

NONE

9 0.

COMPUTED MEMOER NUMBERS, LENSTHS, AND OFFSETS

. 2.4005+02 2.4007+02 9.

0 2.400E+02 2.400F.02 0.

. 2.400E+82 2.400E+82 .

0 2.400E+02 2.4007.02 0.

• 2.400E+02 2.400E.02 8. • 3.394E+02 2.400F.02 2.400E+02

0 3.394E+02 2.408F.02 2.400E+02

0 3.394E+02 2.400F-02 -2.400E+02

0 3.394E+02 2.400F.02 -2.400E+02

0 3.394E+02 2.400F.02 -2.400E+02

2.4002.02

2.4000+02

2,4002+02

2.4002.02

2.4002+02

0 3.394E+02 2.400F.02 2.400E+02

1 . 2.400E+02 2.400E+02 0.

3 0 2.400E+02 2.400F.02 0. 0 2.400E\*02 2.400F+02 0. 0 2.400E\*02 2.400F+02 0.

2.4002+02 0.

2.4002.02 0.

2.400E+02 0.

2.4002+02 0.

0 Z.400E+02 0.

24400E+02 2.400E.92 9.

menser from to stiff load length 1-offset y-offset WIND JOINT JOINT TYPE TYPE

|    |            |            |            |            | #*2AAC*A1 |      |
|----|------------|------------|------------|------------|-----------|------|
| 2  | 3.0662-01  | ~6.460E-01 | -1.9985-03 | 0.         | ð•        | Q .  |
| 3  | -6-6732-03 | -7.259E-01 | -2.3548-03 | 0.         | ô.        | 13 a |
| 4  | 1.66662-01 | -1.174E+00 | -1.532g-03 | 0.         | ñ.        | 0.   |
| 5  | -1.334E-02 | -1,154E+00 | -1.349F-03 | ð.         | 8.        | 0.   |
| 6  | 1.0055-02  | -1.3496+00 | 2.2465-04  | 0          | 0.        | 0.   |
| 7  | 5.949E-05  | -1.349E+00 | 2,702=-04  | 0.         | fi e      | Ø s  |
| 8  | -1.3338-01 | -1.0726+00 | 1.772F-03  | 0.         | 0.        | 9.   |
| 9  | 5.3326-02  | -1.012E+00 | 1.6894-03  | 8.         | ñ.,       | Ö •  |
| to | -2.5338-01 | -5,173E-01 | 1.9327-03  | 0.         | ñ.        | 8.   |
| 11 | 2.667E-02  | -5.57ZE-01 | 2.041F-03  | 0.         | đ.        | 0.   |
| 12 | 4.8338-99  | -3,500E-98 | 2,1726-03  | -4.833E+01 | 3.500E+01 | Q •  |
|    |            |            |            |            |           |      |

|   |            |            | #2.967#-n3 | A                  | 4.5085.01 | ñ.,  |
|---|------------|------------|------------|--------------------|-----------|------|
|   | 3 06/8-41  | A A407-61  | -1 000- 01 |                    | 440405441 |      |
| ¢ | 7-005-01   | ~0.40UL=91 | -1*AA06-n1 | ¥4                 | 8•        | Q.#  |
| 3 | -6-6732-03 | -7.2598-01 | -2.3546-03 | Q                  | ô.        | 13 a |
| 4 | 10-3000.1  | -1.174E+00 | -1.5328-03 | 0.                 | ñ.        | ñ.   |
| 5 | -1.334E-02 | -1,154E+00 | -1.349F-03 | 0.                 | G .       | 0.   |
| 6 | 1.005E-02  | -1.349E+0u | 2.2464-04  | 0.                 | 0+        | 0.   |
| 7 | 5-3666-0S  | -1,349E+00 | 2,7025-04  | - <b>0</b> • • • • | ñ e       | 0 e  |
| 8 | -1-3338-01 | -1.0726+00 | 1.772r-03  | 0.                 | G +       | Q+   |
| 9 | 5.3326-02  | -1.012E+00 | 1.6896-03  | ê.                 | fi e      | Ö •  |
| Ø | -2.5336-01 | -5,173E-01 | 1.9327-03  | 0.                 | R.        | 0.   |
| 1 | 2.667E-02  | -5.5728-01 | 2.041F-03  | <b>0</b> .         | đ.        | 0.   |
| - |            |            |            |                    |           | -    |

JOINT DISP(X) UISP(Y) HUTATION(2) HEACT(X) REACT(Y) REACT(Z)

DESPLACEMENTS REACTIONS

TABLE & - JOINT DISPLACEMENTS AND DEACTIONS

PROB (CONTO) 1103 EFFECT OF RIGIU CONNECTIONS AND POLIFE POFEZING ON TOUSS

NO DATA

TABLE 7 - COMPILATION TABLE

PROB (CONTR) EFFECT OF RIGIO COMMECTIONS AND ROLLER FREEZING ON TRUSS 1103

an Chatter

HOLDING DATA FROM THE PREVIOUS PROALEM PLUS THE FALLOWING

TABLE # - MEMBER LOAD DATA

PROB (CONTU) LEFECT OF RIGIN CONNECTIONS AND ROLLER FREEZING ON TRUSS 1103

THE MAXIMUM ENULLISHIUM CHAON INTERNAL TO THE MEMBER IS 3-553E-10

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AT JOINT

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ARTAL FURCE .

SHFAR

THE MAXIMUM EUGLIGRIUM ERHOM INTEGNAL TO THE MEMORE IS 107765-10

MOMENT

LOAD TYPE

10

0.995E+00

E. 124E-03

A. 11+E-01

.

\* BETA # 1.0002+05

| SHEAR       | 8<br>5 | -!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      | $ \rightarrow $ |            |       | 6ETA     | *  | ]•0¶UL |
|-------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------|------------|-------|----------|----|--------|
|             |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TCSP | ECT TO          | THE P      | ·E481 | ER AXES  |    |        |
|             | -      | and the second sec |      |                 | <b>_</b> . |       |          |    |        |
|             | T .    | GINT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4    |                 | AT J       | ) INT | Ą        |    |        |
| ALTAL FONCE |        | -1.+98E+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | VI.  | AXTAL           | FORCE      |       | -1.497E+ | 01 |        |
| SHEAR       |        | 5+956E*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | •v 3 | SHFAR           |            |       | €.95h€-  | 03 |        |
|             |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | . 1  | MELAS BAT       |            |       | 7 28.F=  | at |        |

STIFF TYPE

ALL OUTPUT FONCES ANE WITH HESPECT TO THE MEMBER AKES

11

ALPHA .... 0.

MEMBER NUMBER 2 LOAD TYPE LENGTH # 2.400E+02 ALPHA # 1.000E+00 AFTA # GOFS FROM JOINT & TO JOINT S ALL OUTPUT FONCES ARE WITH HESPECT TO THE MENBER AND THIQL TA 4 ATTAL FONCE # -3.331E+00 TYPE 6

STIFF TYPE 1

THE MAAIMUM EQUILIBRIUM ENNUM INTERNAL TO THE MEMBER IS 3.2205-10

| 2      |       |   |            |             |   |            |
|--------|-------|---|------------|-------------|---|------------|
| A. IAL | FONCE |   | -3.3376.10 | AXTAL FURCE |   | -7.337E+00 |
| SHEAR  | ;     | 3 | 9+10BE-13  | SHFAR       |   | 9.10HE-03  |
| HOMENT |       | 8 | -7-867F-1  | MONENT      | 8 | 1.1095+00  |

AT JUINT AT JOINT 1 3

STIFF TYPE 1 MEMBER NUMBER 1 LOAD TYPE LENGTH # 2.400E+02 ALPHA # 1.000E+00 BETA . Π. GOES FROM JOINT 1 TO JOINT 3 ALL OUTPUT FORCES ANE WITH HESPECT TO THE MEMBER ANES

TABLE 4 - MEMBER RESULTS

IS REMUN REGNER

SHEAR

MOMENT

LENGTH & 2.4UUE+02

GOES FROM JOINT 11 TO JOINT 10

# 5+126E- 3

# "6-288E=01

AT JUINT

AXIAL FONCE # 9.995E+00

PROB (CONTO) 1103 EFFECT OF RIGIU CONNECTIONS AND ROLLER PREEZINT ON TRUSS

PROB (CONTD) 1103 EFFECT OF RIGIU CONNECTIONS AND ROLLER PREEZING ON TRUSS

TABLE 10 - JOINT EQUILIBRIUM ERRORS

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| J01NT | ERR (A)<br>Force | ERR (Y)<br>Force | ERR (Z)<br>MOMENT |
|-------|------------------|------------------|-------------------|
| 1     | -3.8666-97       | -1.0362-06       | ~7.7962-05        |
| 2     | 1.195E-06        | -2.1305-06       | -1.9465-05        |
| 3     | -8.504E-07       | 1.6836-06        | -3.76505          |
|       | 6.69ZE-97        | 1-4136-04        | -1.6055-04        |
| 5     | -6. 3488-97      | -1.269E-06       | -2.421F-05        |
| 6     | -1-874E-07       | 8.8296-07        | 1.5526-05         |
| Ť     | 2.0172-07        | 2.6362-96        | 2.5885-05         |
| 8     | -1.011E-06       | 1.2866-06        | 1.5665-04         |
| 9     | 1.040E-00        | -1.6315-06       | 7-4245-05         |
| 10    | -1.256E-04       | ~2.037E-06       | 1.0475-05         |
| 11    | 8-998E-97        | 7.210E-07        | 1.9415-05         |
| 12    | 3.469E-07        | -4,942E-07       | 1.7672-05         |

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82 JULY 78 - COH - HR Example problems for report

PR08 1201 THO STORY BENT WITHOUT INTERIOR COLUMN - LIVE LOAD

TABLE 1 - PROSRAM CONTROL DATA PROBLEM TYPE 1

|                 | INPUT TABLES                                       |                                              |
|-----------------|----------------------------------------------------|----------------------------------------------|
| TABLE<br>NUMBER | HOLD DATA FROM<br>Last problem<br>(] = yes+0 = HO) | NUMBER OF CARDS<br>ADDED FOR THIS<br>PROBLEN |
| . 2             | •0                                                 | 6.                                           |
| 3.              | ÷9                                                 | 7                                            |
| Ā               | -0                                                 | 2                                            |
| 5               |                                                    | 13                                           |
| 6               | · •••                                              | 10                                           |
| 7               | -0                                                 | •                                            |
|                 | OUTPUT TABLES                                      |                                              |
| TABLE           | SUPPRESS OUTPUT                                    |                                              |
| NUMBER          | (1 . YES, 0 . MO)                                  |                                              |

|    | ۰Ŷ          |
|----|-------------|
| 9  | <b>6</b> 07 |
| 10 |             |
|    |             |

TABLE 2 - FRAME GEOMETRY DATA

NUMBER OF JOINIS IN FRAME = 8 Reference Joini is Joint 1 at X = Joint Tolerance is J0000-02 θ. AND Y = 0.

#### INPUT OF JOINT OFFSETS

| FRON<br>IOINT | X=OFFSET  | Y-OFFSFT   | OT<br>Triol | 10 | to | TO | Įo | TO | TC |
|---------------|-----------|------------|-------------|----|----|----|----|----|----|
| 1             | 0.        | 2.2786.02  | 2           | 3  |    |    |    |    |    |
| 2             | 4.800E+02 | -0.        | 4           | 7  |    |    |    |    |    |
| 3             | 4.800E+12 | 10+35/E.E  | . 5         |    |    |    |    |    |    |
| 7             | 0.        | -2.760E.02 | 6           |    |    |    |    |    |    |
| 1             | 8-6006+12 | -4.8248.01 | 6           |    |    |    |    |    |    |
|               |           |            |             |    |    |    |    |    |    |

### CONPUTED JOINT COORDINATES

JOINT X

| 1 | 0.         | 0.         |
|---|------------|------------|
| 2 | 9.         | 2.278E+02  |
| 3 | 9.         | 4.5556+02  |
| 4 | 4.8002+02  | 2.278E+02  |
| 5 | 4.000E+02  | 4.886E+02  |
| 6 | 9.6002+02  | -4.8246+01 |
| 7 | 9.6002.02  | 2.2702.02  |
| 8 | 9.6002 +02 | 5.2166.02  |

.¥

| 19 | 19 <b>8</b> 9 1    | - 19 <b>2</b>   |     | 3          | • | 2.2746+02 | ۰.        | 2.2788+02   |  |
|----|--------------------|-----------------|-----|------------|---|-----------|-----------|-------------|--|
| 2  | - 2 : <b>2</b> .28 | ( C <b>.</b> -  |     | 2          |   | 2.2782+92 | 0.        | 2.2702+02   |  |
| 3  | - 김 주석한 김          | ್ಷಣ್            | - C | \$         | 0 | 2.4096+02 | 0.        | 2.4092+92   |  |
| \$ | - 5 🍎 i e          | w 19 <b>7</b> - | 4.1 | 3 .        | 0 | 2.7602+02 | ٥.        | 2.7ADE+02   |  |
| -  | <b>1</b>           | 🐔 🕷 👘           |     | ٠          | 0 | 2.9402+02 | 0.        | 2.9402.02   |  |
| 6  | 2                  | · 4             |     | <b>8</b> . | 3 | 4.8006+02 | 4.800F.02 | - <b>8.</b> |  |
| 7  | ٠                  | . 7             |     | 5          | 1 | 4.8002+02 | 4.8000.02 | °₽          |  |
|    | ۵.                 | 5               |     | 6          | å | 4.H11E+02 | 4.800F+02 | 3.3126+01   |  |
|    | 1 <b>B</b>         | 8               |     | •          | 5 | 4.8112.02 | 4.8007.02 | 3.3126+61   |  |

# COMPUTED HENDER NUMBERS, LENGTHS, AND OFFSETS

| fron<br>Joint | ST LFF<br>TYPE | LOAD<br>TYPE | OT<br>Triol | to              | 10      | TQ | To | 10 | Ŧ0 | TŮ | TO | TO |
|---------------|----------------|--------------|-------------|-----------------|---------|----|----|----|----|----|----|----|
| 1<br>4<br>6   | 123            |              | 2<br>5<br>7 | 3               |         |    |    |    |    |    |    |    |
| 7<br>3<br>2   | 6<br>5         | n daliju je  |             | <b>8</b><br>9 3 | . '<br> |    |    |    |    |    |    |    |

R-OFFSET Y-OFFSET

INPUT OF HEMBER LOCATIONS

#### NUMBER OF MEMBER STIFFNESS TYPES a 6 NUMBER OF MENBER LOAD TYPES . 2

MENGER FROM TO STIFF LOAD LENGTH

NUMB JOINT JOINT TYPE TYPE

TABLE 3 - MEMBER LOCATION DATA

PROB (CONTO) THE STORY BENT WITHOUT INTERIOR COLUMN - LIVE LOAD 1501

# STIFF HOD OF PRISHATIC PRISHATIC NO AXIS DITPUT PIN PIN TYPE ELAST PILOTO AND CARUS OFT OFT FROM TO

1

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HEGTRAINTS ARE IN MENBER DRIMED ARES

8 X

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Α....

V.040E+03 7.040E+01 -0.

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#### TABLE 4 - MEMBER STIFFESS DATA

1 2.9601.00 1.0502.03 2.8006.01 -0

2 2,900E+04 8,000E+02 2.000E+01 -0

3 2.900E.0+ 1.050E.03 2.000E.01 -0

4 2.960E+04 1.050E+03 2.800E+01 -0

\*0+

6.360E+U1 1.860E+02 3.400E+03 4.200E+01 -0.

1.060E+02 2.9+0E+02 5.000E+01 5.000E+01 -0.

2.940E+02 4.144E+02 3.400E+03 4.240E+01 -0. 4.164E+02 -0. 3.400E+03 4.240E+01 -0. -0. 4.500E+02 7.000E+03 7.000E+01 -0.

1.

6,300E+01 3.400E+03 4.200E+01 -0.

5 2,9602+04 1,8082+03 2,4082+01

a 2.900E+04-0.

0.

-0.

~0.

STIFF TYPE & CONTD FROM TO

- Q -

PROB (CONTU) 1201 TWO STORY MENT WITHOUT INTERIOR COLUMN - LIVE LOAD

#### SAME AS INPUT FOR THIS PHORLEM

#### ACCUMULATED JOINT DATA

| 1 | -0.  | ~0. | -0. | 1-0002-94 | 1.0006.99 | ~\$a      |
|---|------|-----|-----|-----------|-----------|-----------|
| 6 | -0 e | -0, | -0. | 1+0005+84 | 1.000£.99 | 1.0002.99 |

JOINT FONCE(A) FORCE(Y) MOMENT(Z) SPRING(X) SPRING(Ž) SPRING(Z)

#### INPUT OF JOINT DATA

#### TABLE & - JOINT DATA

PROB (CONTU) 1201 IND STORY GENT WITMOUT INTERIOR COLUMN - LIVE LOAD

| LOAD<br>TYPE | UNIFORM<br>QX   | oa<br>nilloum | NO<br>CARDS  | aiia<br>Tqo  |                                        |     |
|--------------|-----------------|---------------|--------------|--------------|----------------------------------------|-----|
| <b>1</b> :   | -0.             |               | 4            | <b>3</b>     |                                        |     |
| L.<br>F      | OAD TYPE<br>Rom | 1 CONTO       | 9X           |              | 12.5 Maria<br>17.5 Maria<br>19.7 Maria | • . |
| 9.66         | 0£+91 9.        | 696E+61 -0.   | •            | _1.000E+61   | -0-                                    |     |
| 1.92         | 0E.02 1.        | 920E+02 =0.   |              | -1.0002+01   | -0.                                    |     |
| 3.84         | 0E+02 3.        | 840E+02 -9.   |              | -1.000E+01   |                                        |     |
| LOAD<br>TYPE | un iform<br>ex  | uniform<br>Qy | NO<br>CARD\$ | ax 15<br>oft | · ·                                    |     |
| 2            | -0.             | ~\$.          | 4            | 3            |                                        |     |
| .6           | OAD TYPE        | 2 CONTD       |              |              |                                        |     |
| ę            | ROM             | 10            | ez           | 0Y           | 92                                     |     |
| 9.60         | 0E+01 9.        | 600E+01 -0.   |              | ~2.000E+0}   | -0,                                    |     |
| 1.92         | 0E+02 1.        | 920E+02 -0+   |              | -2.0002*01   | -0.                                    |     |
| 2.68         | 0E+02 2.        | *** 20+3088   |              | -2-0006-01   | - <b>-</b>                             |     |
| <b>₹.</b> ¶& | NE°7⊈ 3.        | 1406405 mms   |              | - 5.040£+01  | - 🖷 🔐                                  |     |

TABLE 6 - MEMBER LOAD DATA

PROS (CONTD) TWO STORY MENT WITHOUT INTERIOR COLUMN - I IVE LOAD 1201

PROS (CONTU) 1201 ING STORY GENT WITHOUT INTERIOR COLUMN . LIVE LAND

JOINT DISP(X) DISP(Y) HOTATION(Z) REACT(X) REACT(Y) REACT(Z) 

REACTIONS

| 1 | -1.0x0E-08 | 1,205E-97  | 3,1010-03  | L.090E+01  | 1.205E.02 | Ő •       |
|---|------------|------------|------------|------------|-----------|-----------|
| 2 | -3,3778-92 | -1,3126-02 | -5,9182-03 | 0.         | 9÷        | 0         |
| 3 | 7.278E-01  | -5,3906-02 | ~1.590#-02 | 9 e        | 0.        | ĝ.        |
|   | -4.341E-93 | -5,928£+00 | -7,025c-04 | 8.         | ð •       | 0.        |
| 5 | 1-114E+00  | -5,9341.00 | 3,291F-04  | 0.         | Ø.        | 0.        |
|   | 1.0405-48  | -1.195E-97 | -1.0218-96 | -1+090E+01 | 1.1958.02 | 1.0516+03 |
| 7 | 202405-02  | -3.9792-02 | 4.2916-03  | 0.         | ñ•        | 0 e       |
| 4 | 6.9178-01  | -6.477E-02 | 1.4638-02  | 0 e        | ñ •       | δ.e       |

TABLE & - JOINT DISPLACEMENTS AND DEACTIONS

PROB (CONTO) 1201 THE STURY RENT WITHOUT INTERIOR COLUMN - LIVE LOAD

DISPLACEMENTS

. .

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TABLE 7 - COMPILATION TABLE

NO DATA

PROB (CONTU) 1201 TWO STORY HEAT WITHOUT INTERIOR COLUMN - LIVE LOAD

TABLE 4 - MENNEN RESULTS

STIFF TYPE 1 MENNER NUMMER LOAD TYPE . LENGTH = 2,2788.02 ALPHA . 0. SETA # 1.000L+00 GOES FROM JOINT 1 TO JOINT 2 ALL OUTPUT FORCES ARE WITH HESPECT TO THE WENBER AXES

AT JOINT B. AT JOINT

| AXIAL FOR | Cg e | -).205E+02 | AXIAL FORCE . | -j.205E+02 |
|-----------|------|------------|---------------|------------|
| SMEAR     | 8    | -1•091E+01 | SHEAR e       | -1.091E+01 |
| HOMENT    |      | 109406-01  | HOMENT        | -7.484E+03 |

875-08

|                 | 9.5448 .4                           | and the first of a |       | ****     |      |
|-----------------|-------------------------------------|--------------------|-------|----------|------|
|                 | AN A COLOR MANAGEMENT OF MANAGEMENT |                    |       |          |      |
| THE MAXIMUM EQU | NCIERION ENHOR                      | INTERNAL TO        | THE H | EMBER 15 | s.78 |

MEMBER NUMBER 2 STIFF TYPE 1 LOAD TYPE LENGTH = 2,278E-02 ALPHA = 9, BETA GOES FROM JOINT 2 TO JOINT 3 ALL OUTPUT FORCES ARE with Respect to the member axes 9E1A @ 1.0006+00

AT JOINT AT JOINT 2 📲 at 1.13 ANIAL FORCE # -7.562E-01 ALTAL FORCE . T. SOZE+01 SHEAR B -5.040E+08 SHFAR 8 -5.440E+01 MOMENT \* \*\*\*336\* 3 MOMENT # -7.557E+03

THE MAXIMUM EQUILINGIUM ERHOR INTERNAL TO THE MEMBER IS 0.8205-00

MEMBER NUMBER 3 STIFF TYPE 2 LOAD TYPE LEGGTH # 2.609E+02 ALPHA # 0. HPTA SOES FROM JOINT & TO JOINT 5 ------ALL OUTPUT FORCES ARE WITH RESPECT TO THE HEMBER AKES

| VI 20161 0                   | AT JOINT 5                                                                                                       |
|------------------------------|------------------------------------------------------------------------------------------------------------------|
| 그는 물건을 가지 않는 것 같은 것이 있어야 한다. | and the second |
| ARIAL FORCE = -1.395E+01     | AXTAL FORCE # _1 395E+01                                                                                         |
| SHEAR . 3.740E+00            | SHFAR 0 1.74 JE+00                                                                                               |
| HOHENT # -9-757E+U2          | MUMENT # 7,95 E-08                                                                                               |

THE MAXIMUR EQUILIBRIUM ERRON INTERNAL TO THE MEMBER IS 9.392F-08

MENULER NUMBER S STIFF TYPE A LENGTH # 2.9468402 ALPHA # 0. GOES FHOM JOINT Y TO JOINT # LOAD TYPE 4714 # 1.000L+00 ALL OUTPUT FONCES ARE WITH RESPECT TO THE WENNER AKES

THE MALIFUM EQUILIBRIUM CANOR INTEGNAL TO THE MEMBER IS 1.9695-00

NONENT

|            |             |             | 영 가슴 같은 감독하는 | 2 J - T   |  |
|------------|-------------|-------------|--------------|-----------|--|
|            | AT JOINT    | 6. <b>8</b> | AT JOINT     | 1 📲 👘 👘   |  |
|            |             |             |              |           |  |
| ALLAL FONC | E # -7.042E | OL AXTAL    | FURCE .      | 7.0426+01 |  |
| SHEAR      | B 5.066E    | SHEAF       |              | 5.06nE+01 |  |
| MOMENT     | 8 -6.353E   | • 3 HOMEA   | T a          |           |  |

THE MARIMUM EQUILIBRIUM ERRON INTERNAL TO THE MEMOER IS 1.556E-V/

TABLE - MEMBER RESULTS (CUNTD)

MENNER NUMBER

SHEAR

HOMENT

**`&** 

BOES FHOM JOINT & TO JOINT 7

AT JOINT

ArlaL FORCE # =1.195E+ud

LENGTH = 2.7008+42 ALPHA = ".

