Final Report

on

A STUDY OF DEMAND ELASTICITIES FOR ELECTRICITY, GASOLINE, AND NATURAL GAS IN THE TEXAS ECONOMY

Report Prepared

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for the

Governor's Energy Advisory Council

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Austin, Texas

under Contract No.

IAC-76-77(1156)

March, 1977

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INTRODUCTION

The primary purpose of this study is to show how higher prices of gasoline, electricity, and natural gas will decrease the use of these energy end products by consumers in Texas. Another purpose is to show how higher per capita incomes in Texas will increase the use of gasoline, electricity, and natural gas.

A previous effort was made by Thompson et al. (1974) at the University of Houston to estimate the response of electricity consumers in the residential and commercial sector of the Texas economy to higher prices of electricity and increasing per capita incomes. A similar effort was made to estimate the response of the highway use of gasoline in Texas to higher prices of gasoline and increasing per capita incomes The results of that analysis were used by the Texas Governor's Energy Advisory Council in making policy recommendations to the Texas legislature. Also, the results were submitted by the Federal Energy Administration to the Congress in support of President Ford's Energy Program .

The present study updates the analyses made for the Texas Governor's Energy Advisory Council in 1974. This update includes a current review of the literature and improved estimates, using the latest data available, of the residential demand for electricity and the highway use of gasoline. In addition, an entirely new model for the residential demand for natural gas is developed and estimated.

RESULTS OF IMPORTANT DEMAND STUDIES

Demands for Electricity and Natural Gas in the Residential and Commercial Sector

In previous studies, analysts have estimated total energy demands in residential and commercial use and energy demands for electricity and different fuel sources (natural gas, fuel oil, and coal) in residential and commercial use. In general, all price and income effects are measured in real terms to remove the declining purchasing power influence of general price inflation.

Certain studies have been primarily methodological. Balestra's (1967) study of the demand for natural gas in residential and commercial use provides an illustrative example. His methodological study indicates the short-run demand for natural gas in residential and commercial uses is relatively insensitive to price; however, the residential and commercial use of natural gas in new facilities may decrease 7% with a 10% increase in price in the long run.

Levy (1973) used Balestra's methodology to estimate the regional demand for electricity in residential use in New England. Levy used 1969 data for 67 New England electric utilities to estimate the demand for electricity. He found residential electricity use in New England would decrease 11% with each 10% increase in price. He further found per capita electricity use in New England would increase 4.4% with each 10% increase in per capita income.

Tyrell (1973) estimated the residential and commercial demand for electricity on a national and regional basis. His estimates indicate that the demand for electricity in this sector is relatively insensitive to price in the short run (10% increase in price decreases use 1.5%), but relatively sensitive to price in the long run (10% increase in price decreases use 12%). He found a 10% increase in per capita income would increase per capita use only 2%.

Anderson (1973) used a 1969 sample for the 50 states of the nation and a 1947-1969 sample for the state of California to identify and measure the factors which influence residential electricity demand. His results indicate that residential electricity demand is influenced by the cost of electricity, income, urbanism, climate, and the size of the household. Anderson's study showed a 10% increase in the electricity price would decrease use of electricity 8.7%; it further showed a 10% increase in per capita income would increase per capita use of electricity 4.4%.

Berman et al. (1972) explored the impact of increased electricity prices on residential consumers of different income groups. Their results indicate that a doubling of the price of electricity would result in a 50% decrease in residential electricity consumption.

Halvorsen (1972) used a combination of time-series and cross-sectional data for the 48 contiguous states to measure the effects of the marginal as well as the average price of electricity on the use of electricity in the residential and commercial sector. His results showed similar adjustments whether the marginal price or the average price was used in the analysis. A 10% increase in the average price of electricity decreased residential and commercial use by 11.4%, while a 10% increase in the marginal price decreased use by 11.6%, which is practically equivalent to the effect of the average price. In both analyses, a 10% increase in per capita income decreased per capita use of electricity 5.2%.

The Federal Energy Administration in its Project Independence Report (1974) estimated total energy consumption, electricity demand, and market shares for natural gas, oil products, and coal in the residential and commercial sector. The use of energy in this sector was estimated to decrease 2.3% with a 10% increase in the average price of energy and to increase 6.4% with a 10% increase in per-capita income. A 10% increase in the price of electricity is estimated to reduce consumption by 4.2%, while a 10% increase in the price of competing energy sources would result in a 2.8% increase in electricity consumption. The demand for electricity is estimated to increase 19% for a 10% increase in per capita income. Natural gas use in this sector would decrease 3.7% with a 10% increase in price. The FEA's estimates did not differentiate between short and long run response. Length of the adjustment period was not given.

The Federal Energy Administration developed an entirely new energy demand model for its National Energy Outlook (1976). This new model is a large econometric model which estimates energy demand regionally (nine Bureau of the Census Regions) by sector (residential/commercial, industrial, and transportation). Their results for the West South Central Region, which includes Texas, indicate that the residential demand for electricity would decrease 4.3% for a 10% increase in the price of electricity in the long run; a 10% increase in the price of natural gas would influence a 7.9% decrease in residential consumption in the long run. For the United States as a whole, a 10% increase in the price of electricity would influence a 5.3% decrease in electricity use in this sector in the long run. Natural gas use in this sector would decline 7.2% for a 10% increase in real price.

Tummala (1968), in a regional study for Michigan, estimated that the residential use of natural gas in that state would decline 4.4% in the long run for a 10% increase in the price of natural gas. His study indicates the regional demand for natural gas is less sensitive to a sustained price increase than found in the national study of Balestra (1967) and the recent national study of FEA (1976).

<u>Transportation Demand for Gasoline</u>

Phlips (1972) used methodology similar to Balestra's (1967) to estimate the price elasticity of gasoline use nationally. His results indicate that the use of gasoline is relatively insensitive to higher gasoline prices in the short run (only a 1.1% decrease in use results from a 10% increase in price); however, in a long run period of six years the use of gasoline would decrease 6.8% with a gasoline price increase of 10%.

Houthakker and Verleger (1973), using methodology similar to Phlips', found the use of gasoline in a one-year period would decrease 4.3% with a 10% increase in price and the use of gasoline in a period longer than one year would decrease 7.5% with a 10% increase in price. They further found a 10% increase in per capita income would increase per capita gasoline use 4.4% in a one-year period and 7.7% in a period more than one year.

Verleger and Sheehan (1973) in a Data Resources Study found the use of gasoline in a one-year period would decrease 1.4% with a 10% increase in price and the use of gasoline in a period longer than one year would decrease 3.2% with a 10% increase in price. They found a short run income effect similar to the one reported by Houthakker and Verleger (1973); however, they found a 10% increase in per capita income increased per capita gasoline use 10.3% in a period of 2.3 years.

Adams et al. (1974) estimated the economic demand for gasoline in 20 Organization for Economic Co-Operation and Development (OECD) countries in 1969. They found that gasoline use decreased 9% with each 10% increase in the fuel price and per capita gasoline use increased 5.2% with each 10% increase in per capita income.

The FEA (1974) estimated a 2% decrease in gasoline consumption in a one-year period and an 8% decrease in a period of more than one year for a 10% increase in gasoline price. A 10% increase in per capita income would influence a 1.5% increase in gasoline consumption in a period of one year, and a 6% increase in a period of more than one year.

In their new model, the FEA (1976) estimated automobile gasoline demand through a set of equations which relate vehicle miles and changes in the stock of automobiles to economic and technical factors (vehicle operating costs, income, average efficiency of the stock). They estimated in the long run that automobile