# 1.091E.VI

\* -1.n22E+.3

PROS (CONTUL 1201 INO STORY RENT WITHOUT INTERIOR COLUMN - LIVE LOAD

STIFF TYPE 3

ALL OUTPUT FORCES ARE WITH HESPECT TO THE MEMBER AXES

÷.

LOAD TYPE

# 1.9AHE+03

AT JOINT

AXIAL FORCE . .1.195E+02

SHFAR # 1.091E+01

8

9614 m 1.0004+00

| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| DISTANCE         AXIAL         LATERAL         NOTATIONAL         AXIAL         SHEAR         MI           0.         -4.391E-03         -5.928E-00         -7.025E-04         3.075E+01         -0.055E+00         5.           2.400E+01         -3.048E-03         -5.915E+00         1.775E+03         3.075E+01         -0.055E+00         5.           4.800E+01         -1.708E-03         -5.915E+00         6.437E+03         3.075E+01         -0.055E+00         5.           0.600E+01         -3.049E-04         -5.718E+00         6.437E+03         3.075E+01         -0.055E+00         5.           0.600E+02         2.323E+03         -5.335E+00         3.0475E+01         -0.065E+01         4.           1.200E+02         2.323E+03         -5.335E+00         1.248E+02         3.975E+01         -1.906E+01         4.           1.400E+02         3.055E+03         -5.025E+00         1.248E+02         3.975E+01         -1.906E+01         4.           1.400E+02         3.055E+03         -5.025E+00         1.248E+02         3.975E+01         -9.006E+01         2.           1.660E+02         7.904E-03         -4.706E+00         1.667E+02         3.975E+01         -9.006E+01         2.           2.400E+02         1.038E-02<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |
| 0. $-4, 391E-03 - 5.928E \cdot 00 - 7.025E - 04 3.075E \cdot 01 - 9.065E \cdot 00 5 2.400E \cdot 01 - 3.048E - 03 - 5.015E \cdot 00 1.775E \cdot 03 3.075E \cdot 01 - 9.065E \cdot 00 6 4.800E \cdot 01 - 1.708E - 03 - 5.043E \cdot 00 4.155E - 03 3.075E \cdot 01 - 9.065E \cdot 00 4 9.000E \cdot 01 - 3.629E \cdot 04 - 5.535E \cdot 00 8.621E - 03 3.075E \cdot 01 - 9.065E \cdot 00 4 9.000E \cdot 01 - 799E - 04 - 5.535E \cdot 00 8.621E - 03 3.075E \cdot 01 - 9.065E \cdot 00 4 1.200E \cdot 02 2.323E - 03 - 5.303E \cdot 00 1.065E - 02 3.075E \cdot 01 - 9.065E \cdot 01 4 1.400E \cdot 02 3.065E - 03 - 5.035E \cdot 00 1.248E - 02 3.075E \cdot 01 - 9.06E \cdot 01 3 1.688E \cdot 02 5.008E - 03 - 4.706E \cdot 00 1.248E - 02 3.075E \cdot 01 - 9.00E \cdot 01 3 1.688E \cdot 02 5.008E - 03 - 4.706E \cdot 00 1.551E - 02 3.075E \cdot 01 - 9.00E \cdot 01 3 1.690E \cdot 02 7.594E - 03 - 3.054E \cdot 00 1.657E - 02 3.075E \cdot 01 - 9.00E \cdot 01 2 2.400E \cdot 02 9.037E - 03 - 3.558E \cdot 00 1.657E - 02 3.075E \cdot 01 - 2.906E \cdot 01 2 2.400E \cdot 02 1.038E - 03 - 3.558E \cdot 00 1.667E - 02 3.075E \cdot 01 - 2.906E \cdot 01 2 3.025E \cdot 02 1.038E - 03 - 3.558E \cdot 00 1.803E - 02 3.075E \cdot 01 - 3.906E \cdot 01 2 3.025E \cdot 02 1.038E - 02 - 3.126E \cdot 00 1.803E - 02 3.075E \cdot 01 - 3.906E \cdot 01 2 3.025E \cdot 02 1.038E - 02 - 3.258E \cdot 00 1.803E - 02 3.075E \cdot 01 - 3.906E \cdot 01 1 3.120E \cdot 02 1.308E - 02 - 3.258E \cdot 00 1.803E - 02 3.075E \cdot 01 - 3.906E \cdot 01 1 3.120E \cdot 02 1.308E - 02 - 2.558E \cdot 00 1.803E - 02 3.075E \cdot 01 - 3.906E \cdot 01 1 3.120E \cdot 02 1.308E - 02 - 2.558E \cdot 00 1.803E - 02 3.075E \cdot 01 - 3.906E \cdot 01 1 3.306E \cdot 02 1.575E - 02 - 1.826E \cdot 00 1.758E - 02 3.075E \cdot 01 - 3.906E \cdot 01 - 1 3.600E \cdot 02 1.575E - 02 - 1.637E \cdot 00 1.558E - 02 3.075E \cdot 01 - 3.906E \cdot 01 - 1 3.600E \cdot 02 1.575E - 02 - 1.637E \cdot 00 1.558E - 02 3.075E \cdot 01 - 3.906E \cdot 01 - 1 3.600E \cdot 02 1.575E - 02 - 1.637E \cdot 00 1.558E - 02 3.075E \cdot 01 - 3.906E \cdot 01 - 1 3.600E \cdot 02 1.575E - 02 - 1.637E \cdot 00 1.558E - 02 3.075E \cdot 01 - 3.906E \cdot 01 - 1 3.600E \cdot 02 1.575E - 02 - 1.637E \cdot 00 1.558E - 02 3.075E \cdot 01 - 3.906E \cdot 01 - 1 3.600E \cdot 02 1.575E - 02 - 1.637E \cdot 00 1.558E - 02 3.075E \cdot 01 - 3.906E \cdot 01 - 2 3.605E \cdot 02 1.575E - 02 - 1.637E \cdot 00 1.558E - 02 3.075E \cdot 0$ | MENT    |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 610E+6  |
| 4.8562+01 -1.706E=03 -5.843E+80 4.155E=03 3.475E+01 -0.065E+00 5<br>7.200E+01 -1.829E+06 -5.716E+00 6.437E+03 3.475E+01 -0.065E+00 4<br>1.200E+02 2.323E+03 -5.352E+00 1.437E+03 3.475E+01 -1.406E+01 4<br>1.400E+02 3.465E+03 -5.025E+00 1.268E+02 3.475E+01 -1.406E+01 4<br>1.400E+02 5.008E+03 -5.025E+00 1.410E+02 3.475E+01 -1.406E+01 3<br>1.600E+02 5.008E+03 -4.706E+00 1.410E+02 3.475E+01 -1.406E+01 3<br>1.600E+02 5.008E+03 -4.766E+00 1.451E+02 3.475E+01 -1.406E+01 3<br>1.600E+02 7.594E+03 -3.558E+00 1.551E+02 3.475E+01 -2.406E+01 2<br>2.400E+02 9.037E+03 -3.558E+00 1.551E+02 3.475E+01 -2.406E+01 2<br>2.400E+02 9.037E+03 -3.558E+00 1.667E+02 3.475E+01 -2.906E+01 1<br>2.400E+02 1.038E+02 -3.126E+00 1.803E+02 3.475E+01 -2.906E+01 1<br>3.120E+02 1.038E+02 -3.126E+00 1.803E+02 3.475E+01 -2.906E+01 1<br>3.120E+02 1.308E+02 -3.254E+00 1.803E+02 3.475E+01 -2.906E+01 1<br>3.120E+02 1.308E+02 -1.626E+00 1.803E+02 3.475E+01 -3.406E+01 -1<br>3.306E+02 1.575E+02 -1.417E+00 1.650E+02 3.475E+01 -3.406E+01 -1<br>3.600E+02 1.575E+02 -1.417E+00 1.550E+02 3.475E+01 -3.406E+01 -1<br>3.600E+02 1.575E+02 -1.417E+00 1.550E+02 3.475E+01 -3.406E+01 -1<br>3.600E+02 1.755E+02 -1.417E+00 1.550E+02 3.475E+01 -3.406E+01 -1<br>3.600E+02 1.775E+02 -1.417E+00 1.550E+02 3.475E+01 -3.406E+01 -1<br>3.600E+02 1.775E+02 -1.417E+00 1.550E+02 3.475E+01 -3.406E+01 -1<br>3.600E+02 1.775E+02 -1.417E+00 1.555E+02 3.4075E+01 -3.406E+01 -1<br>3.600                                                                                                                                                                                                                                                                                                                                          | 302E+(  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 175E+4  |
| 9.600E+01 9.799E+04 -5.535E+00 8.621E+03 3.975E+01 -1.406E+01 4<br>1.200E+02 2.323E+03 -5.335E+00 1.045E+02 3.975E+01 -1.906E+01 4<br>1.440E+02 3.655E+03 -5.025E+00 1.248E+02 3.975E+01 -1.906E+01 3<br>1.660E+02 5.004E+03 -4.706E+09 1.440E+02 3.975E+01 -1.906E+01 3<br>1.920E+02 6.351E+03 -4.706E+09 1.451E+02 3.975E+01 -2.906E+01 2<br>2.160E+02 7.594E+03 -3.964E+09 1.651E+02 3.975E+01 -2.906E+01 2<br>2.400E+02 9.037E+03 -3.553E+00 1.551E+02 3.975E+01 -2.906E+01 2<br>2.400E+02 1.036E+02 -3.553E+00 1.803E+02 3.975E+01 -2.906E+01 2<br>2.400E+02 1.036E+02 -3.254E+00 1.803E+02 3.975E+01 -3.906E+01 1<br>3.120E+02 1.306E+02 -2.254E+00 1.842E+02 3.975E+01 -3.906E+01 -1<br>3.300E+02 1.365E+02 -1.826E+00 3.759E+02 3.975E+01 -3.906E+01 -1<br>3.300E+02 1.575E+02 -1.826E+00 3.759E+02 3.975E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.417E+00 1.650E+02 3.975E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.437E+00 1.5550E+02 3.975E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.437E+00 1.5550E+02 3.975E+01 -3.906E+01 -1<br>3.600E+02 1.90E+02 -1.937E+00 1.5550E+02 3.975E+01 -3.906E+01 -1<br>3.600E+02 1.975E+02 -1.937E+00 1.5550E+02 3.975E+01 -3.906E+01 -2<br>3.600E+02 1.975E+02 -1.937E+00 1.5550E+02 3.975E+01 -3.906E+01 -2<br>3.600E+02 1.975E+02 -1.937E+00 0.5550E+02 3.975E+01 -3.906E+01 -2<br>3.600E+02 1.900E+02 -1.937E+000 3.5550E+00 -3.905E+01 -3.906E+01 -2<br>3.600E+02 1.900E+02 -2.935E+001 -3.905E+01 -3.906E+01 -3.906E+01 -3.906E+01 -3.906E+01 -3.906E+01 -3.906E+01 -3.906E+01 -3.906E+                                                                                                                                                                                                                                                                                                                                              | 957E+   |
| 1.200E+02 2.323E-03 -5.303E+00 1.005E-02 3.075E+01 -1.006E+01 4<br>1.440E+02 3.065E+03 -5.025E+00 1.248E+02 3.075E+01 -1.006E+01 3<br>1.60E+02 5.004E+03 -3.025E+00 1.410E+02 3.075E+01 -1.006E+01 3<br>1.920E+02 6.351E+03 -3.064E+00 1.551E+02 3.075E+01 -2.906E+01 2<br>2.160E+02 7.094E+03 -3.064E+00 1.551E+02 3.075E+01 -2.906E+01 2<br>2.400E+02 9.037E+03 -3.553E+00 1.551E+02 3.075E+01 -2.906E+01 2<br>2.600E+02 1.038E+02 -3.126E+60 1.667E+02 3.075E+01 -2.906E+01 1<br>2.660E+02 1.038E+02 -3.126E+60 1.803E+02 3.075E+01 -2.906E+01 8<br>2.680E+02 1.038E+02 -3.126E+60 1.803E+02 3.075E+01 -2.906E+01 8<br>3.120E+02 1.308E+02 -1.626E+00 1.804E+02 3.075E+01 -3.406E+01 -8<br>3.260E+02 1.041E+02 -1.626E+00 1.758E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.417E+08 1.650E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.417E+08 1.650E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.437E+00 1.550E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.795E+02 -1.437E+00 1.550E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.795E+02 -1.437E+00 1.550E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.795E+02 -1.037E+00 1.555E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.795E+02 -1.437E+00 1.555E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.795E+02 -1.037E+00 1.555E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.795E+02 -1.037E+000 1.555E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.795E+00 -1 -3.906E+01 -1<br>3.600E+02 1.795E+00 -1.555E+000 1.555E+000 -1.555E+000 -1.555                                                                                                                                                                                                                                                                                                                                              | TADE+   |
| 1+440E+02 3,665E+03 -5.025E+00 1.288E+02 3,975E+01 -1.906E+01 3<br>1+680E+02 5.008E+03 -4.706E+09 1.410E+02 3.975E+01 -1.908E+01 3<br>1.920E+02 6.351E+03 -4.706E+09 1.551E+02 3.975E+01 -2.906E+01 2<br>2.160E+02 7.594E+03 -3.964E+09 1.651E+02 3.975E+01 -2.906E+01 2<br>2.400E+02 9.037E+03 -3.553E+00 1.751E+02 3.975E+01 -2.906E+01 1<br>2.640E+02 1.038E+02 -3.126E+00 1.803E+02 3.975E+01 -2.906E+01 1<br>2.640E+02 1.038E+02 -3.126E+00 1.803E+02 3.975E+01 -3.906E+01 1<br>3.120E+02 1.306E+02 -2.254E+00 1.824E+02 3.975E+01 -3.906E+01 -1<br>3.360E+02 1.441E+02 -1.626E+00 3.759E+02 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.575E+02 -1.637E+00 1.650E+02 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.575E+02 -1.637E+00 1.555E+02 3.975E+01 -3.906E+01 -2<br>3.640E+02 1.795E+02 -1.937E+00 1.555E+02 3.975E+01 -3.906E+01 -2<br>3.640E+02 1.795E+02 -1.637E+00 1.555E+02 3.975E+01 -3.906E+01 -2<br>3.640E+02 1.795E+02 -1.637E+00 1.555E+02 3.975E+01 -3.905E+01 -3.906E+01 -2<br>3.640E+02 1.795E+02 -1.937E+00 1.555E+02 3.975E+01 -3.906E+01 -3.906E+01 -3<br>3.640E+02 1.795E+02 -1.937E+00 1.555E+02 3.975E+01 -3.905E+01 -3.906E+01 -3.905E+01                                                                                                                                                                                                                                                                                                                                                   | 282E+   |
| 1.6688£*02 5.002E=03 -4.706E*00 1.410E=02 3.075E*01 -j.906E*01 3<br>1.920E*02 6.351E=03 -4.356E*00 1.551E*02 3.075E*01 -2.906E*01 2<br>2.160E*02 7.594E=03 -3.964E*00 1.651E*02 3.075E*01 -2.906E*01 2<br>2.400E*02 9.037E=03 -3.553E*00 1.751E*02 3.075E*01 -2.906E*01 1<br>2.640E*02 1.038E=02 -3.2552E*00 1.803E*02 3.075E*01 -7.906E*01 1<br>3.120E*02 1.306E=02 -2.254E*00 1.804E*02 3.075E*01 -3.906E*01 1<br>3.120E*02 1.306E=02 -2.254E*00 1.804E*02 3.075E*01 -3.906E*01 -1<br>3.300E*02 1.441E=02 -1.826E*00 1.759E=02 3.075E*01 -3.906E*01 -1<br>3.640E*02 1.575E=02 -1.417E*00 1.550E*02 3.075E*01 -3.906E*01 -1<br>3.640E*02 1.575E=02 -1.037E=00 1.550E*02 3.075E*01 -3.906E*01 -1<br>3.640E*02 1.709E=02 -1.037E=00 1.550E*02 3.075E*01 -3.906E*01 -1<br>3.640E*02 1.709E=02 -1.037E=00 1.550E*02 3.075E*01 -3.906E*01 -1<br>3.640E*02 1.709E=02 -1.037E=00 1.555E*02 3.075E*01 -3.906E*01 -2<br>3.655E*01 -3.905E*01 -3.90                                                                                                                                                                                                                                                                                                                                                          | 825E+   |
| 1.9206-02 6.351E-03 -0.359E-00 1.551E-02 3.975E-01 -2.906E+01 2<br>2.160E-02 7.594E-03 -3.964E-09 1.667E-02 3.975E-01 -2.906E+01 2<br>2.40E-02 9.037E-03 -3.553E-00 1.751E-02 3.975E-01 -2.906E+01 1<br>2.640E+02 1.038E-02 -3.126E+60 1.803E-02 3.975E+01 -2.906E+01 8<br>2.680E+02 1.37E-03 -2.690E+00 1.842E-02 3.975E+01 -3.406E+01 -3<br>3.120E-02 1.306E-02 -2.254E+00 1.804E-02 3.975E+01 -3.406E+01 -1<br>3.400E+02 1.641E-02 -1.626E+00 1.750E-02 3.975E+01 -3.906E+01 -1<br>3.600E+02 1.575E-02 -2.417E+06 1.650E-02 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.575E-02 -1.417E+06 1.650E-02 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.575E-02 -1.417E+06 1.650E-02 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.795E-01 -1.937E+00 1.505E-02 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.795E-02 -1.417E+00 1.505E-02 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.795E-02 -1.437E+00 1.505E-02 3.975E+01 -3.906E+01                                                                                                                                                                                                                                                                                                                                                                                | TATE A  |
| 2.160E+02 7.694E-03 -3.964E+09 1.667E+92 3.975E+01 -2.906E+01 2<br>2.400E+02 9.037E-03 -3.553E+00 1.751E-92 3.975E+01 -2.906E+01 8<br>2.600E+02 1.038E-82 -3.126E+00 1.803E-02 3.975E+01 -2.906E+01 8<br>2.680E+02 1.038E-82 -3.126E+00 1.803E-02 3.975E+01 -2.906E+01 1<br>3.120E+02 1.306E-02 -2.254E+00 1.808E+02 3.975E+01 -3.406E+01 1<br>3.160E+02 1.441E-82 -1.826E+08 1.758E-82 3.975E+01 -3.906E+01 -1<br>3.600E+02 1.575E-82 -1.417E+00 1.508E-82 3.975E+01 -3.906E+01 -1<br>3.640E+02 1.575E-82 -1.437E+00 1.558E-82 3.975E+01 -3.906E+01 -2<br>3.640E+02 1.795E-82 -1.937E+00 1.558E-82 3.975E+01 -3.906E+01 -2<br>3.640E+02 1.795E-82 -3.975E+00 1.758E-82 3.975E+01 -3.906E+01 -3.905E+01 -3.905E+01 -3.905E+01 -3.905E+01 -3.905E+01 -3.905E+01 -3.905E+000 -3.905E+01 -3.9                                                                                                                                                                                                                                                                                                                                                  | GAGE +  |
| 2.400E+02 9.037E+03 -3.553E+00 1.751E+02 3.075E+01 -2.906E+01 1<br>2.640E+02 1.038E+02 -3.126E+06 1.803E+02 3.075E+01 -2.906E+01 8<br>2.880E+02 1.172E+02 -2.690E+00 1.824E+02 3.075E+01 -3.406E+01 1<br>3.120E+02 1.306E+02 -2.254E+00 1.804E+02 3.075E+01 -3.906E+01 -8<br>3.360E+02 1.441E+02 -1.826E+00 1.759E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.417E+00 1.650E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.417E+00 1.554E+02 3.075E+01 -3.906E+01 -1<br>3.600E+02 1.575E+02 -1.437E+00 1.554E+02 3.075E+01 -3.906E+01 -3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 212E+   |
| 2.640E+02 1.038E-82 -3.126E+60 1.803E-02 3.475E+01 -2.906E+01 8<br>2.680E+02 1.172E-92 -2.690E+00 1.824E-02 3.475E+01 -3.406E+01 1<br>3.120E+02 1.306E-02 -2.254E+00 3.808E+02 3.475E+01 -3.906E+01 -8<br>3.360E+02 1.441E-02 -1.826E+08 1.750E-02 3.475E+01 -3.906E+01 -1<br>3.600E+02 1.575E-02 -1.417E+06 1.650E-02 3.475E+01 -3.906E+01 -1<br>3.640E+02 1.575E-02 -1.417E+06 1.550E-02 3.475E+01 -3.906E+01 -3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |
| 2.8802*62 1.172E-02 ~2.690E*60 1.824E=02 3.073E*61 -3.406E*61 1<br>3.120E*62 1.306E=62 -2.254E*60 1.824E=62 3.073E*61 -3.906E*61 1<br>3.3060E*62 1.441E-02 -1.826E*60 1.758E*02 3.073E*61 -3.906E*61 -1.<br>3.600E*62 1.575E-62 -1.417E*66 1.650E=62 3.073E*61 -3.906E*61 -3.<br>1.846E*62 1.709E-62 -1.037E*66 1.59E=62 3.073E*61 -3.406E*61 -3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 167E+4  |
| 3120E002 1.306E-02 -2.254E00 1.808E-02 3.975E01 -3.906E01 -8.<br>3.360E02 1.306E-02 -1.826E000 1.759E-02 3.075E01 -3.906E01 -1.<br>3.600E02 1.575E-02 -1.417E00 1.650E-02 3.075E01 -3.906E01 -3.<br>1.840E02 1.579E-02 -1.037E000 1.598E-02 3.075E01 -4.406E01 -3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1075 +1 |
| 3.360E+02 1.441E-02 -1.026E+00 1.750E-02 3.075E+01 -3.906E+01 -1.<br>3.600E+02 1.575E-02 -1.417E+00 1.650E-02 3.075E+01 -3.906E+01 -2.<br>3.640E+02 1.709E-02 -1.037E+00 1.508E-02 3.075E+01 -4.406E+01 -3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1445+6  |
| 3.600E*02 1.575E-02 -1.417E*00 1.650E*02 3.475E*01 -3.406E*01 -2.<br>3.640E*02 1.779E-02 -1.937E*00 1.508E*02 3.475E*01 -4.406E*01 -3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TEAFAS  |
| 3.840E+42 1.709E-02 -1.037E+00 1.508E-02 3.075E+01 -4.406E+01 -3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 403540  |
| JUDANCIAN VALANCAN MAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 691F-1  |
| A ANAFANZ I MAAF AT A ATIS AT 1 3185002 3 DEFENS AL 9065401 AL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 9.95.40 |
| • (JAPE-VE 1) 9706 - 3 - 4 - 400F-41 3 - 415E-42 3 4473E-41 - 61705E-44 - 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | GOAFAU  |
| **************************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 144540  |
| **************************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 341640  |

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THE MAXIMUM EQUILIBRIUP LEROR INTERNAL TO THE MEMBER IS 3.8455-07

DISPLACEMENTS FORCES OISTANCE LATERAL GOTATIONAL SHEAR MONENT AXIAL ANTAL -3.377E-02 -3.312E-02 -5.910E-03 4.349E+01 4.490E+01 -7.316E+03 2.400E+01 -3,230E-62 -4.127E-01 -8.971E-03 4.349E+01 4.490E+01 -4.239E+03 4.800E+01 -3.004E-02 -4.897E-01 -1.154E-02 4.349E+01 4.490E+01 -3.161E+03 7.200E+01 -2.937E-02 -7.665E-03 -1.302E-02 4.349E+01 4.490E+01 -4.004E+03 9.600E+01 -2.790E-02 -1.109E+00 -1.522E+02 4.349E+01 3.990E+01 -3.006E+03 1.2002-02 -2.443E-02 -1.4892+00 -1.458E-02 4.349E+01 3.490E+01 -2.158E+03 1.440E+92 -2.496E-02 -1.893E+00 -1.717E-02 4.349E+01 3.490E+03 -1.331E+03 1.680E+02 -2.349E-02 -2.311E+00 -1.754E-02 4.349E+01 1.920E+02 -2.202E+02 -2.734E+00 -1.762E-02 4.349E+01 2.160E+02 -2.055E-02 -3.153E+00 -1.733E-02 4.349E+01 3.4902-01 -4.9362-02 2.9902+01 3.439E.0Z 7.490E\*01 9.414E+02 2.4002-02 -1.9082-02 -3.5522-00 -1.6752-02 4.3492-01 2.4002-02 -1.9082-02 -3.5522-00 -1.6772-02 4.3492-01 2.8002-02 -1.7612-02 -3.9562+00 -1.63942-02 4.3492-01 3.1202-02 -1.4402-02 -4.3262-00 -1.6392-02 4.3492-01 3.1202-02 -1.4402-02 -4.6672+00 -1.3332-02 4.3492-01 2-4902-01 1-5392+03 2.4902+01 2.1362+03 1.990E+01 2.734E+03 1.490E+01 3.091E+03 3,300E+02 -1.321E-02 -4.974E+00 -1.206E-02 4.349E+01 1.490E+01 3.449E+03 3.609E+02 -1.174E-02 -5.244E+00 -1.042E-02 4.349E+01 1.490E+01 3.806E+03 3.840E+02 -1.027E-02 -5.473E+00 -8.629E-03 4.349E+01 0.696E+00 4.164E+03 4.080E+02 -8.799E-03 -5.657E+00 -6.726E-03 4.349E+01 4.696E+00 4.281E+03

4.320E+02 -7.329E-03 -5.798E+09 -4.771E-03 4.349E+01 4.896E+00 4.349E+03 4.560E+02 -5.860E-03 -5.886E+00 -2.763E-03 4.349E+01 4.896E+00 4.536E+03 4.80E+02 -4.391E-03 -5.928E+08 -7.025E-04 4.349E+01 4.896E+00 4.634E+03

THE MARINUM EQUILIBRIUM ENROR INTERNAL TO THE MEMBER IS 3-200E-07

LOAD TYPE

Ĩ.

LENGTH & 4.800E+02 ALPHA & 1.000E+00 BETA & 0. ODES FROM JOINT & TO JOINT & OUTPUT DISTANCES ARE FOM JOINT & ALONG THE MEMBER AXIS ALL OUTPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AXES

TABLE . - HEMBER RESULTS (CONTD)

PROB (CONTO) 1201 TWO STORY BENT WINOUT INTERIOR COLUMN - LIVE LOAD

STIFF TYPE S

NEMBER NUMBER

#### TABLE 9 - MENBER RESULTS (CONTO)

7

GOES FROM JOINT & TO JOINT 7 OUTPUT DISTANCES ANE FROM JOINT 6

LENGTH # 4,800E+02 ALPHA # 1,000E+00

MEMBER NUMBER

PROB (CONTO) 1201 TWO STORY BENT #17MOUT INTERIOR COLUMN - LIVE LOAD

STIFF TYPE 5

ALL OUIPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AXES

PROB (CONTD) 1201 THO STORY BENT WITHOUT INTERIOR COLUMN - LIVE LOAD

TABLE 9 - MEMBER RESULTS (CONTO)

MEMBER NUMBER & STIFF TYPE 6 LOAD TYPE 2 LENGTH = 4.6112.02 ALPMA = 9.976E-01 BETA = 6.884E-02 SOES FROM JOINT 3 TO JOINT S OUTOUT DISTANCES ARE FROM JOINT 3 ALONG THE STOUCTURE X-AXSS ALL OUTPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AXES

|             |           | DISPLACEMEN | îs          | FORCES      |            |             |
|-------------|-----------|-------------|-------------|-------------|------------|-------------|
| DISTANCE    | AXIAL     | LATERAL     | ROTATIONAL  | AXTAL       | SHEAR      | MOMENT      |
| Q.,         | 7,2232-01 | -1.039E-01  | -1.5902-02  | -5.9472-01  | 7.170E.01  | -7.556E.#3  |
| 2.4052*81   | 7.216E-01 | -4.947E-01  | -1.658E-02  | -5.9472*01  | 7.1702.01  | -5-8312+03  |
| 4.800E+01   | 7.207E-01 | -9.020g-01  | -1.728E-02  | -5.947E+01  | 7.170E+01  | -4.1062.03  |
| 7.200E+01   | 7.196E-01 | -1.326E+00  | -1.7968-02  | -5.947E+01  | 7.170E+01  | -2,381E.03  |
| 9.606E+01   | 7.184E-01 | -1.763E+00  | -1.832E-02  | -5.878F+01  | A-1728+01  | -6.564E+02  |
| 1.2885+02   | 7.173E-01 | -2.205E+00  | -1.833E-02  | -5. A09E+01 | 9.175E+01  | 5.885E.02   |
| 1.4402+02   | 7.162E-01 | -2.6432+00  | -1.8048-02  | -5-809E+91  | 4.175E+01  | 1.833E+03   |
| 1.680E+02   | 7.151E-01 | -3.070E+00  | -1.746E-02  | -5.848F+01  | 5.175E+01  | 3.078E+03   |
| 1.920E+02   | 7-140E-01 | -3.461E+00  | -1.665E-02  | -5.740F*01  | A.177E+01  | 4.373E+03   |
| 2.160E+0Z   | 7.131E-01 | -3.872E+00  | -1-588E-02  | -5.4715+01  | 3.186F+01  | 5.088E+03   |
| 2.400E+02   | 7.121E-01 | -4.244E+00  | -1-499E-02  | -5.471E+01  | 1.180F+01  | 5-853E+93   |
| 2.640E+62   | 7.112E-01 | -4.393E.00  | -1-398E+02  | -5.4715+01  | 1.180F+01  | 6.618E+93   |
| 2.8866+02   | 7.103E-01 | -4.915E+00  | -1.284E-02  | -5.442F+81  | 2.1825+01  | 7.383E+03   |
| 3.120E+02   | 7.093E-01 | -5.205E+00  | -1-1197-02  | -5.534F+01  | 1.1847+41  | 7.648E+03   |
| 3.3665+02   | 7.082E-01 | -5.452E.40  | -9.3185-03  | -5.534F+01  | 1.1845+91  | 7.953E+03   |
| 3.604F+02   | 7.071E-01 | -5-653F+00  | -7.3837-03  | -5-5345+81  | 1.184F+01  | 8.238F.U.3  |
| 3.8405+02   | 7.0618-01 | -5-8075.00  | -5-380F-03  | -5.4456+01  | 1.864.+00  | 8-5227-03   |
| A. 886F+62  | 7.0505-01 | -5. 912F+00 | -1. 366F-03 | -5 3045+61  | -8-1105+44 | 8.327E.43   |
| A-170F+02   | 7-040E-01 | -5.9715.00  | -1-4076-03  | -5.3045+81  | -8.1105+00 | 8.1 32E. 03 |
| A. 5405002  | 7.0328-01 | -5.9955.480 | -A. 769F-04 | -6.3945+01  | -8.1105+00 | 7.937F.03   |
| A. SASEA 62 | 7.025F-01 | -5.9967.00  | 1.2916-04   | -5.3045+81  |            | 7.742F.03   |
|             |           |             |             |             |            |             |

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMAER IS 1.2832-06

PROB (CONTO)

1201 INO STORY BEAT WITHOUT INTERIOR COLUMN - LIVE LOAD

TABLE 9 - MEMBER RESULTS (CONTD)

MEMBER NUMBER 9 STIFF TYPE 6 LOAD TYPE 9 LENGTH # 4.811E+02 ALPHA # 9.976E+01 BETA # 6.684E+02 GDES FROM JOINT 5 TO JOINT 8 Outout Distances are from JOINT 5 along the structure x-axis All Output Forces and Displacement« are with respect to the member axes Ô

209

|            | ł         | DISPLACEMEN | TS         |             | FORCES       |            |
|------------|-----------|-------------|------------|-------------|--------------|------------|
| DISTANCE   | AXIAL     | LATERAL     | ROTATIONAL | ANTAL       | SHEAR        | MOMENT     |
| 0          | 7.025E-01 | -5.9962.00  | 3.2418-04  | -5-1398-01  | 6.0672+00    | 7.742E.03  |
| 2.400E*01  | 7.019E-01 | -5.979E+00  | 1.1338-03  | -9-119E+01  | 6.067E.00    | 7.888E+03  |
| 4.800E*01  | 7.0118-01 | -5.9396.00  | 2.2528-03  | -5.1198+01  | 6.067E.00    | 8 .034E+03 |
| 7.200E+01  | 7.002E-01 | -5.8656+00  | 3.9858-03  | -5.1198+01  | 6+067E+00    | 8-180E+03  |
| 9.600E+01  | 6,992E-01 | -8.746E+00  | 5.9586-03  | -5-050E+01  | -3.9092+00   | 8.326E+03  |
| 50+3005+1  | 6.982E-01 | -5.579E+00  | 7.908E-03  | -4.9818+01  | -1 .389E .01 | 7.992E+03  |
| 1.440E*04  | 6.9728-01 | -5.364E+00  | 9.778E-03  | -4.9#1E+01  | -1.3896+01   | 7.658E.03  |
| 1.680E+0Z  | 6.9638-01 | -5-109E+00  | 1.157E-02  | -4.981E+01  | -1.3892.01   | 7.324E+03  |
| 1.9202+02  | 6.954E-01 | -*.811E+00  | 1.3145-02  | -4.917E+01  | -2+3862+01   | 6-990E+03  |
| 2.160E+02  | 6.946E-01 | -4.481E+00  | 1.421E-02  | -4.844E+01  | -3.384E+01   | 0.176E.03  |
| 2.4006+02  | 6.938E-01 | -4.128E+00  | 1.515E-02  | -4.844E+01  | -3.384E+U1   | 5.362E+03  |
| 2.6406.02  | 6.930E-01 | -3.754E+00  | 1.5962-02  | -4. A44E+01 | -3,3842+01   | 4.5482.03  |
| 2.8802+02  | 6.922E-01 | -3.301E+00  | 1.663E-02  | -4.775E+01  | -4.3812.01   | 3.734E+03  |
| 3.120E+92  | 6.913E-01 | -2.953E+00  | 1.730E-02  | -4.7965+01  | -9.379E+01   | 2.440E+93  |
| 3.3602+02  | 6.904E-01 | -2.531E+08  | 1.7738-02  | -4.7062-01  | -5.379E+01   | 1.145E+03  |
| 3.6002+02  | 8.895E-01 | -2.102E+00  | 1.7858-02  | -4. 706E+01 | -5. 379E+01  | -1.486E+02 |
| 3.840E+02  | 6.886E-n1 | -1.675E+00  | 1.7668-02  | -4.477+01   | -A.377E+01   | -1.443E+03 |
| 4.080E+02  | 6.077E-01 | -1.250E+00  | 1.7108-02  | -4, 548E+01 | -7.374E+U1   | -3.217E+#3 |
| \$.320E+02 | 6,009E-01 | -6.545E-01  | 1.624E-02  | -4.4486+01  | -7.374E+01   | -4.991E+03 |
| 4-560E 02  | 6.862E-01 | -4.737E-01  | 1.5428-02  | *4.548E*01  | -7.374E+01   | -6.765E+03 |
| 4.800E.0Z  | 6.856E-01 | -1.122E-01  | 1.4036-02  | -4.548E+01  | -7-374E-01   | -8.539E.03 |

THE MAXIMUM EQUILIBRIUM ENROR INTERNAL TO THE MEMBER IS 1.175E-06

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PROB (CONTO) 1201 TW TWO STORY BENT WITHOUT INTERIOR COLUMN - LIVE LOAD

ERR(Z) HOMENT

TABLE 10 - JOINT EQUILIBRIUM ERRORS

ERR (Y)

FORCE

1 -1.704E-03 1.801E-10 1.940E-01 2 -6.796E-03 -3.890E-03 2.284E-01 3 8.500E-03 1.546E-09 9.680E-01 4 1.461E-04 8.432E-03 1.182E-01 5 -1.461E-04 1.691E-07 -5.221E-00 6 1.744E-03 1.764E-10 -2.351E-01 7 6.211E-03 -4.541E-03 -3.088E-01 4 -7.915E-03 1.055E-08 -1.1645.68

# -7.915E-03 1.055E-08 -1,164E+00

JOINT ERR(X) FORCE

3

210

TAPLE HOLD DATA FROM NUMBER OF CARDS NUMBER LAST PROBLEM 3

# ADDED FOR THIS

| 5<br>6<br>7  | 1<br>1<br>-9                        | t a da i<br>i |  |
|--------------|-------------------------------------|---------------|--|
|              | OUTPUT TABLES                       | N., 1941      |  |
| TABLE NUMBER | SUPPRESS OUTPUT<br>(1 = YES.e = NO) | etan ji ji    |  |

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•5

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| 3 |         | 1                | ,<br>, | aren dia 🛓 |
|---|---------|------------------|--------|------------|
|   |         | 1                | 9      |            |
| 7 |         | 1<br>-9          |        |            |
|   |         |                  |        |            |
|   | OU      | PUT TAB          | £3.    |            |
|   | 12 12 2 | <u> 1995 - 1</u> | 1000   | 1 + 16D (  |

| 10 | # YES | • Q · W | NO) |                | PROBLEM            |
|----|-------|---------|-----|----------------|--------------------|
|    |       | 1       | 2   |                | St. 16-3, 24 🙎     |
|    |       | ž.      | .<  | с <sup>4</sup> | i a tekto g Pa 💆   |
|    |       | ĩ       |     | - 5            | - 1                |
|    |       | 8       |     |                | ta ka ka ji ka 🖕 👘 |
|    |       | 1       |     |                | 0                  |
|    |       | +9      |     |                |                    |

| indal | TABLES |  |
|-------|--------|--|
|       |        |  |

PROBLEM TYPE 2

4

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PROB 1202

TABLE 1 - PROGRAM CONTROL DATA

4

OZ JULY 70 - CON - HM Example problems for report

THE STORY BENT - ADD INTERIOR COLUMN - LIVE LOAD

FROM X-OFFSET V-OFFSFT TOIMI -3,960E.02 . 4 ٥.

COMPUTED JOINT COORDENATES

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JOINT

1 0.

2 0.

1

JOINT 9

to to to to to 10

INPUT OF JOINT OFFSETS

NUMBER OF JOINTS IN FRAME . 9

HOLDING DATA FROM THE PREVIOUS PROALEN PLUS THE FOLLOWING

۲.

٥. 2.2786+02

3 0. 4.555E.02 4 4.800E+02 2.278E.02 5 4.400E+02 4.886E.02 6 9.6002 -4.8248.01 1 9,6006+02 2.2786+02

50+3815. C \$0+3006. C B 4.800E402 -1.682E+02

TABLE - FRAME GEUNETRY DATA

PROB (CONTU) 1202 THO STURY BENT - ADD INTERIOH COLUMN - LIVE LOAN 1

۰. د

| MBER<br>UMB | FRON<br>JOINT | to<br>Joint | STIFF<br>TYPE | LOAD<br>TYPE | LENGTH     | X-0 <b>FF</b> \$#1 | 4-0#F SE T |
|-------------|---------------|-------------|---------------|--------------|------------|--------------------|------------|
| 1           | 3             | 2           | 3             |              | 8.9TBE+92  | 8.                 | 2.2785+69  |
| 2           | ž             | 3           | ī             | ā            | 2.978E+02  |                    | 2.270E+68  |
| ž           |               | 5           | 2             | ě            | 2.4096+82  | 4.                 | 2.6092+03  |
| ě           | 6             | 7           | Ĵ             | ě            | 2.760E+02  | 9.                 | 2.7402+02  |
| Ś           | 7             |             | á,            | ě            | 2.040E+02  | <b>.</b>           | 2.940E+02  |
| 6           | 2             | 4           |               | i            | 4.800E+82  | 4.8008.09          | 0.         |
| 7           | ě.            | 7           | 5             | ĭ            | 4.800E+82  | A.8006.02          | 0.         |
| Å           | j             | Ś           | 6             | 2            | 4.8118.42  | 4.8005.92          | 3.3122.01  |
|             | 5             | 8           | 6             | 2            | 4. 8116+02 | 4. 800F.02         | 3. 3122+01 |
| 10          | 9             | 4           | 7             | õ            | 3-9602-02  |                    | 3.9692+02  |

TWO STORY BENT - ADD INTERIOR COLUMN - LIVE LOAD

INPUT OF HEMBER LOCATIONS

To

7

2

10

TO TO

TO

HOLDING BATA FROM THE PREVIOUS PROALEN PLUS THE FALLOWING

TØ

JOINT

COMPUTED MEMBER AUMBERS, LENGTHS, AND OFFSETS

GOG COMPUTES MENSER NUMBERS AGREE WITH LAST PROBLEM GOG

PROB (CONTO)

TABLE 3 - HEMBER LOCATION DATA

MUNBER OF MENBER STIFFNESS TYPES

NUMBER OF MEMBER LOAD TYPES .

STIFF LOAD

7 .

TYPE TYPE

1505

**FROM** 

JOINT

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-0-

10

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STIFF MOD OF PRISHATIC PRISHATIC NO AXIS OUTPUT PTN PIN' CARUS OPT NOT FROM 70 TYPE ELAST I A

7 2.960E+04-9. -0. 3 1 -9

0. -0. 1.056E+03 2.800E+01 2.000E+00 9.000E+09 -0. -0. 1.920E+02 1.05UE+03 2.800E+01 2.000E+00 7.500E+00 -0. 1.920E+02 3.960E+02 1.050E+03 2.800E+01 -0. -0. -0.

RESTRAINTS ARE IN MEMBER PRIMED ARES STIFF TYPE 7 CONTO FROM 10 1 4 42 ŝ∀

HOLDING DATA FHON THE PHENIOUS PROBLEM PLUS THE FALLOWING

TABLE 5 - NEMBER STIFFAESS DATA

DADY BALL - NULLOS ROLATING OUN - LIVE LOAD

PR08 (CONTO)

6 0. 9 6. 1.000E+99 1.000E+99 1.000E+99 ۰. . 2.0002.01 0. 8. .

JOINT FORCE (1) FORCE (1) MOMENT (2) SPRING (1) SPRING (2)

Ø.

1.0002.99 1.0002.99 0.

ACCUMULATED JOINT DATA

ŧ ... -0. -0. ϝ . 2.0002.01 -0.

JOINT FORCE(X) FORCE(Y) MONENT(Z) SPRING(X) SPRING(V) SPRING(Z)

INPUT OF JOINT DATA

HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

TABLE & - JOINT DATA

1 0.

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PROE (CONTU) 1202 INO STORY BENT - AND INTERIOR COLUMN - LIVE LOAD

\$2

#### PROD (CONTO) 1545

THE STORY BENT - ADD INTERIOR COLUMN - LIVE LOAD

#### TABLE & - HEHBER LOAD DATA

HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

NONE

PROD (CONTD) 1505 THO STORY SENT - AND INTERIOR COLUMN - LIVE LOAD TABLE Y - COMPILATION TABLE

NG DATA

PROB (CONTR TWO STORY BENT - ADD INTERIOR COLUMN - LIVE LOAD 1202

TABLE & - JOINT DISPLACEMENTS AND REACTIONS

DISPLACEMENTS REACT10NS

JOINT DISP (K) DISP(Y) ROTATION(Z) REACT(X) REACT(Y) REACTIZE

1 -2.7062-99 -5.4392-98 7.5542-04 2.7062-00 5.4392.01 0. 2 -6.516E-04 -1.495E-02 -1.503E-03 0. 0. 6. 3 3.4032-01 -2,4446-82 -3,4456-03 0. 8. Ø. 5.677E-03 -3.685E-61 -7.896F-05 8. 0.. ۵. 5 2.028E-01 -4.090E-01 8.050F-05 0. 0. 0. 6 2.785E-99 -5.411E-98 -2.655F-97 -2.785E.08 5.411E.01 2.055E.02 7 1.147E-02 -1.802E-02 1.054F+03 8. 0. 6. 0 1.725E-01 -2.908E-02 3.118r-03 0. 0. Ô a 1.107E-04 -3,202E-01 3.337F-06 0. 6.405E.00 0.

PROB (CONTU) THO STORY BENT - ADD INTERIOR COLUMN - LIVE LOAD 1202

TABLE . - MEMBEN RESULTS

MEMBER NUMBER STIFF TYPE 1 1 LOAD TYPE ALPHA . No LENGTH . 2.278E+02 BETA . 1.0001+00 BOES FROM JOINT | TO JOINT 2 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER ANES

#### AT JOINT 1 AT JOINT 2

| AXIAL FORCE | e | -5+439£+v1 | AXIAL FORCE | 88 | -5,439E+01 |
|-------------|---|------------|-------------|----|------------|
| SHEAR       | 8 | -2.706E+00 | SMEAR       | 19 | -2.706E+00 |
| MOMENT      | 8 | 4.416E-02  | Hompnt      | 5  |            |

THE MALINUM EQUILIBRIUM ERHOR INTERNAL TO THE MEVAER IS 1.1910-00

STIFF TYPE 1 HEHBER NUMBER LOAD TYPE LENGTH . 2.278E.02 ALPHA . 0. 1.0006+00 RETA B BOES FROM JOINT 2 TO JOINT 3 ALL OUTPUT FORCES ARE WITH RESPECT TO THE WEMBER INES

> AT JOINT 2 AT JOINT

SHEAR MOMENT ANIAL FORCE = -3.454E+VI SHEAR · -1.287E.01 -1.454E+01 4.567E+01 -4.662E.03 1.110000 NOMENT J.442E-04 -1.454E+01 4.567E+01 -3.563E+03 THE HASTMUN. TC-01 -4.926E-01 -1.358E-03 -1.385E-01 3.569E+01 -2.670E+02 1.729E-01 -5.255E-01 -1.368E-03 -1.317E+01 2.572E+01 3.516E+02 TCE+02 1.727E-01 -5.562E-01 -1.100E-03 -1.317E+01 2.572E+01 9.702E+02 1.6689E+02 1.724E-01 -5.815E-01 -8.855E-04 -1.317E+01 2.572E+01 1.589E+03 1.722E-01 -5.474E-01 -4.700E-04 -1.244E+01 1.574E+01 1.728E-01 -6.047E-01 -9.940E-05 -1.179E+01 5.763E+00 1.718E-01 -6.025E-01 2.928E-04 -1.179E+01 5.763E+00 1.716E-01 -5.905E+01 7.079E+04 -1.179E+01 5.763E+00 1.920E+Vd 2+208E+V3 51-1608+42 2-346F+03 20+3004.5 2.485E+03 2.640E+02 2.623E.03 2.880E+02 1.714E-01 -5.682E-01 1.144E-03 -1.110E+01 -4.213E+00 2.762E+03 1.712E-01 -5.340E-01 1.714E-03 -1.041E+01 -1.419E+01 2.421E+03 3-120E+02 3.360E+02 1.710E-01 -+.801E-01 2.252E-03 -1.041E+01 -1.419E+01 2.079E+03 3.6000.02 1.708E-01 -4.203E-01 2.708E-03 -1.n41E+01 -1.419E+01 1.7382.03 3.844E+42 1.706E-01 -3.565E-01 3.083E-03 -9.754E+00 -7.417E+01 1.397E+43 4.080E+02 1./04E-01 -2.791E-01 3.318E-03 -9.016E+00 -3.414E+01 5.753E+02 4.320E+02 1.703E-01 -1.905E-01 3.358E-03 -9.036E+00 -3.414E+01 -2.460E+02 4.560E+02 1.701E-01 -1.186E-01 3.268E-03 -9.036E+00 -3.414E+01 -1.067E+03 4.000E+02 1.700E+01 ++.108E-02 3.118E-03 -9.036E+00 -3.414E+01 -1.089E+03

THE MAXIMUM EQUILIDATUM ERROR INTERNAL TO THE MEMAER IS 1.234E-07

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#### PRON (CONTU)

1202 TWO STORY BENT - ADD INTERION COLUMN - LIVE LOAD

TABLE . - MEMBER RESULTS (CONTO)

STIFF TYPE 7 MENDER NUMBER 10 LOAD TYPE LEMBER NUMBER AU LEMBER = 3.960E+02 ALPHA # 4. BETA = 3.600L+00 OUTPUT DISTANCES ARE FROM JOINT & ALONG THE MEMBER AXIS ALL OUTPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AXES ñ

|         |               | DISPLACEMEN  | 75         | n i di<br>1941 - Alfan Arwijeri | FORCES       |               |
|---------|---------------|--------------|------------|---------------------------------|--------------|---------------|
| DISTANC | E ANTAL       | LATERAL      | ROTATIONAL | AXÍAL                           | SHEAR        | MOMENT        |
| 0.      | -3,202E-0     | L =1.167E=04 | 3.337E-06  | -6.405F+00                      | 4-475E-14    | -1-5328-14    |
| 1.9802+ | 01 -3.206E-0  | -5.055E-05   | 3.3518-06  | -1.9495+01                      | A.ASIF-03    | 5.708F-02     |
| 3.960E+ | 01 -3.212E-01 | 1.4426-05    | 3-424E-06  | -3-1005+01                      | 8. RI 75-0.5 | 1.738E-01     |
| 5.940E* | 01 -3.221E-01 | 8.5\$4E-05   | 3.5678-06  | -4.4835+01                      | 3.2155-03    | 2.7076-01     |
| 7.920E* | 01 -3-2338-01 | 1-5802-04    | 3.749E-84  | -8.9-15+01                      | 4735-03      | 2.818F-01     |
| 9.900E+ | 01 -3.248E-0  | 2.338E-04    | 3.8942-06  | -7.014F+01                      | -1.1577-02   | 1.4996-01     |
| 1.1882+ | V2 -3.246E-0  | 3.112E-04    | 3.891E-06  | -8-3445+01                      | -2.3136-02   | -1-8762-01    |
| 1.366E+ | 02 -3.288E-0) | 3.858E-04    | 3-5956-06  | -9.402F+01                      | -1.6885-02   | -7-771E-01    |
| 1.5846* | 02 -3.312E-01 | 4.503E-84    | 2.8328-06  | -1.0015+02                      | -8.2125-02   | -1-6865-00    |
| 1.702E* | 02 -3.340E-01 | 4.935E-04    | 1.4115-06  | -1.251E+02                      | -4.7916-02   | -2-844E+00    |
| 1.980E+ | 02 -3.371E-01 | 5-804E-84    | -8-638E-07 | ml. 1725+02                     | -7.8395-02   | -4 - 3985 -00 |
| 2.178E+ | 02 -3.402E-01 | 4.526E-04    | -4-117E-06 | -1 . 31 SE+02                   | -7.868F-02   | -5. RRAE +00  |
| 2.3762+ | 02 -3.433E-0  | 3.306E-04    | -8.3645-06 | -1.316F+02                      | -7-868F#UZ   | -7-4446+00    |
| 2.574E+ | 02 -3.4658-0) | 1.147E-04    | -1-360E-05 | -1.3155+02                      | -7-8685-02   | -9.002E+40    |
| 2.772E+ | 02 -3.496E-01 | -2.148E-04   | -1-903E-05 | -1.115F+02                      | -7.868F-02   | -1 +056E+01   |
| 2.970E+ | 02 -3.5286-0  | -6.775E-84   | -2.7062-05 | -1.3158-02                      | -7-868F-02   | -1-212E+01    |
| 3.168E+ | 02 -3,559E-01 | -1.293E-03   | -3-527E-05 | -1 .315E+02                     | -7.868F-02   | -1 -3486+01   |
| 3.3666+ | 02 -3.590E-0  | -5.08JE-03   | -4.448E-05 | -1.3158+02                      | -7.868E-02   | -1.523E+01    |
| 3.564E+ | 02 -3.6Z2E-0  | L -3.061E-03 | -5.468E-05 | -1.315E+02                      | -7.8682-02   | -1.679E.01    |
| 3.7626+ | 02 -3,653E-01 | -4.253£-03   | -6.587E-05 | -1.315E+02                      | -7.868E-02   | -1.8358.01    |
| 1.9662+ | 02 -3-685E-A  | 1 -5.677F-03 | -7、良いわドーハち | -1 - 1 BC+02                    | -7.9695-02   | -1-0016401    |

THE MAXIMUM EQUILIBRIUM ERHOR INTERNAL TO THE MEMBER 15 2.983E-10

PROS (CONTU)

1202 TWO STORY BENT - ADD INTERION COLUMN - LIVE LOAN

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TABLE 10 - JOINT EQUILIBRIUM ERHORS

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| JOINT | ERN(X) | EAR (Y) | ERR (Z) |
|-------|--------|---------|---------|
|       | FONCE  | FORCE   | HOMENT  |
|       |        |         |         |

| 1 -4.229E-04 7.981E-11 4  | ,016 <b>F-02</b> |
|---------------------------|------------------|
| 2 -1.464E-43 2.334E-05 2. | 686E-01          |
| 3 1.886E-03 1.920E-09 2   | 148E-01          |
| & 2.762E-05 8.160E-05 2   | 358F-02          |
| 8 -2.762E-05 1.482E-08 -9 | 907F-08          |
| A 4.352E-04 8.072E-11 -6  | 0054-02          |
| 7 1.341E-03 -1.049t-04 -2 | .959F-01         |
| 8 -1.776E-03 1.877E-09 -2 | 611F-01          |
| 9 4.475E-14 2.729E-10 -1  | .532F-12         |

# NZ JULY TO - COM - MM Example phoblems for report

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THO STORY BENT HOLDING STIFFNESS FROM 1902 - WIND LOAD 1203

#### TABLE 1 - PROGHAM CONTROL DATA PROULEN TYPE 3

| 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |                                                    |                                         |               |
|---------------------------------------|----------------------------------------------------|-----------------------------------------|---------------|
| n an saint<br>In sgri safisi          | INPUT TABLES                                       |                                         |               |
| TABLE<br>NUMOER                       | MOLD DATA FROM<br>LAST PROBLEM<br>(L = yesto = no) | NUMBER OF<br>ADDED FOR<br>PROBLEM       | CARNS<br>THIS |
| 3                                     |                                                    | n - Bread In<br>Million State<br>Turker | )<br>         |
| 4<br>5                                |                                                    | 1949 - 1.<br>1949 - 1.                  |               |
| é<br>7                                | 0<br>                                              | -                                       | •<br>0        |
|                                       | NUTPUT TABLES                                      |                                         |               |
| TABLE                                 | SUPPRESS OUTPUT                                    |                                         |               |
| AJUMUER                               | (1 = YES+0 = NO)                                   |                                         |               |
|                                       |                                                    |                                         |               |

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PROB (CONTD) 1203 TWO STORY MENT HOLDING STIFFNESS FROM 1902 - WIND LOAD

TABLE 2 - FRAME BEOMETRY DATA

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HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

Y

#### NONE

COMPUTED JOINT COORDINATES

JOINT ä

> â 0. 0. 5. 0. 2.270E+02 4.5552.02 :0e 4 4.800E+02 2.278E+02 5 4.800E+02 4.886E+02 9.600E+02 -4.824E+01 6 7 9.600E+02 2.278E+02 9.600E+02 5.218E+02 4.8002+02 -1.6822+02

PRON (CONTU)

1203 THO STURY RENT HOLUING STIFFNESS FROM 1207 - WIND LOAD

TABLE & - MEMOLA LUCATION VATA

HOLDING DATA FROM THE PREVIOUS PHOALEN PLUS THE FALLAWING

NUMBER OF MEMBER STIFFNESS TYPES . 7 NUMBER OF MEMBER LUND TYPES & \*

#### INPUT OF MEMBER LUCATIONS

| FROM  | STIFF LOAD                                                                                    | TO                   | To | 10 | 10 | ኘስ | 10 | 70 | 70       | TO | TO |
|-------|-----------------------------------------------------------------------------------------------|----------------------|----|----|----|----|----|----|----------|----|----|
| JOINT | TYPE TYPE                                                                                     | JOINT                |    |    |    |    |    |    |          |    |    |
| 6. E  | 化物化 化硫酸盐 化氯化物合物                                                                               | 44944461             |    |    |    |    |    |    |          |    |    |
| N     | 化乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸乙酸                                                               | 1989), galagina      |    |    |    |    |    |    |          |    |    |
| ŀ     | i kuntupu kapis <b>i</b> lasi keng <b>l</b> i<br>Antoni kana kana kana kana kana kana kana ka | ²,                   | 3  |    |    |    |    |    | - gr (3s |    |    |
| 7     | i i seren veze i se<br>Neti sesti seta 1 seta 3                                               | 8                    |    |    |    |    |    |    |          |    |    |
| 5     | 5 .ď                                                                                          | ti jandu i i bi 🄶 te | 7  |    |    |    |    |    |          |    |    |
| . 3   | T H TH 🕹 🛛 🐴                                                                                  | 1911. <b>5</b> ja.   | ·  |    |    |    |    |    | 1.11     |    |    |
|       |                                                                                               |                      |    |    |    |    |    |    |          |    |    |

#### COMPUTED MEMBER AUMUENS, LENGTHS, AND OFFSETS

| MEMAEH | FHUM  | 14    | STIFF LUAD | LFNGTM | K-OFFSFT | Y-OFFSET |
|--------|-------|-------|------------|--------|----------|----------|
| NUMB   | 10101 | JULNT | TYPE TYPE  |        | 2 - E    |          |

| 1   | 1   | Z          | 1            | 1   | 2.2788+02  | 0.        | 2.274E+02 |
|-----|-----|------------|--------------|-----|------------|-----------|-----------|
| 2   | 2   | Э          | <u>8</u> .   | 1   | 2.27BE+02  | : 0.      | 2.278F+02 |
| 3   | 4   | 5          | ٤            | 0   | 2.4098+02  | 0.        | 2.609E+02 |
| 4   | 6   | 1          | ک            | 2   | 2.760E+02  | 0.        | 2.740E+02 |
| - 5 | 1   | ø          | · •          | . 3 | 2. 4+0E+02 | 0         | 2.9405+02 |
| 6   | . 2 | 4          | ` <b>`</b> > | 0   | 4. A00E+02 | 4.0005.02 | 0.        |
| 7   | 4   | . 1        | 5            | Ó   | 4.400E+02  | 4.9000.02 | 0.        |
| 8   | ک   | 5          | 6            | à.  | 4.A11E+02  | 4.800F+02 | 3.3128+01 |
| 9   | 9   | 6          | 0            | 4   | 4.A11E+02  | 4.800F.02 | 3.3128.01 |
| 10  | y   | ° <b>4</b> | 7            | 0   | 3.950E+02  | 6.        | 3.940F+02 |

#### . . . COMPUTED MENNEN NUNHERS AGHLE WITH LAST PROBLEM ....

# NONE PROB (CONTO) 1203 THO STORY BENT HOLDING STIFFNESS FROM 1902 . WIND LOAD TABLE 6 - MEMBER LOAD DATA

TWO STORY BENT MOLUING STIFFNESS FROM 1902 - WIND LOAU

HOLDING DATA FROM THE PREVIOUS PROALEN PLUS THE FOLLOWING

ACCUMULATED JOINT DATA

0.

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1203 TWO STORY BENT HOLDING STIFFNESS FROM 1902 - VIND LOAD

8.

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| LOAD | UNIFORM | UN1FORM    | N0    | A×15 |
|------|---------|------------|-------|------|
| TYPE | QX      | GY         | CARDS | OPT  |
| 3    | -0.     | -2.5805-02 | 0 Q   | 1    |
| 2    | -0.     | -4.333E-03 | ÷0    | ĩ    |
| 3    | -0.     | -4.3338-03 | -0    | 1    |
| 4    | -0.     | -4.333E-03 |       | 3    |

PROB (CONTU)

TABLE & - JOINT DATA

1203

NONE

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PROB (CONTU)

| TABLE 5 - MEMBEN STIFFNESS DATA                           | 2 4,344E-01 4,405E-04 ~9,6449=04 0.<br>3 8,6848E-01 3,623E-04 ~4,053F-04 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS THE FOLLOWING | <ul> <li>↓ ↓ ∠ 96E=01 -7,009E=03 -4,069F=04 0.</li> <li>↓ 648E=01 -6,21E=03 1.479E=04 0.</li> <li>↓ 540E=09 -3,25E=99 -8,263E=97 -5.510E+00</li> <li>↓ 276E=01 -1,086E=03 -1,092F=03 0.</li> <li>↓ 643E=01 -1,493E=03 -1,525E=04 0.</li> <li>↓ 263E=02 -6,091E=03 -2,562E=04 0.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| none                                                      | $\mathcal{L}_{\mathrm{eff}}$ is the second |
|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

JOINT DISP(1) DISP(T) MOTATION(2) REACT(1) REACT(9) REACT(2) 1 3.7945-99 1.6036-99 -2.5676-03 -3.7946+00 -1.6036+00 0. 0. 0. ð • 0 e

REACTIONS

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3.261E.00 A.203E.02

JOINT FORCE (X) FORCE (Y) MOMENT (Z) SPRING (X) SPRING (Y) SPRING (Z) 1.000E.99 1.000E.99 0. TABLE A - JOINT DISPLACEMENTS AND REACTIONS 1.000E.00 1.000E.99 1.000E.99 2.0006.01 0.

DISPLACEMENTS

PRON (CONTU) 1203 INC COUNT BENT HOLDING STIFFNESS FROM 1902 - WIND LOAD

# NO DATA

TABLE 7 - COMPILATION TABLE

PROM (CUNTU) 1203 TWO STURY RENT HOLUING STIFFNESS FROM 1507 - WIND LOAD PROB (CONTO) 1203 TWO STORY BENT HOLDING SYSFFMESS FROM 1702 - WIND LOAD

TABLE . - MEMBER RESULTS

MEMBER NUMBER 1 STIFF TYPE 1 LOAD TYPE 1 LENGTH = 2.278E+02 ALPHA = 0. BETA = 1.000L+00 GOES FROM JOINT 1 TO JOINT 2 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AXES

| *                              | T JQ | INT                     | 1                    |   |                          | AT JO | imi         | 2                                    |
|--------------------------------|------|-------------------------|----------------------|---|--------------------------|-------|-------------|--------------------------------------|
| AXIAL FORCE<br>Shear<br>Nonent | 2    | 1+603<br>3+794<br>5=070 | E+00<br>E+00<br>E=02 | • | AXÍAL<br>SHEAR<br>HOMENI | FORÇE | 8<br>8<br>9 | Ì,603E+00<br>−Ì,900E+00<br>7.157E+08 |

THE MARINUM EQUILIBRIUM EMPOR INTERNAL TO THE MEMPER IS \$.9165-00

| MEMBER NUMBE<br>LENGTH = 2<br>GOES FROM JO | A 2<br>.2705.02<br>INT 2 TO<br>OBCES ARE | STEFF TYPE<br>ALPHA D<br>JOINT | 1 L(        | DAD TYPE    | · in       |                |
|--------------------------------------------|------------------------------------------|--------------------------------|-------------|-------------|------------|----------------|
| A a                                        | T JOINT                                  | E A                            |             | 1058        | SHEAR      | NOMENT         |
| AXIAL FORCE                                |                                          |                                | 1.479E-04   | -1.301E-01  | 0.503E-0ĵ  | -1.3685.92     |
| SHEAR                                      | No. of Concession, Name                  | -JE-02                         | 1.3508-04   | -1.301E-01  | 8+221E-01  | -1+197E+62     |
| MOMENT                                     | TT                                       | -4.7/0E-0Z                     | 1.201E-04   | -1.3016-01  | 7-1792-01  | -9-720E-01     |
|                                            |                                          | ~~ *20 AE ~05                  | 1+012E-04   | -1-3016-01  | 6+136E-01  | -8.118E.01     |
|                                            | 0.007E-01                                | -+ -2 -02                      | 8.J42E-05   | -1.3016-01  | 3+094E-01  | -6+768E+01     |
|                                            | 0.007C=01                                | -+*103E-05                     | 6.0345-02   | -1.301E-01  | 8-0512-01  | -5+668E+01     |
| 1-440E+02                                  | 8.007E-01                                | -1.930E+02                     | 5-610E-05   | -1.301E-01  | 3+009E-01  | -4+818E+91     |
| 1.680E+02                                  | 6.00TE-01                                | -3.6342-02                     | 4.533E-05   | -1.3016-01  | 1.9678-01  | -+.220E+41     |
| 1+920E+02                                  | 6.007E+01                                | -3. T30E-02                    | 3.845E-05   | -1.301E-01  | 9+242E=V4  | -3.872E+U      |
| 2+101E+02                                  | 6.007E=01                                | -3.6306-02                     | 3.0262-05   | ~1.301E=01  | -1.182E-02 | ~3.775E+01     |
| 2.+01E+02                                  | 6.007E-01                                | ~3.590E-02                     | 2,4038-05   | -1.3016-01  | -1.1618-01 | -3,929E+01     |
| 2+640E+02                                  | 6.067E-01                                | -3-241E-05                     | 1.7346-05   | -1.3012-01  | -5.503E-01 | #4.334E+VI     |
| 2.889E+92                                  | 6.467E-01                                | -3-2005-02                     | 9.745E-06   | -1.3016-01  | -3.245E-01 | -4.989E+01     |
| 3.1205+92                                  | 6.067E-01                                | -3.498E-02                     | -2.1916-06  | -1.301E-01  | -4.288E-01 | -3.895E+01     |
| 3.3605+02                                  | 6.667E-01                                | -3.521E-02                     | -1.763E-05  | -1.301g-01  | -4,330E-v1 | -7.052E.01     |
| 3.606E+02                                  | 6.0005-01                                | -3.5052-02                     | -3.613E-05  | -1.3018-01  | -4-3732-01 | -8.460E.01     |
| 3.6486+02                                  | 6. 566E-n1                               | -3.698E-02                     | -5.830E-05  | -1.101E-01  | -7.415F-01 | -1.012E+0Z     |
| 4.880F *0Z                                 | 4.6668-01                                | -3.8695-02                     | -8-473E-05  | -1-1016-01  |            | -1 -20 38 442  |
| 4.320E+02                                  | 6.006E-01                                | -4-107E-02                     | -1.1268-04  | -1-3015-01  | -0.5005-01 | -1 -A 1 9E +#2 |
| 4.5668.402                                 | 6.006E-41                                | ************                   | -1.3416 444 | -1 -3-15-01 |            | -1             |
| 4.800E+02                                  | 4.446E-01                                | -4 . 749E-42                   | -1-525E-04  | -1.3012-01  | -1+158E*00 | -1+926E+02     |

이 소설님, '제' 전 1956 중지 않는

THE MARINUM EQUILIBRIUM EAROR INTERNAL TO THE MEMBER IS 1.037E-00

PROB (CONTU)

1203 TWO STORY BENT HOLDING STIFFMESS FROM 1902 - WIND LOAD

TABLE 9 - MEMBER RESULTS (CONTO)

MEMBER NUMBER 10 STIFF TYPE 7 LOAD TYPE 0 LENGTH # 3.980E+02 ALPHA # R. BETA # 1.000E+00 GOES FROM JOINT & 70 JOINT & 0 Output distances and read joint # Along the newber axes All Output forces and displacements are with respect to the member axes .

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|            | 4          | DISPLACEMEN | Tg         | FORCES       |             |            |  |
|------------|------------|-------------|------------|--------------|-------------|------------|--|
| DISTANCE   | ARTAL      | LATEHAL     | ROTATIONAL | AXTAL        | SHEAR       | MOMENT     |  |
| 0          | -6,091E-03 | 2.8036-02   | -2.802E-04 | -1.218E-01   | A.228E-11   | -5.664E-10 |  |
| 1.980E+01  | -6.097E-03 | 2.294E-02   | -2.900E-04 | -3-632E-01   | -1.4916+00  | -1.573E+01 |  |
| 3.960E*01  | -6.109E-01 | 1.702E-02   | -3-1236-04 | -6.0482-01   | ->.590E+00  | -5-709E+01 |  |
| 5.9400+01  | -6,126E-03 | 1.0355-02   | -3.670E-04 | -8-4715-01   | -3.3845+90  | -1.164E.02 |  |
| 7.970E+01  | -0.1492-03 | 2.2028-03   | -4.6316-04 | -1. AORE+00  | -1.6182+00  | -1.8598+02 |  |
| 9.900E+01  | -6.178E-03 | -8,2962-03  | -6.044E-04 | -1.334E+00   | -1.4912+00  | -2.575E.42 |  |
| 1.1842+02  | -6.213E-03 | -2.203E-02  | -7.894E-04 | -1.5802+00   | -2.8616+00  | -3.2172.02 |  |
| 1.3865+92  | -6.2548-03 | -3.9802-02  | -1-0105-01 | -1.4947+00   | -1.6585+00  | -3-6802+02 |  |
| 1.5845+02  | -6.300E-03 | -0.217E-02  | -1.251E-01 | -2.075F*00   | 1.8075-01   | -3.842E+02 |  |
| 1.7622+02  | -6.3538-03 | -8-9338-02  | -1.4895-03 | -2.3355+08   | 9+687F+00   | -3-575E+02 |  |
| 1.980E+02  | -4.4118-03 | -1.2096-01  | -1.694E-03 | -2.40 65 .00 | A. 7715.00  | -2.773E+02 |  |
| 2.178E+02  | -6.471E-03 | -1.560E-01  | -1.840E-03 | -2. 561E+80  | 4.841F+99   | -1.815E.02 |  |
| 2.376E+02  | -0.5316-03 | -1.934E-01  | -1.9256-01 | -2. SAIE+08  | 4. 641E+00  | -8.540E.01 |  |
| 2.5748+02  | -6.59AE-A3 | -2.3186-01  | -1.949E-03 | -2-SALE+00   | A.841F+00   | 1.0266.01  |  |
| 2.772E+02  | -6.050E-03 | -2.701E-01  | -1.912E-03 | -2.4n1F+00   | 4.8415+00   | 1.061E+02  |  |
| 2.970E+02  | -6.710E-03 | -3.071E-01  | -1.814E-03 | -2.5016+00   | 4 .841E .00 | 2.020E+02  |  |
| 3.1668.92  | -6.770E-03 | -3.4158-01  | -1.654E-03 | -2.501E+00   | A.841E+00   | 2.978E+02  |  |
| 3.3666+02  | -6.629E-03 | -3.722E-01  | -1.4346-03 | -2.5018+00   | A.841F+00   | 3.9376+02  |  |
| 3.5646+02  | -6.089E-03 | -3.979E-01  | -1.1538-03 | -2.441E+00   | A.841F+00   | 4.895E+02  |  |
| 3.762E+02  | -6.9496-03 | -4.174E-01  | -8.1038-04 | -2.5615+00   | 4.841E+00   | 5-8546-42  |  |
| 3.9608 .92 | -7.009E-03 | -+.290E-01  | -4.009E-04 | -2.501E+00   | 4.8412+00   | 6.813E+42  |  |

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMAER IS 1.7125-08

## PROB (CONTD) 1203 TWO STORY RENT HOLDING STIFFNESS FROM 1982 - WIND LOAD

TABLE 10 - JOINT EQUILIBRIUM ERRORS

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|               |                       | 1,000,00 M M M M M M M M |
|---------------|-----------------------|--------------------------|
| JOINT ERR(X)  | ERR (Y)               | ERR (Z)                  |
| FORCE         | FORCE                 | MOMENT                   |
|               | and the second second |                          |
|               | i da di wala madi     | nd nazhrazi              |
| 1.1.4802-04   | ~Z,352E-12            | 5,070E=02                |
| 2 2.257E-04   | 2.049E-04             | 1.1375-02                |
| 3 -3.7386-04  | 1.1526-10             | -1.101E-01               |
| A 2.079E-05   | 1.4546-45             | 1.4475-01                |
| 6 -2-081F-05  | 1.7506-09             | -5-2636-08               |
| 4 7.67ÅF-#4   | A.444E-17             | -A.A746-02               |
| 7 -4 -1636-44 | -3 3845084            | 3756-42                  |
|               |                       | -3 005- 63               |
| @ -1+3635-64  | 1.248C-44             | -3.0134-96               |
| 9 8.2288-11   | 2,588E-12             | -5.6648-10               |
|               |                       |                          |

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PROB (CONTO) 1204 TWO STORY BENT HOLDING STIFFNESS FROM 1502 - DEAD LOAD

.

TABLE 3 - NEMBER LOCATION DATA

NUMBER OF MEMBER STIFFNESS TYPES = 7 NUMBER OF MEMBER LOAD TYPES = 7

INPUT OF NENBER LOCATIONS

| from<br>Joint | stiff<br>Type | LOAD       | TO<br>Joint | To      | 10 | TO | 10 | TD | ţ0 | <b>T</b> 0 | 70 | TO |
|---------------|---------------|------------|-------------|---------|----|----|----|----|----|------------|----|----|
| 1             | 177           | 17         | . 2         | 3       |    |    |    |    |    |            |    |    |
| *<br>*<br>7   | 23            | 2          | 5 7         | _       |    |    |    |    |    |            |    |    |
| 3             | •             | and of the | e 🚦         | 7<br>8. |    |    |    |    |    | ,          |    |    |

COMPUTED MEMBER NUMBERS.LENGTHS, AND OFFSETS

| MEHBER       | FROM  | TO       | STIFF                                   | LOAD | LENGTH                                                         | K-OFF SPT | Y-OFF SET |
|--------------|-------|----------|-----------------------------------------|------|----------------------------------------------------------------|-----------|-----------|
| NURB         | 30141 | JOTAL    | 1 TPE                                   | TIME | 가 가 있는 것 않는다.<br>이 가 있는 것 같은 것 같 |           |           |
| 41<br>22     |       | :        | 2                                       |      |                                                                |           |           |
| <b>1</b>     | 2     | 2        | - i - i - i - i - i - i - i - i - i - i | 1    | 2.2788+02                                                      | 3.        | 2.2788+02 |
| . <b>2</b> . | 2     | 3        | 1                                       | 1    | 2.2706+02                                                      | D.        | 2.278E+82 |
| 3            |       | <u> </u> | <b>- 2</b>                              | 2    | 2.6892+92                                                      | 9.        | 2.6092+02 |
| <b></b>      |       |          |                                         | 3    | 2.760E+02                                                      | 9.        | 2.740E+02 |
| · • • •      | 1     |          | - · · · · · · · · · · · · · · · · · · · |      | 2.4408469 /                                                    | A         | 3 8.65.63 |

| <b>* * *</b> * | 2                                     |              | 5 | 5 | 4.x00E+02 | 4.8085.82 | 0.        |
|----------------|---------------------------------------|--------------|---|---|-----------|-----------|-----------|
| 7              | i i i i i i i i i i i i i i i i i i i | 71           | 5 | 5 | 4.n00E-02 | 4.8085.82 | 0.        |
|                | 3                                     | 5            | 6 | 6 | 4.8116+02 | 4.8007.02 | 3.312E+01 |
| 9              | 5                                     | <b>8</b> - 1 | 6 | 6 | 4,911E+02 | 4.8007.02 | 3.312E+01 |
| 18             | 9                                     | 4            | 7 | 7 | 3.9602+02 | 0.        | 3.9498+02 |

... COMPUTED MENBER NUMBERS AGREE WITH LAST PROALEN ....

PROB (CONTU)

1204 TWO STORY BENT HOLDING STIFFNESS FROM 1202 - DEAD LOAD

TABLE . - JOINT DATA

HOLDING DATA FNON THE PREVIOUS PHOALEM PLUS THE FOLLOWING

NOME

#### ACCUMULATED JOINT DATA

JOINT FORCE (1) FORCE (Y) MOMENT(2) SPRING(1) SPRING(2)

| 1 0. 0. | 0. | 1-080E+99 1.000E+99 | 0.                  |
|---------|----|---------------------|---------------------|
| 6 0. 0. | 0. | 1.0002.99 1.0002.99 | 1.008E+99           |
| 9 d. 0. | 0. | 0. 2.008E.01        | ð • 100 - 100 - 100 |

PROB (CONTU) 1204 TWO STORY BENT HOLDING STIFFNESS FROM 1002 - DEAD LOAD

TABLE 5 - MEMBER STIFFNESS DATA

HOLDING DATA FROM THE PREVIOUS PHONLEM PLUS THE FOLLOWING

NONE

OF JULY TO - COM - MM Example problems for report

#### PROB

1204 THO STORY BENT HOLDING STIFFNESS FROM 1202 - DEAD LOAD

TABLE I - PROGRAM CONTROL DATA PROBLEM TYPE 3

|                            | INPUT TABLES                                       | an an ann an Arrainn<br>1946 an Arrainn<br>1946 an Arrainn an Arrainn | a de la composición d<br>La composición de la c<br>La composición de la c |
|----------------------------|----------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TA <b>BLE</b><br>NUMBER    | HOLD DATA PROM<br>LAST PROBLEM<br>(1 = YESOU = NO) | NUMBER OF CARDS<br>ADDED FOR THIS<br>PROULEN                          | e e la déc<br>la color e gracie<br>la color e gracie                                                                                                                                                                                                                                                                                                    |
| 2<br>3<br>4<br>8<br>6<br>7 | ै<br>ਹ<br>ੈ<br>ਦ                                   | 1                                                                     |                                                                                                                                                                                                                                                                                                                                                         |
|                            |                                                    | <b>i</b>                                                              |                                                                                                                                                                                                                                                                                                                                                         |

| TABLE  | SUPPRESS OUTPUT  |
|--------|------------------|
| NUMBER | (l = 75208 = MO) |
|        |                  |
|        |                  |
|        |                  |
| . 9    | <b>a</b> ()      |
| 10     | 60 <b>0</b>      |

PROB (CONTU)

1204 THO STORY BENT HOLDING STIFFNESS FROM 1202 - DEAD LOAD

TABLE 2 - FRAME GEUNETHY NATA

HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

NONE

COMPUTED JOINT COONUINATES

| LAIOF | A         | ۲                                      |
|-------|-----------|----------------------------------------|
| ł     | . Ú .     | 0.                                     |
| 2     | 0.        | 2.278E+02                              |
| 3     | 0 o       | 4 . 555E+ 02                           |
| 4     | 4.400E+02 | 2.2782+02                              |
| 5     | 4.849E+02 | ************************************** |
| 6     | 9.6402+02 | -4.8246.01                             |
| 7     | 9.600E+02 | 2.2702.02                              |
| 8     | 4.600E+02 | 5.218E.02                              |
| 9     | 4.800E+02 | -1.062E+02                             |

| ] -0:<br>4 -0:<br>5 -0:                                               | -5.000E-02<br>-5.000E-02<br>-0.                                         | -0<br>-0<br>% | 4 74 74 74<br>7                                                                  |                          |     |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------|--------------------------|-----|
| LOAD TYPE<br>FROM                                                     | S CONTO                                                                 | QX            | 47                                                                               |                          | 02  |
| 0. 4.<br>9.600E+01 9.<br>1.920E+02 1.<br>2.680E+02 2.<br>3.840E+02 3. | 800E+02 -0.<br>600E+81 -0.<br>920E+02 -0.<br>680E+02 -0.<br>840E+02 -0. |               | -2.000E-01<br>-4.0000+00<br>-4.0000+00<br>-4.0000+00<br>-4.000E+00<br>-4.000E+00 | -0.<br>-0.<br>-0.<br>-0. |     |
| LOAD UNIFORM<br>Type gr                                               | UNIFORM<br>QY                                                           | NO<br>CARDS   | ATIS                                                                             |                          | · . |
| 6 -9.                                                                 | ~Q.                                                                     | 5             | 2                                                                                |                          |     |
| LOAD TYPE                                                             | 6 CONTO                                                                 | QX            | ٩¥                                                                               | :                        | 92  |
| 0.<br>9.600E.01 9.<br>1.920E.02 1.<br>2.880E.02 2.<br>3.840E.02 3.    | 8086+02 -u.<br>6086+02 -u.<br>9286+02 -0.<br>8606+02 -u.<br>8406+02 -u. |               | -2,000E-01<br>-4,000E+00<br>-4,000E+00<br>-4,000E+00<br>-4,000E+00               | -0.<br>-0.<br>-1.        |     |
| LOAD UNIFORM                                                          | UNIFORM<br>DY                                                           | NO<br>CARDS   | AXIS<br>OPT                                                                      |                          |     |
| 7 =0.                                                                 | -5.000E-02                                                              | -0            | 2                                                                                |                          |     |

#### TABLE & - MENBER LOAD DATA

LOAD UNIFORM

1 =0.

GX.

TYPE

**4** -

UNIFORM

-5,0006-02

QY

PROB (CONTU) 1204 TWO STORY BENT HOLUING STIFFNESS FROM 1902 - DEAD LOAD

NO

-8

AXIS

CARDS OPT

AFACTIONS: DISPLACEMENTS REACTIN JOINT DISP(K) DISP(Y) ROTATION(Z) REACT(X) REACTIZI 1 -7.093E-99 -1.301E+97 2.101E-03 7.093E+0A 1.301E+02 0\* 2 -2.913E-02 -3.419E-02 -3.818F-03 0. **7. 0.** 3 2.7576-01 -5.0256-02 -4.6346-03 0. 9. 4 -1.9496-02 -7.438E-01 -1.203F-04 0. 0. 0. 5 3.203E-01 -7.999E-01 1.519F-04 0. 0. 0. 6 7.590E-99 -1.350E-97 -6.886F-97 -7.590E-00 1.350E.02 6.886E+02 7 -1.143E-02 -4.265E-02 3.186F-03 0. 0. 0. 8 2.625E-01 -6.323E-02 3.997F-03 0. 9 2.274E-03 -6.506E-01 2.668E-05 0. A ... 0.

1.3018.01 0.

PRON (CONTU) 1204 THO STURY HENT HOLDING STIFFNESS FROM 1902 - DEAD LOAD

TABLE A - JOINT DISPLACEMENTS AND DEACTIONS

#### NO DATA

TABLE 7 - COMPILATION TABLE

PROH (CONTU) 1204 THE STURY RENT HOLDING STIFFNESS FROM 1907 - DELD LOAD

MEMBER NUMBER 10 STIFF TYPE 7 LOAD TYPE 7

TABLE & - MENBER RESULTS (CONTD)

MEMBER NUMBER 10 STIFF TYPE 7 LOAD TYPE 7 LENGTH = 3.960E.02 ALPHA = 0. RETA = 1.000E.00 SOES FHOM JOINT 9 TO JOINT 4 OUTPUT DISTANCES ARE FROM JOINT 9 ALONG THE MEMBER AXES ALL OUTPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AXES

|                 | I           | DISPLACEMEN     | Ts            | FORCES                                    |             |                  |  |
|-----------------|-------------|-----------------|---------------|-------------------------------------------|-------------|------------------|--|
| DISTANCE        | AXIAL       | LATERAL         | ROTATIONAL    | ANTAL                                     | SHEAP       | MOMENT           |  |
| 0.              | -6,506E-01  | -2.274E-03      | 2.6048-05     | -1.3018+01                                | -1.067E-11  | 1+191E=10        |  |
| 1.9808.01       | -6.513E-01  | -1.740E-03      | 2.719E-05     | -3.7A0E+01                                | 1-161E-01   | 1+238E+00        |  |
| 3.9602+01       | -6.525E-01  | -1.187E-03      | 2.092E-05     | -6.262E+01                                | 1.966E-01   | 4.419E+00        |  |
| 5.940E+01       | -6.542E-01  | -5.776E-04      | 3.3126-05     | -8.740E+01                                | 2.4286-01   | 8-854E+V0        |  |
| 7.920E+01       | -6.5062-01  | 1.447E-04       | 4.034E-05     | -1.1956+02                                | 2+540E-01   | 1.3862+01        |  |
| 9.900E+01       | -6.596E-01  | 1.0428-03       | 5.0748-05     | -1.3752+02                                | 9.279E-01   | 1.873E.01        |  |
| 1-1885+92       | -6.6328-01  | 2.174E-03       | 6.3998-05     | -1-627F+02                                | 1.606E-01   | 2.268E+01        |  |
| 1.3862+02       | -6.674E-01  | 3.589E-03       | 7.9228-05     | -1. AR1F+02                               | A.810E-02   | 2.486E+01        |  |
| 1.5846+ 02      | -6-72PE-01  | 5.3156-03       | 9-5028-05     | -7-136F+02                                | -1-127E-01  | 2.4358.01        |  |
| 1.7828+02       | -6.776E-01  | 7.342E-03       | 1.0V4E-04     | -7.1047+02                                | -1.225E-01  | 2+016E+01        |  |
| 1.980E+02       | -8.036E-01  | 9.618E-03       | 1.1965-04     | -2.544F+02                                | -4-918E-01  | 1+157E+01        |  |
| 2.1745+02       | -447F-01    | 1.2048-02       | 1-2398-04     | -2.8415+02                                | -A.974F-01  | 1.774E+00        |  |
| 2-3765+02       | -6.958E-01  | 1.440E-02       | 1.218E-04     | -2-8415+02                                | -4.9745-01  | -8+124E+90       |  |
| 2.57.5+02       | -7-91#F-01  | 1.4825-02       | 1.1358-04     | -2.4.25+02                                | 9745-01     | =1.797E+U1       |  |
| 2 7726+02       | -7. HEAE-AL | 1.6936-02       | 9-8946-05     | -2 5125402                                | -A.974F=01  | -2.7A2E.01       |  |
| 2.9746+42       | -7.100F-01  | 2.070F-02       | 7.8485-05     | a2.8428+02                                | -4-974F-U1  | -3.767E+01       |  |
| 9 1485443       | -7 2405-01  | 2.1985-02       | S ONAFRAS     | -2 -3 -35 - 67                            |             | -A-762FAU1       |  |
| 301075-08       | -7.2405-01  | 2.3676-02       | 3.074C-03     | -2 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 |             | -5.736F +41      |  |
| JAJBOL VE       | -7.3346 -1  | 3 3436-43       | 11135605      | -2 +5025 *06                              |             | -6.7515401       |  |
| 343846494       | -7.3206-01  | 2 . 755-02      | -2.2132-03    | -244925402                                |             | -7.7845401       |  |
| J. 7622+06      | -1-9145-01  | C . 1 / 3L - 02 | -6.01VC-05    | -Z .AHZE -UC                              | -4-4/45-01  | -7 4 1 1 4 1     |  |
| 3 • 30 9 4 • 65 | -7.938L-Al  | 1°A&AE-05       | -1 •2 431 -04 | -Z .472E+VZ                               | -#**A14E_n4 | -9 •9 4 15 • 4 1 |  |

THE MARINUM EQUILIBRIUM ENNOR INTERNAL TO THE NEWBER 15 1.2050-09

AT JOINT 1 AT JOINT 2

MEMBER NUMBER 1 STIFF TYPE 1 LOAD TYPE LENGTH = 2.2786.02 ALPHA = n. 8574 BOES FROM JOINT 1 TO JOINT 2 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AKES

PROB (CONTO) 1204 TWO STORY BENT HOLDING STIFFNESS FROM 1202 - DEAD LOAD

TABLE . - MEMBER RESULTS

| ARIAL  | PONCE | 8 | -1•301f.ac | AXIAL TURUS | - | -1-10.5.0% |
|--------|-------|---|------------|-------------|---|------------|
| SHEAR  |       | 8 | -7.0942+00 | SHEAR       | • | -7.094E+80 |
| WOWE N | P     |   | 7+595C-A1  | sarration a | • | -]*010c.A% |

THE MAXIMUM EQUILIORIUM ERROR INTERNAL TO THE MEMAER IS 3.356E-08

| د هندا این افغان کار                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  | STIEF TYPE  | ,         | 1 848 \$5.00  |                          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  | AL BHA      | •         | LUND ITTE     |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2.2/VL+0Z        | ALFIA -     | . 0+      | 8E . w        | a Tennar                 | Contraction of the second seco |
| BOES FROM J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DINI 2 H         | 1 WINI      |           |               |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ALL OUTPUT I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | FORCES ARE       | STIM NERREC | I TO IME  | MEMBER AXED   | CONTRACTOR OF CONTRACTOR |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  | •           |           |               |                          | -4+805E+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | TALOG TA         | 2           | 81 7      | QUE           | 8.304F+01                | -3-473E+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |             |           | 210           | #-02AF+01                | -2-156F+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ARIAL FORCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | E = -6.410       | L+01        |           | 15            | A. 844#441               | -1-0056-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SHEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | = -2.074         | 5-21-V-12-3 |           | AN -9 003848  | 9.4616401                | 2.9926.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| MONENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2,200            |             | 0 0235-   | A3 -2,2215.4  |                          | A. 8325.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  | ALC: NO     | - 707636- | 04 -Z.1772**  | 2 301032°40              | 0133224VE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| - Contraction of the local division of the l | _                | -0 2436 061 | ~/ .UZUZ~ | 04 -Z.)44E-9  | 2 201038441              | 103626403                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| THERE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10-21            | -4-361E-01  | ~2.300E*  | 04 -Z.1)15.6  | 5.55226.01               | 2+159L+93                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>2.013E-01</b> | -4-3002-01  | S.000E-   | 04 -2.0632+0  | 1.1.230E+01              | 2.631E+#3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 20+308 - 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2.610E-01        | ~9.242E-01  | 7.200E-   | 04 -2.ni7E+0  | 8.662E*00                | 2+897E+0J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 20+3005+05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.607E-01        | -9.0115-01  | 1.204E-   | 03 -1.984E+0  | 1 3-86SE+00              | 3+047E+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2,640E+02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2,604E-01        | -0.661E-01  | 1.704E-   | 03 -1,9416+0  | L -9.303E-01             | 3.082E.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2.8806+02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.0006-01        | ~0.192E-01  | 2.199E-   | 03 -1.9032+0  | L = 7.847E+00            | 2.999E+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3.120E+02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.597E-01        | -7.5898-01  | 2.827E-   | 03 -1 .# 7E+0 | L -1.453E+01             | 2.708E+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3.3002+04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.5932-01        | -0.8355-01  | 3.427E-   | 03 -1.824E+0  | 1 -1.9335+01             | 2.300E.UJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3.600E+02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.590E-01        | -5.949E-01  | 3.916E~   | 03 -1.700F40  |                          | 1 .778E+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 50+30AB.C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.5866-01        | -4,962E-01  | 4.267E-   | 03 -1.743E+0  | -3.108E+U1               | 1.1368+#3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4.080E+02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.5836-01        | -3.911E-01  | 4.4386-   | 03 -1.407E+0  | -1.7728+01               | 2.861E+92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4. 1205 +02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2.580E-01        | -2.844E-01  | 4.4835-   | 03 -1.4448+0  | -A.252F+01               | -6.790E+92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| A. SEAFAA7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.5785-01        | -1.4035-41  | 4.2165-   | 81 -1 A10F+E  | -A.7328+01               | -1-760F+03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 4.8000402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2.5762-01        | -0.1156-02  | 1.997E-   | 81 -1.4005+0  | -4.189F+01               | -2.9562.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

VPE 1 BETA = 1.000E-00

THE MAXIMUM EQUILIBRIUM ERROA INTERNAL TO THE MEMBER 15 1.7010-07

### PROB (CONTD) 1204 THO STORY BENT HOLDING STIFFNESS FROM 1902 - DEAD LOAD

63

223

## TABLE 10 - JOINT EQUILIBRIUM ERRORS

| JOINT | ERR (X) | ERR (Y) | ERR (Z) |
|-------|---------|---------|---------|
|       | FONCE   | FORCE   | MOMENT  |
|       |         |         |         |

| 1 | -1.108g-03 | 2.0016-10  | 1,262,-01  |
|---|------------|------------|------------|
| 2 | -2.1362-03 | 2,129E-04  | 5.4082-01  |
| 3 | 3.2442-03  | 3.720E-09  | 3.694E-01  |
| 4 | 4.8272-05  | -2.4416-04 | 3.0996-02  |
| 5 | -4.8272-05 | 2.5938-08  | -2.1956-07 |
|   | 1-1865-03  | 2.046E-10  | -1.637F-01 |
| 7 | 1.8652-03  | 3,129E-05  | -6.197F-01 |
| 8 | -3-0512-03 | 6.947E-09  | -4.4852-01 |
| 9 | -1.067E-11 | 7.595E-10  | 1.1915-10  |
|   | 3 71       |            |            |

|                                      | INPUT OF PRO                                                                             | BLEN NUMBE                                                                                     | AS AND MULT                                                                                                | IPLIERS                           |                                                |                                         |
|--------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------|-----------------------------------------|
| NPRO8                                | MULTIPL                                                                                  | IER                                                                                            |                                                                                                            |                                   |                                                |                                         |
| 1208<br>1204<br>1203                 | 1.250F+00<br>1.250E+00<br>1.250E+00                                                      |                                                                                                |                                                                                                            |                                   |                                                |                                         |
|                                      |                                                                                          |                                                                                                |                                                                                                            |                                   |                                                |                                         |
|                                      | PROBLEM NUME<br>PROBLEM NUME                                                             | ERS AND ML                                                                                     | NLTIPLIERS U<br>Der Problems                                                                               | SED FOR THE<br>WERE INPUT         | Ś PROBLEM                                      |                                         |
| NPROB                                | NULTIPL                                                                                  | .168                                                                                           |                                                                                                            |                                   |                                                |                                         |
| 1202<br>1203<br>1204                 | 1,250E+89<br>1,250E+88<br>1,250E+88                                                      |                                                                                                |                                                                                                            |                                   |                                                |                                         |
| PROB<br>1205                         | (CONTD)<br>TWO STO                                                                       | RY BENT HO                                                                                     | DLUINĜ STIFF                                                                                               | NESS FROM I                       | 502 - 0EAD•                                    | LIVE+#IND LOADS                         |
| TABLE                                | A - JOINT &                                                                              | ISPLACEMEN                                                                                     | ITS AND REAC                                                                                               | TIONS                             |                                                |                                         |
|                                      | 01                                                                                       | SPLACEMENT                                                                                     | rs .                                                                                                       | AF                                | ACTIONS                                        |                                         |
| JOINT                                | D15P(x)                                                                                  | 015P(Y)                                                                                        | ROTATION (Z)                                                                                               | REACT(X)                          | REACT (Y)                                      | REACT                                   |
| 1<br>2<br>3<br>4<br>5<br>6<br>7<br>7 | -7.546E-99<br>5.458E-01<br>1.406E+00<br>5.192E-01<br>1.490E+00<br>1.986E-98<br>5.341E-01 | -2.286E-97<br>-6.086E-02<br>-9.290E-02<br>-1.399E+00<br>-1.521E+00<br>-2.404E-97<br>-7.719E-02 | 3.625F-04<br>-7.862F-03<br>-1.060F-02<br>-7.566F-04<br>-7.566F-04<br>-7.528F-04<br>-2.228F-96<br>3.935F-03 | 7.506E+0A<br>0.<br>0.<br>0.<br>0. | 2.286E.02<br>6.<br>6.<br>7.<br>0.<br>2.404E.07 | 0.<br>0.<br>0.<br>7.<br>2.228E+03<br>0. |
| 9                                    | -3.280E-02                                                                               | -1.221E+00                                                                                     | -3.199F-04                                                                                                 | 0.                                | 2.442E+01                                      | 0 •                                     |

PROS (CONTUS

TABLE 7 - COMPILATION TABLE

TABLES (2 - 6) OMITTED

1

02 JULY 70 - COH - HH EXAMPLE PROBLEMS FOR REPORT

INPUT TABLES

HOLD DATA FROM LAST PROULEN (1 = YES+U = NO)

**∞0** 

- B -0 -0

TABLE SUPPRESS OUTPUT NUMBER (1 . YES. . NO)

OUTPUT TABLES

.

TABLE 1 - PROGRAM CONTROL DATA

PROBLEM TYPE 4

TABLE NUMBER

2

3

.

9 10

THE STORY BENT MOLDING STIFFNESS FROM 1282 - DEAD.LIVE.WIND LOADS

NUMBER OF CARDS

-0

-9 

PROULEM

٦,

PROB

1205

1205 THO STORY BENT HOLDING STIFFNESS FROM 1702 - DEAD+LIVE+WIND LOADS

PROS (CONTO) 1205 TWO STORY BEAT HOLDING STIFFNESS FROM 1902 - DEAD-LIVE-WIND LOADS

TABLE . - MENDER RESULTS

LENGTH . 2.274E-42

HENDER NUMBER

SHEAR

HOHENT

AT JOINT

# -7.508E+88

# 2.813E-01

ATTAL FORCE = -2.286E+92

- 3

SHEAR

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER IS 1.3085-07

HOMENT

AT JOINT

ARTAL FORCE = -2.1448+02

2

# -1.463E+01

B -2.520E+03

STIFF TYPE

GOES FROM JOINT 1 TO JOINT 2 ALL OUTPUT FORCES ARE WITH RESPECT TO THE NEMBER ARES

1

ALPHA = 0.

TABLE & - NEMBER RESULTS (CONTO) BETA # 1.000E+00

PROB (CONTD)

1205

MENBER NUMBER 10 STIFF TYPE 7 ALPHA IN Do LENGTH = 3.960E+02 BETA # 1.000E+00 BOES FROM JOINT . TO JOINT . OUTPUT DISTANCES ARE FROM JOINT & ALONG THE NEWBER AXIS ALL OUTPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AKES

THE STORY BENT HOLDING STIFFNESS FROM 1202 - DEAD-LIVE-HIND LOADS

|            |             | DISPLACEMEN | Tş          | FORCES                                   |             |              |  |  |
|------------|-------------|-------------|-------------|------------------------------------------|-------------|--------------|--|--|
| DISTANCE   | AAIAL       | LATERAL     | ROTATIONAL  | AXTAL                                    | SHEAR       | HOMENT       |  |  |
| 0.         | -1.2218+00  | 3.280E-02   | -3-199E-04  | -2.44ZE+01                               | A.957E-11   | -5-6102-10   |  |  |
| 1.9802+01  | =1.222£+08  | 2.6446-02   | -3.243E=a4  |                                          | -1.7135+00  | -1-2055+01   |  |  |
| 3.9642+01  | -1.225E+00  | 1.9818-02   | -3.860E-04  | S0+7481.14                               |             | -4-5425-01   |  |  |
| 5.9402+01  | -1.2286+08  | 1.2328-02   | -4-1292-04  | -1.4417+02                               | -1.8278+00  | -1.341E+02   |  |  |
| 7.9205+01  | -1.2338+00  | 1.1316-03   | -5-2378-04  | -7.1147+02                               |             | -2-1485+02   |  |  |
| 9.900E+01  | -1.238E+00  | -A. 175F-03 | -4.877E+04  | -2.4138+02                               |             | -2.0035.07   |  |  |
| 1.188E+02  | -1,245E+00  | -2.4432-02  | -9.019F-84  | -1.0075+02                               |             | -1.7405+02   |  |  |
| 1.3865+02  | -1.2538+04  | -4.6785-02  | -1.159Funt  | 1 8745462                                |             | _A. 788F. 87 |  |  |
| 1-5042+02  | +1.262E+60  | -7-0515-02  | -1-442F-AT  |                                          | 0100-07     | -4-5-95.02   |  |  |
| 1.7425+62  | -) .272E+AD | -1          | -1.7235-013 | -4.4.45.447                              |             | -4.5176.09   |  |  |
| 1.0805+02  | -1-28AFAAR  | -1-1855-01  | -1 040F 041 | -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 - |             | -T-STATANS   |  |  |
| 2.1785+02  | -1.296F466  | -1-7945-41  | -3.1608-03  |                                          | 342315.00   | -3-3-06-02   |  |  |
| 2 3745 402 | -1.3075.466 | -2 -3128-61 | 3 3445-43   | - A SHITE OL                             | A PARE W    | -6+3246+46   |  |  |
| 2 Sale 402 | -1 3105.00  | -2 4845-01  | -2+20-2-03  | STATE VE                                 | 2033KEAAA   | -1.02020-02  |  |  |
| 3 7936.03  | -114C-04    |             | -243112-03  | -4.4722.02                               | 3.3.72E.00  | -2.0545+11   |  |  |
| 6. FIEL 46 | #14330E+00  | -3-1-25-01  | ~5.5A15-01  | -* . NADE+02                             | 8+332E+44   | 8.4612.491   |  |  |
| 2.4105.444 | -1-3455+00  | -3+300F-01  | -2.20JL-03  | -4 . P77E+02                             | 5.332E+00   | 1-9026+02    |  |  |
| 3.1985.05  | -1.JJJL+80  |             | -2.0486-03  | -4.815E+0Z                               | 5+332E*00   | 2+958E+02    |  |  |
| 3.369F.+0S | -1.JO3E+00  | -+.375E-01  | -1.026E-03  | -4 .ROZE .OZ                             | 4.3322+00   | 4.014E.02    |  |  |
| 3.5645+02  | -1.J76E.000 | -4,729E-01  | -1.537E-03  | ~4.740E+02                               | 4.332E+00   | 5.069E.02    |  |  |
| 3.7628+02  | -1.388E+00  | -4.999E-01  | -1.100E-03  | -4 .778E+02                              | 5.3322.00   | 6.125E+02    |  |  |
| 3.960E+02  | -1,399E+00  | -5.192E-01  | -7.566E-04  | -4 .745E .02                             | g , 332E+00 | 7.1016+02    |  |  |
|            |             |             |             |                                          |             |              |  |  |

THE NAXIMUN EQUILIBRIUM ERROR INTERNAL TO THE MEMBER IS 2-3385-08

STIPE TYPE MEMBER NUMBER 2 1 LENGTH ... 2.2782-02 ALPHA ... 0. BET GOES FROM JOINT 2 TO JOINT 3 ALL OUTPUT FORCES ARE NITH RESPECT TO THE MEMBER AXES 8ETA = 1.000E-00-SHEAD HOMENT. AT JOINT 2 AXIAL FORCE = -1.237Ean 1.269E+02 -8.877E-03 -TTITE-04 -4. 155E-91 1.2002+02 -8.097E+03 1.147E+02 -3.065E+03 SHEAR HOMENT 9.3512+01 -3.810E+V2 T.J78E-00 -1.838E+08 -2.840E-03 -4.383E+81 7.247E+81 1.435E+03 J.105E+03 6+6342+01 1.680E+02 1.376E+00 -1.945E+00 -1.369E-03 -4.300E+81 6.021E.01 4.677E+03 1.375E+00 -1.954E+00 -2.050E-04 -4.135E+01 1.9202+02 3.902E+01 5.9996+13 2.164E+02 1.375E+00 -1.957E+00 0.129E-04 -4.011E+01 1.802E+01 6-506E+03 2.400E+02 1.374E-08 -1.924E+08 1.981E-03 -3.989E+01 1.1092.01 6.866E+03 1. 3736+00 -1.8656+00 3.0366-03 -3.0786+81 2.640E+02 5.7552+08 2.880E+02 1.3/3E+00 -1.7/8E+00 4.193E-03 -3.782E+01 -1.548E+01 7+1402+03 3.120E+82 1.372E+88 +1.640E+88 5.673E+83 -3.639E+81 -3.643E+81 3.366E+82 1.371E+88 -1.5864E+88 7.677E+83 -3.697E+81 -4.256E+81 6-337E+03 5-3876-03 3.600E\*02 4 .289E +03 3.0402+02 3.0392.03 4.080E+02 1.369E+00 -6.602E+01 4.590E-03 -3.227E+01 -4.080E+01 9.265E+02 4.324E+02 1.369E+00 -8.550E-01 9.561E+03 -3.225E+01 -9.761E+01 -1.334E+03 4.560E+02 1.300E+00 -4.287E-01 4.213E-03 -3.104E+01 -1.031E+02 -3.741E+03 4.800E+02 1.368E+04 -2.129E-01 8.703E-03 -3.146E+01 -1.090E+02 -6.296E.03

THE MALIMUM EQUILIBRIUM ERROR INTERNAL TO THE HEMBER IS 3.173E-07

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PROB (CONTD) 1205 THO STORY BENT HOLDING STIFFNESS FROM 1902 - DEAD, LIVE . WIND LOADS

#### TABLE 10 - JOINT EQUILIBRIUM ERRORS

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| JOINT | ERR (X)<br>FORCE | ERR (Y)<br>FORCE | ERR (Z)<br>HOMENT |
|-------|------------------|------------------|-------------------|
|       |                  |                  |                   |
| 1     | -1.7295-03       | 3.465E-10        | 2.0130-01         |
| Ż     | -4.217E-03       | 6.6398-04        | 1.033#+00         |
| 3     | 5.946E-03        | 7.195E-09        | 5.9272-01         |
|       | 1.208E-04        | -1.5882-04       | 2.4902-01         |
| 5     | -1.209E-04       | 5.313E-08        | -4.6402-07        |
| 6     | 2.9862-03        | 3.620E-10        | -3.9062-01        |
| 7     | 3-2136-03        | -3.051E-04       | *1.199F+00        |
|       | -4-1996-03       | 1.2591-08        | -9.3577-01        |
| 9     | 8-957E-11        | 1.294E-09        | -5.6192-10        |

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#### PROB

THE STORY BENT HOLDING STIFFNESS FROM 1702 - DEAD-LIVE LOADS 1206

#### TABLE 1 - PROGRAM CONTROL DATA PROBLEN TYPE 4

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#### INPUT TABLES

|          | HOLD DATA FROM<br>Last proulem | NUMBER OF                                                                                                       | CARDS<br>THIS |
|----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|
| 6. E. E. | (1 = YES+0 @ NO)               | PROBLEM                                                                                                         |               |
|          | 化化学电子 化合同分子 医鼻腔外的 法公司          | and the state of the | i stali       |
| ·        | i ngant na gapatén ka          |                                                                                                                 | a la serie    |

#### e a constituire constituire de la const La constituire de la c -0 n e sere a sere e s ം പ ÷) OUTPUT TABLES

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TABLE SUPPRESS OUTPUT NUMBER (1 . YES. 0 . NO)

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# 12.5 Cold APE Science (Cold Science) (Cold Science) (Cold Cold Cold Science) (Cold Science) (Cold Science) (Cold Cold Science) (Cold Science) (Cold Science) (Cold Cold Science) (Cold TABLE 7 - COMPILATION TABLE

#### TABLES (2 - 6) ONITTED

## INPUT OF PROBLEM NUMBERS AND MULTIPLIERS

#### NPROB MULTIPLIER

#### 1202 1.800€+00 1204 1.500E+00

PROB (CONTU)

n an an Artan Artan. An an Artan Artan PROBLEM NUMBERS AND MULTIPLIERS USED FOR THIS PROBLEM PROBLEM NUMBERS IN URGER PROBLEMS WERE INPUT

1206 TWO STORY BENT HOLDING STIFFNESS FROM 1902 - DEAD.LIVE LOADS

NPROB MULTIPLIER

1202 1,8006+00

1203 0. 1204 1,500E+00

PROB (CONTU) 1206 TWO STORY RENT HOLDING STIFFNESS FROM 1902 - DEAD+LIVE LOADS

TABLE A - JOINT DISPLACEMENTS AND REACTIONS

#### DISPLACEMENTS

REACTIONS

JOINT DISP(x) OISP(y) HOTATION(Z) REACT(x). REACT(y) REACT (Z)

| 1.1 | v . |     |     |       |     |            |     |                                         |    |       | 866 -      | 1.10 |       |     |       | m, e.   |     |       |       |     |                                         |   |          |
|-----|-----|-----|-----|-------|-----|------------|-----|-----------------------------------------|----|-------|------------|------|-------|-----|-------|---------|-----|-------|-------|-----|-----------------------------------------|---|----------|
| 1   | 1   | 1   | • 5 | 51g   | -9  | 8          | -2  | , g 3                                   | 16 | -9    | 7          | ٩    | . 5   | 11  | E-1   | 03      |     | 1.55  | 1E+01 |     | .931E.02                                | Ð | •        |
| 11  | z   |     |     | 876   | •0  | 5          | -7  | 82                                      | 0£ | -07   | 2          | 8    | . 4   | 32  | E-(   | 03      | i i | ð     |       | 2 X | )• <sup>1</sup> s <sup>an</sup> sar     | 0 | •        |
| 210 | 3   | ା ଏ | • 3 | 82E   | - 0 | 1          | -1, | . 19                                    | ¢E | -0    |            | - 1  | . 3   | 15  | F - ( | 02      | 11  | 9     |       | . ( | •                                       | 6 | •        |
|     | 4   | -1  | • 9 | 62E   | -0  | 2          | -1  | . 77                                    | 9E | •01   | 9 9        | • 3  | •2    | 10  | E - ( | 04      | 1   | 9 .   |       | (   |                                         | 9 | •        |
|     | 5   | 8   | •   | 54E   | -0  | 1          | -1. | ,93                                     | 6E | •0(   | <b>)</b>   | 3    | • 7 i | 271 | E (   | 04      | (   | ) e ( |       | 6   | •                                       | 0 | e.       |
|     | 6   | 1   | • 6 | • 0 E | -9  | <u> </u>   | -2, | , 99                                    | 9£ | -9'   | <b>?</b> - | -1   | • 5   | 11  | - 3   | 96      | •   | 1.64  | 0E+01 | 2   | -999E+02                                | 1 | +511E+03 |
|     | 7   | 2   | • 9 | 06E   | -0  | <b>)</b> _ | -9  | .64                                     | 16 | -0    | 2          | 6    | • 6   | 77  | F = ( | 03      | 1   | 0.    | -     | 1   |                                         | 0 | •        |
|     | 8   | 1   | • 0 | • 3E  | -0  | 1          | -1, | ,48                                     | 6E | -0    | t; :       | 1    | • 1 ! | 61  | E = ( | 50      | 1   | مزل   |       | 1   | •.                                      | 0 | •        |
|     | 9   | 3   | . 6 | 2 1 E | - 0 | 3          | -1, | , 55                                    | 2£ | • 0 ( | ) (        | ۰,   | . 6   | 33( | F - ( | 05      |     | 0.    |       | 1   | +105E+01                                | 0 | •        |
|     |     |     |     |       |     |            |     | 1 I I I I I I I I I I I I I I I I I I I |    |       |            |      |       |     |       | - 10 A. |     |       |       |     | (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) |   |          |

N 27 HENBER NUMBER 1 STIFF TYPE 1 LENSTH = 2.274E02 ALPHA = 0. BETA GOES FROM JOINT 1 TO JOINT 2 ALL OUTPUT FORCES ARE SITH RESPECT TO THE HENBER AKES AT JOINT 1 AT JOINT 2 ----.....

TWO STORY BENT HOLDING STIFFNESS FROM 1202 - DEADOLIVE LOADS

BETA = 1.000E+00

| AXIAL FORCE | .8 | -2+931E+02 | AXTAL FORCE | 9 | -2,7602+02 |
|-------------|----|------------|-------------|---|------------|
| SHEAR       |    | #1+551E+01 | SHEAR       | • | -1.551E+01 |
| HOMENT      | 8  | 2.760E-01  | MOMENT      | 8 | -3,532+03  |

PROB (CONTO) 1206 TW

TABLE 9 - HEMBER RESULTS

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE MEMBER IS 7-1785-08

| MEMBER NUMBER<br>LENGTH = 2.278E<br>BOES FROM JOINT<br>ALL OUTPUT FORCES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 STIFF TYPE<br>+02 ALPHA =<br>2 TO JOINT 3<br>ARE WITH RESPECT | ן<br>0.<br>10 The Heh | BER AXES    | 1.0000     |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------|-------------|------------|------------|
| IOL TA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NT R                                                            | 47-4-                 |             | SHEAR      | MONENT     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ·····                                                           | -                     | ~           |            |            |
| AXIAL FORCE .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.5836+02                                                       | and the same          |             | 2 7948-02  | 1          |
| SHEAR 0 **                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | \$.2000 ·                                                       |                       | -0.)732.01  | 1.1292.02  | -1.3645.04 |
| MOMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                 | -1-014E-03            | -0.1536.01  | 1.0+8E+nt  | -1.1556+84 |
| and the second se | E+030E+00                                                       | -5-3315-03            | -0.0735+01  | 1.5/0E+02  | *1.670L.03 |
| THE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 42-01 ~6.110E+00                                                | -3.3/1E-03            | -0.0232+01  | 1.504E+04  | -3.9602+03 |
| 7.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 00+346-01 -2-204E+00                                            | -4.0956-03            | -5.679E+01  | 1.2226.05  | -4.368E.0Z |
| TOE 02 7.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 16-01 -8-305E+00                                                | -3-910E-03            | -5.6352-01  | 9.407E+01  | 1.913E+03  |
| 1.440E+02 7.04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0E-01 -2.388E+00                                                | -3,1962-03            | -5.5852+01  | A.687E+01  | 4.089E+03  |
| 1.6802+02 7.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 295-01 -2.4715+80                                               | -1.970E-03            | -5-536E+01  | 7.9678+01  | 6.092E+03  |
| 1.9202+02 7.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 9E-01 -2.440E.00                                                | -4-416E-04            | -5.3412+01  | 9.140E+01  | 7.919E+03  |
| 2.160E+02 7.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 11E-01 -2.475E+00                                               | 9.002E-04             | -5.147E+01  | 2.337E+01  | 8.568E+03  |
| 2.400E+02 7.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | BSE-01 -2.436E+00                                               | 2,3332-03             | -5, 1986+01 | 1.417E-01  | 9.044E+03  |
| 2.6405+02 6.99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | P4E-01 -2.362E+00                                               | 3.830E-03             | -5.048E*01  | A.966E+00  | 9.3460+03  |
| 2.880E+02 6.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 00+3255°C- 10-39                                                | 5.3612-03             | -4,852E+01  | -1.9357+01 | 9.471E+03  |
| 3.1206+02 6.97                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7E-01 -2.100E+00                                                | 7.325E-03             | -4,659E+01  | -4.733E+01 | 8.419E+03  |
| 3.3602+02 6.96                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 58E-01 -1.909E+00                                               | 9,1948-03             | -4.410E+01  | -5.453E+01 | 7.194E.U3  |
| 3.6002 0.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 59E-01 -1.660E+00                                               | 1.075E-02             | -4.5402+01  | -4-173E+01 | 5.7956+03  |
| 3.6402+02 6.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 51E-01 -1.386E+00                                               | 1.1956-02             | -4.364E+01  | -9.011E+01 | 4.218E+U3  |
| 4.080E+02 6.94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | JE-01 -1.089E.08                                                | 1.2038-02             | -4.172E+01  | -1.180E+02 | 1.465E+03  |
| 4.320E+02 6.93                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 35E-01 -7.039E-01                                               | 1.265E-02             | -4.172E+01  | -1.25ZE+02 | -1.461E.03 |
| 4.560E+02 6.92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 29E-01 -4.840E-01                                               | 1.224E-02             | -4.072E+01  | -1+324E+02 | -4-561E+03 |
| 4.800E+02 4.92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 24E-01 -1.968E-01                                               | 1.1016-02             | -4.025E+01  | -1.3936+02 | -7.8336+03 |

THE MAXIMUN EQUILIBRIUM ERROR INTERNAL TO THE MEMOER IS 4.022E-07

TABLE 9 - MEMBER RESULTS (CONTO)

PROB (CONTD) 1206 TWO STORY BENT HOLDING STIFFNESS FROM 1902 - OFADILIVE LOADS

| MEMBER NUMBER 10   | STIFF TYPE | 7  |                  |           |
|--------------------|------------|----|------------------|-----------|
| LENGTH = 3.960E+02 | ALPHA .    | 0. | BETA .           | 1.000£+00 |
| GOES FROM JOINT 9  | TO JUINT 4 |    | THE MELORIA ANTO |           |

| OUTI | PUT DIS  | TANCES A | RE FROM JUINI | r q ALC  | NG THE MENBER | AXIS   | -      |      |
|------|----------|----------|---------------|----------|---------------|--------|--------|------|
| ALL  | OUTPUT   | FONCES   | AND DISPLACE  | ENTS ARE | WITH RESPECT  | TO THE | MENBER | AXES |
|      | ta avî 👘 |          |               |          |               |        |        |      |

|                 | DISPLACEMENTS |                          |                        | FORCES     |                         |                        |
|-----------------|---------------|--------------------------|------------------------|------------|-------------------------|------------------------|
| DISTANCE        | ATTAL         | LATERAL                  | POTATIONAL             | AXŤAL      | SHEAP                   | HOMENT                 |
| 0.<br>1.988E+91 | -1.552E+00    | -3.621E-03<br>-2.701E-03 | 4.633E-05<br>4.681E-05 | -3.)05E+01 | -1.592E-11<br>1.628E-01 | 1.759E-10<br>1.961E+00 |

| $\begin{array}{c} 3.960 \ (-01 - 1.537 \ (-00 - 1.752 \ (-03 - 4.955 \ (-05 - 02 - 1.55 \ (-02 - 1.557 \ (-00 - 7.125 \ (-03 - 4.955 \ (-05 - 2.1157 \ (-02 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 1.557 \ (-01 - 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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|-------------------|-------------|-----------------|--------------|--------------|
| $\begin{array}{c} \textbf{s.94} 0 \textbf{f} \cdot 01 & -1.56 \textbf{f} \textbf{f} \cdot 06 & -7.124 \textbf{f} - 04 & \textbf{s.610} \textbf{f} \cdot \textbf{s} \cdot$ | 1.960E+01   | -1.557E+00 | -1.7526-03        | 4.9556-05   | -1.512E+02      | 3.054E-01    | 6.940E+00    |
| $\begin{array}{c} 7.926 \pm 01 & -1.567 \pm 90 & 5.01 \pm 1-04 & 6.726 \pm 95 & -2.719 \pm 02 & 3.762 \pm 91 & 2.130 \pm 0.990 \pm 91 & -1.574 \pm 90 & 1.968 \pm 0.0 & 3.621 \pm 9.03 \pm 0.313 \pm 95 & -3.336 \pm 9.0 & 3.210 \pm 9.0 & 2.0366 \pm 1.386 \pm 92 & -1.583 \pm 90 & 3.621 \pm 9.33 \pm 9.0 & -3.936 \pm 9.0 & 3.936 \pm 9.0 & 3.621 \pm 9.03 \pm 9$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1.940E*01   | -1.561E+00 | -7.124E-04        | 5.610E-05   | -2.114E+02      | 3.699E-01    | 1+377E+01    |
| 9.900E+01 -1.574E+00 1.983E+03 8.313E+05 -3.356E+02 3.210E+01 2.836E<br>1.188E+02 -1.583E+00 3.421E+03 1.930E+04 -3.968E+02 1.993E+01 3.368E<br>1.386E+02 -1.583E+00 0.78E+03 1.253E+04 -4.550E+02 7.56E+03 3.590E<br>1.584E+02 -1.605E+00 0.78E+03 1.476E+04 -5.168E+02 -2.620E+01 3.354E<br>1.782E+02 -1.618E+00 1.190E+02 1.666E+04 -5.791E+02 -4.660E+01 2.532E<br>1.980E+02 -1.632E+00 1.533E+02 1.778E+04 -6.209E+02 -4.670E+01 2.532E<br>2.178E+02 -1.647E+00 1.633E+02 1.778E+04 -6.209E+02 -4.677E+01 -8.098E<br>2.376E+02 -1.602E+00 2.232E+02 1.677E+04 -6.194E+02 -0.867TE+01 -8.098E<br>2.376E+02 -1.691E+00 2.634E+02 1.638E+04 -6.195E+02 -8.67TE+01 -6.074E<br>2.574E+02 -1.691E+00 2.694E+02 1.638E+04 -6.145E+02 -8.67TE+01 -6.074E<br>2.970E+02 -1.691E+00 2.694E+02 0.6841E+05 -6.195E+02 -8.67TE+01 -6.074E<br>2.970E+02 -1.75E+00 3.055E+02 1.27E+04 -6.145E+02 -8.67TE+01 -6.074E<br>3.166E+02 -1.72E+00 3.055E+02 1.537E+05 -6.195E+02 -8.67TE+01 -6.074E<br>3.564E+02 -1.75E+00 3.055E+02 1.637E+05 -6.195E+02 -8.67TE+01 -1.358E<br>3.66E+02 -1.75E+00 3.055E+02 1.537E+05 -6.195E+02 -8.67TE+01 -1.358E<br>3.564E+02 -1.75E+00 3.026E+02 -5.376E+05 -6.195E+02 -8.67TE+01 -1.35E<br>3.762E+02 -1.675E+00 3.026E+02 -5.376E+05 -6.195E+02 -8.67TE+01 -1.35E<br>3.762E+02 -1.75E+00 3.026E+02 -5.376E+05 -6.195E+02 -8.67TE+01 -1.35E<br>3.762E+02 -1.75E+00 3.026E+02 -5.376E+05 -6.195E+02 -8.67TE+01 -1.35E<br>3.762E+02 -1.775E+00 3.026E+02 -5.376E+05 -6.195E+02 -8.67TE+01 -1.35E<br>3.762E+02 -1.775E+00 3.026E+02 -5.376E+05 -6.195E+02 -8.67TE+01 -1.35E<br>3.762E+02 -1.779E+00 1.962E+02 -3.210E+04 -6.175E+02 -8.67TE+01 -1.310E<br>3.762E+02 -1.779E+00 1.962E+02 -3.210E+04 -6.175E+02 -8.67TE+01 -1.62E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | .920E*01    | -1.567E+60 | 5.014E-04         | 6.726E-05   | -2.7195+02      | 1.7625-01    | 2.130E+01    |
| $\begin{array}{c} 1.188\pm \cdot 02 & -1.583\pm \cdot 00 & 3.621\pm - 03 & 1.930\pm - 04 & -3.916\pm \cdot 02 & 1.993\pm - 01 & 3.368\pm \\ 1.384\pm \cdot 02 & -1.593\pm \cdot 00 & 6.074\pm - 03 & 1.253\pm - 04 & -4.450\pm \cdot 02 & 5.756\pm - 03 & 3.590\pm \\ 1.584\pm \cdot 02 & -1.605\pm \cdot 00 & 0.74\pm - 03 & 1.476\pm - 04 & -5.168\pm \cdot 02 & -2.62\pm - 03 & 3.594\pm \\ 1.742\pm \cdot 02 & -1.618\pm \cdot 00 & 1.919\pm - 02 & 1.666\pm - 04 & -5.79\pm \cdot 02 & -4.060\pm - 01 & 2.512\pm \\ 1.980\pm \cdot 02 & -1.63\pm - 00 & 1.533\pm - 02 & 1.779\pm - 04 & -6.21\pm - 02 & -4.060\pm - 01 & 2.512\pm \\ 1.980\pm \cdot 02 & -1.647\pm \cdot 00 & 1.637\pm - 02 & 1.748\pm - 94 & -6.219\pm \cdot 02 & -8.078\pm - 01 & -9.568\pm \\ 2.178\pm \cdot 02 & -1.647\pm \cdot 00 & 1.637\pm - 02 & 1.647\pm - 04 & -6.219\pm \cdot 02 & -8.078\pm - 01 & -9.568\pm \\ 2.574\pm \cdot 02 & -1.647\pm \cdot 00 & 2.634\pm - 02 & 1.647\pm - 04 & -6.194\pm \cdot 02 & -8.677\pm - 01 & -2.558\pm \\ 2.772\pm \cdot 02 & -1.647\pm \cdot 00 & 2.634\pm - 02 & 1.458\pm - 04 & -6.194\pm \cdot 02 & -8.677\pm - 01 & -3.56\pm \\ 2.772\pm \cdot 02 & -1.647\pm \cdot 00 & 2.634\pm - 02 & 1.458\pm - 04 & -6.194\pm \cdot 02 & -8.677\pm - 01 & -6.074\pm \\ 2.970\pm \cdot 02 & -1.649\pm - 00 & 2.634\pm - 02 & 1.27\pm - 04 & -6.195\pm - 02 & -8.677\pm - 01 & -6.074\pm \\ 2.970\pm \cdot 02 & -1.70\pm - 00 & 3.065\pm - 02 & -3.376\pm - 03 & -6.195\pm - 02 & -8.677\pm - 01 & -7.631\pm \\ 3.166\pm \cdot 02 & -1.72\pm \cdot 00 & 3.065\pm - 02 & -3.376\pm - 05 & -6.195\pm - 02 & -8.677\pm - 01 & -7.631\pm \\ 3.366\pm \cdot 02 & -1.75\pm \cdot 00 & 3.025\pm - 02 & -5.376\pm - 05 & -6.135\pm - 02 & -8.677\pm - 01 & -1.315\pm \\ 3.56\pm \cdot 02 & -1.75\pm \cdot 00 & 3.025\pm - 02 & -5.376\pm - 05 & -6.13\pm - 02 & -8.677\pm - 01 & -1.63\pm \\ 3.762\pm \cdot 02 & -1.75\pm \cdot 00 & 3.025\pm - 02 & -2.52\pm - 05 & -6.13\pm - 02 & -8.677\pm - 01 & -1.63\pm \\ 3.762\pm \cdot 02 & -1.75\pm + 00 & 3.025\pm - 02 & -3.316\pm - 04 & -6.175\pm - 02 & -8.677\pm - 01 & -1.63\pm \\ 3.762\pm - 02 & -1.75\pm + 00 & 3.025\pm - 02 & -3.376\pm - 03 & -6.13\pm - 02 & -8.677\pm - 01 & -1.63\pm \\ 3.762\pm - 02 & -1.75\pm + 00 & 3.025\pm - 02 & -3.216\pm - 04 & -6.175\pm + 02 & -8.677\pm - 01 & -1.63\pm \\ 3.960\pm + 02 & -1.77\pm + 00 & 1.99\pm - 02 & -3.210\pm - 04 & -6.175\pm + 02 & -8.677\pm - 01 & -1.65\pm \\ 3.960\pm + 02 & -1.77\pm + 00 & 1.99\pm - 02 & -3.210\pm - 04 & -6.075\pm + 02 & -8.677\pm - 01 & -1.65\pm \\ 3.960\pm + 02 & -1.77\pm + 00 & 1.$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | .900E+U1    | -1.574E+00 | 1.9836-03         | 8-313E-05   | -3.126F+02      | 3.7105-01    | 2 .836E+01   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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1.0935-01    | 3.348E+01    |
| 1.584E+02 -1.605E+00 0.783E+03 1.476E+04 -5.186E+02 -2.620E+01 3.354E<br>1.782E+02 -1.618E+00 1.190E+02 1.666E+04 -5.791E+02 -8.606E+01 2.512E<br>1.980E+02 -1.632E+00 1.533E+02 1.779E+04 -6.211E+02 -8.788E+01 9.568E<br>2.177E+02 -1.647E+00 1.887E+02 1.774E+04 -6.209E+02 -8.6877E+01 -8.009E<br>2.378E+02 -1.642E+00 2.232E+02 1.677E+04 -6.194E+02 -8.6877E+01 -8.009E<br>2.378E+02 -1.647E+00 2.634E+02 1.677E+04 -6.194E+02 -8.6877E+01 -8.019E<br>2.578E+02 -1.691E+00 2.630E+02 1.127E+04 -6.194E+02 -8.6877E+01 -4.316E<br>2.772E+02 -1.691E+00 2.690E+02 1.127E+04 -6.195E+02 -8.6877E+01 -4.518E<br>2.970E+02 -1.706E+00 2.982E+02 6.841E+05 -6.195E+02 -8.6877E+01 -4.589E<br>3.166E+02 -1.735E+00 3.055E+02 1.5376E+05 -6.135E+02 -8.6877E+01 -1.589E<br>3.564E+02 -1.755E+00 3.026E+02 -5.376E+05 -6.135E+02 -8.6877E+01 -1.589E<br>3.66E+02 -1.755E+00 3.026E+02 -5.376E+05 -6.135E+02 -8.6877E+01 -1.589E<br>3.762E+02 -1.755E+00 3.026E+02 -5.376E+05 -6.135E+02 -8.6877E+01 -1.6310E<br>3.762E+02 -1.755E+00 3.026E+02 -3.316E+04 -6.105E+02 -8.6877E+01 -1.6310E<br>3.762E+02 -1.779E+00 1.9962E+02 -3.210E+04 -6.105E+02 -8.6877E+01 -1.6310E<br>3.762E+02 -1.779E+00 1.9962E+02 -3.210E+04 -6.075E+02 -8.6877E+01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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7565-03   | 3.5905.01    |
| 1.7822+02 -1.018E+00 1.190E-02 1.6666=04 -5.791E+02 -A.600E=01 2.512E<br>1.980E+02 -1.632E+00 1.533E-02 1.779E=04 -6.211E+02 -A.600E=01 2.512E<br>2.376E+02 -1.662E+00 2.632E=02 1.677E=04 -6.219E+02 -A.677E=01 -8.099E<br>2.376E+02 -1.662E+00 2.632E=02 1.677E=04 -6.194E+02 -8.677E=01 -2.558E<br>2.574E+02 -1.677E+00 2.594E=02 1.458E=04 -6.194E+02 -8.677E=01 -4.316E<br>2.772E+02 -1.691E+00 2.691E=02 1.127E=04 -6.195E+02 -8.677E=01 -4.316E<br>2.970E+02 -1.70E+00 2.691E=02 1.27E=04 -6.195E+02 -8.677E=01 -4.5316E<br>2.970E+02 -1.70E+00 2.691E=02 1.27E=05 -6.135E+02 -8.677E=01 -7.631EE<br>3.166E+02 -1.73E+00 3.065E=02 1.292E=05 -6.135E+02 -8.677E=01 -9.589E<br>3.366E+02 -1.73E+00 3.065E=02 -5.376E=05 -6.135E+02 -8.677E=01 -1.33EE<br>3.566E+02 -1.75E+00 2.494E=02 -1.316E=04 -6.195E+02 -8.677E=01 -1.33EE<br>3.566E+02 -1.75E+00 2.494E=02 -3.376E=05 -6.130E+02 -8.677E=01 -1.33EE<br>3.566E+02 -1.75E+00 2.494E=02 -3.376E=05 -6.130E+02 -8.677E=01 -1.33EE<br>3.566E+02 -1.75E+00 2.494E=02 -3.217E=04 -6.075E+02 -8.677E=01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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     | 1.384E-01    |
| 1.980E'02 -1.032E'00 1.533E'02 1.779E'04 -6.21[E'02 -8.078E'01 2.5]2E'<br>2.178E'02 -1.047E'08 1.087E'02 1.778E'04 -6.209E'02 -0.877E'01 -0.568E<br>2.378E'02 -1.047E'08 1.087E'02 1.077E'04 -6.198E'02 -0.877E'01 -2.558E<br>2.578E'02 -1.077E'00 2.548E'02 1.057E'04 -6.199E'02 -0.877E'01 -0.316E<br>2.578E'02 -1.0591E'00 2.982E'02 1.0127E'04 -6.145E'02 -0.877E'01 -0.316E<br>2.772E'02 -1.0591E'00 2.982E'02 1.027E'04 -6.155E'02 -0.877E'01 -0.316E<br>2.970E'02 -1.73E'00 3.065E'02 1.027E'05 -6.135E'02 -0.877E'01 -0.589E<br>3.168E'02 -1.73E'00 3.065E'02 1.27E'05 -6.135E'02 -0.877E'01 -0.589E<br>3.366E'02 -1.73E'00 3.065E'02 -5.376E'05 -6.135E'02 -0.877E'01 -1.316E<br>3.564E'02 -1.756E'00 2.644E'02 -1.316E'05 -6.135E'02 -0.877E'01 -1.316E<br>3.762E'04 -1.76E'00 2.644E'02 -2.237E'04 -6.090E'02 -0.877E'01 -1.6316E<br>3.762E'04 -1.779E'00 1.962E'02 -3.210E'04 -6.075E'02 -0.877E'01 -1.662E'                                                                                                               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    | 3 5 35 - 01  |
| $\begin{array}{llllllllllllllllllllllllllllllllllll$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | -194195400 | 1 9 1 4 0 E - 0 E | 1+040C-04   | -3.7915-05      | -4+0006-04   | 5+215E+A1    |
| $\begin{array}{c} 2.17\pi E + 02 & -1.447 E + 00 & 1.487 E - 02 & 1.784 E - 04 & -6.209 E + 02 & -0.877 E - 01 & -8.009 E \\ 2.374 E + 02 & -1.469 E + 00 & 2.232 E - 02 & 1.457 E - 04 & -6.194 E + 02 & -0.877 E - 01 & -2.558 E \\ 2.574 E + 02 & -1.677 E + 00 & 2.544 E - 02 & 1.458 E - 04 & -6.195 E + 02 & -0.877 E - 01 & -4.316 E \\ 2.574 E + 02 & -1.691 E + 00 & 2.982 E - 02 & 1.427 E - 04 & -6.145 E + 02 & -0.877 E - 01 & -4.316 E \\ 2.970 E + 02 & -1.70 E + 00 & 2.982 E - 02 & -0.817 E - 01 & -6.074 E \\ 3.166 E + 02 & -1.72 E + 00 & 3.065 E - 02 & -0.812 E + 02 & -0.877 E - 01 & -7.831E \\ 3.564 E + 02 & -1.73 E + 00 & 3.065 E - 02 & -5.376 E + 05 & -6.135 E + 02 & -0.877 E - 01 & -1.358 \\ 3.564 E + 02 & -1.750 E + 00 & 2.644 E - 02 & -1.316 E - 04 & -6.105 E + 02 & -0.877 E - 01 & -1.316 E \\ 3.762 E + 02 & -1.750 E + 00 & 2.644 E - 02 & -2.237 E - 04 & -6.105 E + 02 & -0.877 E - 01 & -1.316 E \\ 3.762 E + 02 & -1.779 E + 00 & 1.962 E - 02 & -3.210 E - 04 & -6.075 E + 02 & -0.877 E - 01 & -1.662 E \\ 3.960 E + 02 & -1.779 E + 00 & 1.962 E - 02 & -3.210 E - 04 & -6.075 E + 02 & -0.877 E - 01 & -1.662 E \\ \end{array}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | .980E+02    | -I.032E.00 | 1.533E-02         | 1.7/9E-04   | -6.211E+02      | -8.788E-01   | 9+568E+00    |
| $\begin{array}{c} 2.376 \pm 0.2 & -1.462 \pm 0.0 \\ 2.574 \pm 0.2 & -1.467 \pm 0.0 \\ 2.574 \pm 0.2 & -1.677 \pm 0.0 \\ 2.574 \pm 0.2 & -1.677 \pm 0.0 \\ 2.594 \pm 0.2 \\ -1.677 \pm 0.0 \\ -1.677 \pm 0.0 \\ -1.677 \pm 0.0 \\ -1.677 \pm 0.0 \\ -1.772 \pm 0.0 \\ -1.316 \pm 0.0 \\ -1.316 \pm 0.0 \\ -1.316 \pm 0.0 \\ -1.772 \pm 0.0 \\ -1.316 \pm 0.0 \\ -1.3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2.178E+02   | -1.047E+08 | 1.887E-02         | 1.7846-04   | -6.2098+02      | -A.877E-01   | -8+009E+00   |
| 2.574E+02 -1.677E+00 2.544E-02 1.458E+04 -6.179E+02 -8.677E-01 -4.316E<br>2.772E+02 -1.691E+00 2.801E+02 1.127E-04 -6.145E+02 -8.677E-01 -6.074E<br>2.970E+02 -1.706E+00 2.902E+02 6.041E+05 -6.155E+02 -8.677E-01 -7.831E<br>3.164E+02 -1.73E+00 3.065E+02 1.292E+05 -6.135E+02 -8.677E-01 -9.589E<br>3.366E+02 -1.735E+00 3.065E+02 -5.376E+05 -6.135E+02 -8.677E+01 -9.589E<br>3.566E+02 -1.735E+00 3.026E+02 -5.376E+05 -6.155E+02 -8.677E+01 -1.135E<br>3.566E+02 -1.735E+00 2.484E+02 -1.316E+04 -6.155E+02 -8.677E+01 -1.316E<br>3.762E+02 -1.756E+00 2.497E+02 -2.207E+04 -6.990E+02 -8.677E+01 -1.486E<br>3.966E+02 -1.779E+00 1.962E+02 -3.210E+04 -6.975E+02 -8.677E+01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | \$+376E+02  | -1.0622+00 | 2.2328-02         | 1.677E-04   | -6.194E+02      | -8.877E-01   | -2 .558E .01 |
| 2.772E+U2 -1.691E+00 2.801E+02 1.127E+04 -6.145E+02 -8.877E+01 -6.074E<br>2.970E+U2 -1.706E+00 2.982E+02 6.841E+05 -6.190E+02 -8.877E+01 -7.891E<br>3.166E+U2 -1.721E+00 3.065E+02 1.292E+05 -6.135E+02 -8.877E+01 -9.589E<br>3.366E+U2 -1.735E+00 3.026E+02 -5.376E+05 -6.130E+02 -8.877E+01 -1.135E<br>3.564E+U2 -1.750E+00 2.644E+02 -1.316E+04 -6.105E+02 -8.877E+01 -1.310E<br>3.762E+02 -1.750E+00 2.649E+02 -2.227E+04 -6.090E+02 -8.877E+01 -1.436EE<br>3.964E+02 -1.779E+00 1.962E+02 -3.210E+04 -6.075E+02 -8.877E+01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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-8.8777-01   | -6.316E.01   |
| 2.978E+62 -1.706E+00 2.982E-02 6.841E-05 -6.190E+02 -8.877E-01 -7.831E<br>3.164E+02 -1.721E+00 3.065E-02 1.292E-05 -6.135E+02 -8.877E-01 -9.589E<br>3.366E+62 -1.735E+00 3.026E-02 -5.376E-05 -6.130E+02 -8.877E-01 -1.135E<br>3.566E+02 -1.735E+00 2.494E-02 -1.316E-04 -6.105E+02 -8.877E-01 -1.310E<br>3.762E+02 -1.764E+00 2.497E-02 -2.207E-04 -6.990E+02 -8.877E-01 -1.662E<br>3.966E+02 -1.779E+00 1.962E-02 -3.210E-04 -6.975E+02 -8.877E-01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2. TT2E+02  | -1.091E.00 | 2.801E-02         | 1.127E-04   | #6.145E+02      | -8-877F-01   | -6-074E-01   |
| 3.164E+02 -1.721E+00 3.065E+02 1.292E+05 +6.135E+02 -9.877E+01 +9.589E<br>3.366E+02 -1.735E+00 3.026E+02 -5.376E+05 +6.136E+02 -9.877E+01 +1.135E<br>3.564E+02 -1.756E+00 2.484E+02 -1.316E+04 +6.195E+02 -9.877E+01 +1.135E<br>3.762E+02 +1.756E+00 2.497E+02 -2.207E+04 +6.990E+02 -9.877E+01 +1.486E<br>3.966E+02 +1.779E+00 1.962E+02 -3.210E+04 +6.975E+02 -9.877E+01 +1.466E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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-8-877F-01   | -7-831F+01   |
| 3.366E+02 -1.735E+00 3.026E-02 -5.376E-05 -6.130E+02 -A.877E-01 -1.135E<br>3.564E+02 -1.750E+00 2.644E-02 -1.316E-04 -6.135E+02 -8.877E-01 -1.310E<br>3.762E+02 -1.750E+00 2.647E-02 -2.207E-04 -6.195E+02 -8.877E-01 -1.486E<br>3.960E+02 -1.779E+00 1.902E-02 -3.210E-04 -6.175E+02 -8.877E-01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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    | -9-5-95-01   |
| J.366E+02 -1.735E+00 J.020E+02 -5.376E-05 -6.100E+02 -#.877E-01 -1135E<br>3.566E+02 -1.750E+00 2.644E-02 -1.316E-04 -6.105E+02 -#.877E-01 -1.310E<br>3.762E+02 -1.764E+00 2.6497E-02 -2.207E-04 -6.090E+02 -#.877E-01 -1.662E<br>3.960E+02 -1.779E+00 1.962E-02 -3.210E-04 -6.075E+02 -#.877E-01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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    |              |
| 3.566E+U2 -1.750E+00 2.844E=02 -1.316E=04 -6.195E+U2 -8.877E=01 -1.310E<br>3.762E+02 -1.764E+00 2.497E=02 -2.207E=04 -6.990E+02 -8.877E=01 =1.486E<br>3.960E+U2 -1.779E+00 1.962E=02 -3.210E=04 -6.975E+02 -8.877E=01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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-#*#11E-01   | -1+135E+VZ   |
| 3.762E+02 -1.764E+00 2.497E-02 -2.207E-04 -6.00E+02 -A.877E-01 -1.486E<br>3.960E+02 -1.779E+00 1.962E-02 -3.210E-04 -6.075E+02 -A.877E-01 -1.662E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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-8.877E-01   | ~1.310E+02   |
| 3.960E+02 +1.779E+00 1.962E-02 -3.210E-04 -6.075E+02 -R.877E-01 -1.662E4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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-R.877E-01   | -1.486E+V2   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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-R.877E-01   | -1.662E.02   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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    |              |

THE MAXIMUM EQUILIBRIUM ERROR INTERNAL TO THE NEWSER IS \$.4655-09

PROB (CONTU)

1206 THO STORY BENT HOLDING STIFFNESS FROM 1902 - DEADALIVE LOADS

TABLE 10 - JOINT EQUILIBRIUM ERHORS

| JOINT | ERH(x)     | ERP(Y)     | ERRIZI     |
|-------|------------|------------|------------|
|       | FONCE      | FORCE      | MOMENT     |
| 4     |            |            | · .        |
| 1     | -2.424E-03 | 4,438E-10  | 2.7604-01  |
| 2     | -5.038E-uJ | 3.613E-04  | 1.3044.00  |
| 3     | 8.2626-03  | 9.036E-09  | 9.4095-01  |
| 46    | 1.221E-04  | -2.1936-04 | 8.892F-02  |
| 5     | -1-2216-04 | 6.557L-08  | -5.0765-07 |
| 6     | 2.5636-03  | 4.529E-10  | -3.536F-01 |
| 1     | 5.211E-03  | -1,419E-04 | -1.462#+00 |
| 9     | -7.773E-03 | 1.300E-08  | -1.143F+00 |
| 9     | -1°2A5E-11 | 1.630E-09  | 1,759F-10  |

#### 92 JULY 70 - CON - HH Example problems for report

#### PROB 1207

ADD JOINT TO AT GROUND LINE TO SUBDIVIDE PILE - DEAD LOAD

### TABLE 1 - PROBRAM CONTROL DATA PROBLEM TYPE 1

|                       |      | INPUT                  | TABLE               | 8  |                           | ·                  |             |
|-----------------------|------|------------------------|---------------------|----|---------------------------|--------------------|-------------|
| TAQLE<br>NUMBER       | HOLD | DATA<br>PROBL<br>YES+0 | FROM<br>EN<br>= NO) |    | NUMBER<br>ADDED<br>PROBLE | OF C<br>For t<br>M | ARD9<br>HIS |
| 2<br>4<br>5<br>6<br>7 |      | 1                      |                     |    |                           | 8<br>4<br>4<br>0   |             |
|                       |      | OUTPUT                 | TABL                | ES |                           |                    |             |

# TABLE SUPPRESS OUTPUT

NUMBER (1 . YES,0 . NO)

| . • |  | ~~ |  |
|-----|--|----|--|
| 9   |  | -0 |  |
| 10  |  | -0 |  |
|     |  |    |  |
|     |  |    |  |

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PROF (CONIU)

1207 ADD JUINT 10 AT GROUND LINE TO SURDIVINE PILE - DEAD LUAD

#### TABLE 2 - FRAME GEOMETRY DATA

na se a transferio de la companya d En la companya de la c

# MOLDING DATA FNOM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

NUMBER OF JOINTS IN FRAME # 10

#### INPUT OF JOINT OFFSETS

| FROM<br>Jotas | X-OFFSE | T Y <b>~OFFSøt</b> | OT<br>Twicl | <b>TO</b> | TO | 10 · | 10 | TO | TQ |
|---------------|---------|--------------------|-------------|-----------|----|------|----|----|----|
| ۲             | 0.      | 1.9206+02          | 10          | •         |    |      |    |    |    |
|               |         |                    |             |           |    |      |    |    |    |

#### COMPUTED JOINT COORDINATES

| JOINS                  | A           | ۲          |
|------------------------|-------------|------------|
|                        | 3 <b>0.</b> | .0,        |
| 8                      | 0.          | 2,278E+02  |
| 3                      | 0.          | 4.555E+02  |
| ise di 19 <b>≜</b> 99  | 4,8092+92   | 2.278E+02  |
| use he ser <b>b</b> ed | 4.400E+02   | 4.866E+02  |
| 6                      | 9.690E+02   | -4.824E+01 |
| 7                      | 9.640E+02   | 2.278E+02  |
| 8                      | 9.509E+02   | 5-2186-02  |
| 9                      | 4.800E+02   | -1.682E+02 |
| 10                     | 4.800E+02   | 2.3766+01  |
2 5 3 4 2 2.6096+02 φ. 2.609E+02 6 7 3 3 2.760E+92 2.7601.02 . ۰. \$ 3 8 2.940E+92 0. 2.9405+02 2 4 9 4.500E+02 4.880F.02 6 - 5 ٥. 7 4.600E+02 4.600F.02 8. 4.811E+02 4.600F.02 3.312E+01 - 2 4 5 - 5 2 6 - **R** 4.811E+02 4.800F.02 3.312F+01 4 3 £ 10 8 - 68 11 . 16 1.4202+92 8. 1.9205+02 8 2.n48E+82 0. 12 10 2.9405+02 4

... COMPUTED MEMBER NUMBERS AGREE WITH LAST PROBLEM ...

2.276E+02 0. 2.2788+02 3 1 1 2.278E+92 2 2.2788 +02 6.

TO STIFF LOAD LENGTH K-OFFSET HENGER FROM Y-OFFSET JOINT JOINT TYPE TYPE \*\*\*\*\*

COMPUTED MENSER NUMBERS, LENGTHS, AND OFFSETS

- 6 . 10 ä 10 4

INPUT OF HENBER LOCATIONS FROM STIFF LOAD 10 Tn. 10 TO TO TO 70 TO TO JOINT TYPE TYPE JOINT

NUNBER OF MENDER STIFFNESS TYPES . . NUMBER OF MEMBER LOAD TYPES . 7

HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

TABLE 3 - NEMBER LOCATION DATA

1

PROB (CONTD) ADO JOINT 10 AT GROUND LYNE TO SUBDIVIDE PILE - DEAD LUAD 1207

> PROS (CONTD) ADD JOINT 10 AT GHOUND LINE TO SUBDIVING PILE - DEAD LOAD 1207

HOLDING DATA FROM THE PHENIOUS PHONLEN PLUS THE FOLLOWING

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STIFF HOD OF PRISHATIC PRISHATIC NO AXIS HIPPUT

9 2,960E+04 1.050E+03 2.800E+01 0 1

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A CONTO

| 1 | 0 • | 9. | 0 = | 1+000E+99 | 1.000E.99 | 0+        |  |
|---|-----|----|-----|-----------|-----------|-----------|--|
| 6 | 0 • | 9. | 0 = | 1+000E+99 | 1.000E.99 | 1+800E+99 |  |
| 9 | 0 • | 9. | 0 = | 0+        | 2.000E.81 | 0+        |  |
|   |     |    |     |           |           |           |  |

PRISHATIC PHISHATIC NO ATTS OUTPUT PTH PIN

2 1 - 8

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1.VZDE+02 1.050E+03 2.800E+01 2.000E+00 1.500E+00 -0.

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CARUS OPT OPT

RESTRAINTS ARE IN MEMBER DRIMEN AXES

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neT

1.050E+03 2.000E+01 2.000E+00 4.000E+00 -0.

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**S**2

JOINT FORCE(X) FORCE(Y) MOMENT(Z) SPRING(X) SPRING(Y) SPRING(Z)

ACCUMULATED JAINT DATA

NONE

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HOLDING DATA FROM THE PHEVIOUS PROBLEM PLUS THE FOLLOWING

TABLE . - JOINT DATA

TABLE 5 - NEMBEH STIFFNESS DATA

1

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1

STIFF HOU OF

TYPE ELAST

\$ 80M

TYPE ELAST

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8 2.9606+84-0.

-0.

STIFF TYPE

PROB (CONTU) 1207 ADD JUINT 10 AT GROUND LINE TO SUBDIVIDE FILE - DEAD LOAD

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | and the second and the second seco                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | THE MAXIMUM EQUILIBRIUM ERHON INTEGNAL TO THE MEMBER IS 2.901E-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| NO DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <pre>characteric - Costant - Filesad<br/>http://www.sec.com/costant<br/>entities.com/costant/costant<br/>entities.com/costant/costant<br/>entities.com/costant/costant/costant<br/>entities.com/costant/costant/costant/costant/costant/<br/>entities.com/costant/costant/costant/costant/costant/costant/<br/>entities.com/costant/costant/costant/costant/costant/costant/<br/>entities.com/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/cost<br/>costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/costant/cos</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | HENBER NUMMER 2 STIFF TYPE 1 LOAD TYPE 1<br>LENGTH # 2.278E-92 ALPHA = 0.<br>BOSS FROM JOINT 2 TO JOINT 3<br>ALE OUTPUT FORCES ARE WITH RESPECT TO THE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| PROB (CONTD)<br>1>07 ADD JOINT 10 AT GROUND LINE TO SUBDIVID<br>TABLE R - JDINT DISPLACEMENTS AND REACTIONS<br>DISPLACEMENTS RF<br>JOINT DISP(X) DISP(Y) HOTATION(2) REACT(X)<br>1 -7.024E-99 -1.296E-97 2.0822-03 7.024E+00<br>2 -2.923E-02 -3.404E-97 2.0822-03 7.024E+00<br>2 -2.923E-02 -3.404E-97 2.0822-03 0.<br>3 8.705E-01 -4.998E-02 -4.526E-03 0.<br>4 -2.019E-02 -6.959E-01 -1.153E-04 0.<br>5 3.120E-01 -7.522E-01 1.407E-04 0.<br>5 3.120E-01 -4.929E-02 3.159F-03 0.<br>6 7.516E-99 -1.344E-97 -0.814E-97 -7.514E+00<br>7 -1.4231E-02 -4.246E-02 3.697F-03 0.<br>8 2.576E-01 -6.293E-05 3.697F-03 0.<br>9 2.278E+03 -6.048E-01 2.092F-05 0. | PILE - DEAD LOAD<br>ACTIONS<br>REACT(Y) REACI(Z)<br>1.296E+02 0.<br>0. 0.<br>0. 0.<br>0. 0.<br>1.344E+02 6.41AE+02<br>0. 0.<br>0. 0. | AT JOINT 2<br>AT JOI |

## PROB (CONTD) 1207 ADD JOINT 10 AT GROUND LINE TO SUBDIVIDE BILE . DEAD LOAD

NONE

## HOLDING DATA FROM THE PREVIOUS PROBLEM PLUS THE FOLLOWING

TABLE & - MEMBER LOAD DATA

PROS (CONTD) 1207 ADD JOINT 10 AT GROUND LINE TO SUBDIVING PILE - DEAD LOAD

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231

| AXIAL FONCE<br>Shear | 8<br>8 | -1.296E+02<br>-7.025E+00 | AXTAL FORCE | 8 | -1.192E+02<br>-7.025E+00 |
|----------------------|--------|--------------------------|-------------|---|--------------------------|
| MOMENT               | .0     | 1-250E-01                | MONENT      |   | -1.600E+03               |

AT JOINT 1 AT JOINT 2

MEMBER NUMBER 1 STIFF TYPE 1 LENGTH 2.2786-02 ALPHA 0, GOES FROM JOINT 1 TO JOINT 2 LOAD TOPE 1 BETA # 1.000E+00 ALL OUTPUT FORCES ARE WITH RESPECT TO THE MEMBER AXES

TABLE 9 - MEMBER RESULTS

Т

1207 ADD JOINT 10 AT GROUND LINE TO SUBDIVIDE PILE - DEAD LUAD

8

PROB (CONTU)

MEMBER NUMBER 11 STIFF TYPE 8 LOAD TYPE 0 RETA = ALPHA . D. 1.0002\*00

PROB (CONTO)

TABLE . - NEMBER RESULTS (CONTD)

1207

LENGTH = 1.920E+92 ALPNA = SOES FROM JOINT 9 TO JOINT 19 OUTPUT DISTANCES ARE FROM JOINT

ADD JOINT 10 AT GROUND LINE TO SUBDIVINE PILE - DEAD LUAD

OUTPUT DISTANCES ARE FROM JOINT . ALONG THE MEMBER AKIS ALL OUTPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AKES

DISPLACEMENTS FORCES AXIAL LATERAL ROTATIONAL ATTAL DISTANCE SHEAD HONFINT -6.048E-01 -2.278E-03 2.692E-85 -1.210E+01 -1.745E-11 1.741E-10 0. 9.6082+00 -6.0512-61 -2.0202-03 2.6952-05 -2.3712+01 6-1082-02 3.0352-01 

 1.920E-00
 -0.03[2-0]
 -2.002[-0.3
 2.092[-0.7]
 -2.533[\*0]
 5.135[\*0]
 5.135[\*0]

 1.920E-01
 -6.059E-01
 -1.740E-0.3
 2.772E-03
 -3.533E\*01
 1.357E-01
 2.463E\*00

 3.840E\*01
 -6.059E-01
 -1.447E+03
 2.772E\*03
 -4.696E\*01
 1.575E\*01
 2.463E\*00

 3.840E\*01
 -6.059E-01
 -1.447E+03
 2.473E\*05
 -5.986E\*01
 1.575E\*01
 2.463E\*00

 3.840E\*01
 -6.059E-01
 -1.447E+03
 2.473E\*05
 -5.986E\*01
 1.575E\*01
 2.463E\*00

 4.800E\*01
 -6.072E\*01
 -9.456E\*04
 3.032E\*05
 -7.695E\*01
 2.91E\*01
 6.155E\*08

 5.760E\*01
 -6.072E\*01
 -6.423E\*04
 3.256E\*05
 -8.102E\*01
 2.4039E\*01
 8.332E\*00

 6.720E\*01
 -6.091E\*01
 -3.160E\*04
 3.552E\*05
 -9.366E\*01
 2.525E\*01
 1.076E\*01

7.680E+01 -6.103E-01 4.214E-05 3.922E-05 -1.053E+02 2.558E-01 1.321E.01 8.640E+01 -6.103E-01 4.395E-04 4.368E-05 -1.178E+02 2.594E-01 1.365E.01 9.600E+01 -6.130E-01 8.832E-04 4.888E-05 -1.288E+02 2.360E-01 1.600E+01 1.056E+02 -6.146E=01 1.380E=03 3.4477E=05 -1.496E+02 2.326E+01 2.050E+01 1.152E+02 -6.162E=01 1.937E=03 6.130E=05 -1.632E+02 1.782E=01 2.205E+01 1.248E+02 -6.161E=01 2.559E=03 6.835E=05 -1.632E+02 1.338E=01 2.356E+01 1.346E+02 -6.201E=01 3.251E=03 7.579E=03 -1.761E+02 7.855E=02 2.459E+01 1.440E+02 -6.201E=01 4.415E=01 8.347E=0E -1.761E+02 7.855E=02 2.459E+01 1.056402 -6.146E-01 1.366E-03 5.477E-05 -1.496E-62 1.152E-02 -6.146E-01 1.937E-03 6.130E-05 -1.524E-62 1.440E+02 -6.222E-01 4.015E-03 8.347E-05 -1.841E+02 1.201E-02 2.504E.01 1.536E+02 -6.244E-01 4.053E-03 9.118E-05 -2.000E+02 -6.605E-02 2.479E+01 1.632E+02 -6.268E-01 5.765E-03 9.869E-05 -2.120E+02 -1.557E-01 2.374E+01 1.728E+02 -6.293E-01 6.747E-03 1.057E-04 -2.241E+02 -2.569E-01 2.177E-01 1.824E+02 -6.320E-01 7.793E-03 1.120E-04 -2.342E+02 -3.693E-01 1.878E+01 1.920E+02 -6.348E-01 8.894E-03 1.172E-04 -2.484E+02 -4.926E-01 1.466E+01

THE MAXIHUM EQUILIBRIUM CRROR INTENNAL TO THE MEMBER IS 1.445E-UP

TABLE 4 - MEMBER RESULTS (CONTO)

MEMBER NUMBER 12

LENGTH = 2.040E+02

PROS (CONTU) 1907 ADO JUINT 10 AT GROUND LINE TO SUBDIVIOF PILE - DEAD LUAU

STIFF TYPE 9

ALPHA = D.

GOES FROM JOINT IN TO JOINT A OUTPUT DISTANCES ARE FROM JOINT 10 ALONG THE MEMBER AXIA ALL OUTPUT FORCES AND DISPLACEMENTS ARE WITH RESPECT TO THE MEMBER AXES

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|           |            | SPLACENEN | Tg         |               | FORCES      |             |
|-----------|------------|-----------|------------|---------------|-------------|-------------|
| DISTANCE  | ANTAL      | LATERAL   | SOTATIONAL | AXIAL         | SHEAR       | MOMENT      |
| 0         | -6.3466-01 | 0.894E-03 | 1.1726-04  | -2.4=48+02    | -4.926E-01  | 1.467E.01   |
| 1.020E+01 | -6.378E-01 | 1.011E-02 | 1.212E-04  | -2.4#4E+02    | -4.926E-01  | 9.641E.UO   |
| 2.0406+01 | -6,409E-01 | 1.136E-02 | 1.2356-04  | -2.4446+02    | -4.926E-01  | 4.616E+00   |
| 3.060E*01 | -6.4406-01 | 1.2036-02 | 1.2426-04  | -2.4A4E+02    | -4,926E-01  | -4.087E-01  |
| 4.080E+01 | -6.470E-01 | 1.3095-02 | 1-2336-04  | -2.484E+02    | -4.9265-01  | -5.434E+00  |
| 5.100E+01 | -0.5018-01 | 1.5136-02 | 1.207E-04  | +2.454E+02    | -4.926F=01  | -1.046E+01  |
| 6.1208.01 | -6.531E-01 | 1.6345-02 | 1-1645-04  | -2-4845+02    | -4.926F-01  | -1 -548E+01 |
| 7.140E+01 | -6.502E-01 | 1.750E-02 | 1.1056-04  | -2.4#4E+0Z    | -4-926F-01  | -2.051E+01  |
| 8-160E+01 | -6.592E-01 | 1.859E-02 | 1.029E-04  | -2 .484E +02  | -4.9265-01  | -2.553E+01  |
| 9-180E+01 | -6.623E-01 | 1.960E-02 | 9.3746-05  | -7.404E+02    | -4 .926F-01 | -3.056E.01  |
| 1.020E*02 | -4.054E-01 | 2.050E-02 | 8.289E-05  | -2.4845+02    | -4.926F-01  | -3-558E+01  |
| 1.1226+02 | -6.084E-n1 | 2.128E-02 | 7-0396-05  | -2.484F+02    | -4.9265-01  | -4+061E+01  |
| 1.274E+62 | -6.715E-01 | 2.1938-02 | 5-624E-05  | -2 . ABAF +02 | -A+926F-01  | -4-563E+01  |
| 1.326E+02 | -6.745E-01 | 2.2428-02 | 4.044E-05  | -2.4845+02    | -4.9267-01  | -5.066E+91  |
| 1.4245+02 | -6.176E-01 | 2.2795-02 | 2.2998-05  | -2.4845+02    | +4.926F-01  | -5-568E+01  |
| 1.5305+42 | -6.806E-01 | 2.2898-02 | 3.8878-04  | -7-4845-02    | -4.9267-01  | -6-071E+01  |
| 1.6326+62 | -6.837E-01 | 2.2428-02 | -1-6866-05 | -2-ABAF+02    | -4.926F-01  | -6-5732+01  |
| 1.7345+02 | -6.068F-01 | 2.2545-02 | -1.9265-05 | -7.4845+0Z    | -4-926r-Ul  | -7.076F.01  |
| 1.8366+02 | -6.098E-01 | 2.2025-02 | -6.330E-05 | -2.4845+02    | -4.926F-41  | -7.578E+01  |
| 1.9346+02 | -4.9295-01 | 2.124E-02 |            | -7.404F+02    | -4-9265-01  | -8-0A1E-01  |
| 7.0445402 |            | 2-0195-02 | -1.1635-04 | -2.4 44 5 402 |             | -8-5535401  |

LOAD TYPE

n

RETA = 1.000E.00

THE MAXIMUM EQUILIBRIUM ERHUR INTERNAL TO THE MEMBER IS 4.081E-09

PROB (CONTD)

1207 ADU JUINT 10 AT GROUND LINE TO SUBDIVINE PILE - DEAD LOAD

TABLE 18 - JOINT EQUILIBRIUM ERROAS

| JOINT | ERH(I) | ERR(Y) | ERR (Z) |
|-------|--------|--------|---------|
|       | FONCE  | FORCE  | HOMENT  |

| 1   | -1.0y8E-03  | 1.992E-10  | 1.250g-01  |
|-----|-------------|------------|------------|
| 2   | -2. U89E-03 | 2.467E-04  | 5.471E-01  |
| 3   | 3.107E-03   | 2.5118-09  | 3.629F-01  |
| - 4 | 1.2428-04   | -3.161E-04 | 3.808F-02  |
| 5   | -4./17E-05  | 2.1616-08  | -8.1495-08 |
| 6   | 1-1/5E-03   | 2.037E-10  | -1.621F-01 |
| 7   | 1.8248-03   | 6.947E-05  | -6.195E-01 |
| - 6 | -2.9965-03  | 3.4092-09  | -4.407F-01 |
| 9   | -1.745E-11  | 1.4148-09  | 1.741=10   |
| 10  | -7.0976-05  | 1.6648-08  | 7.851F-03  |

## THE AUTHORS

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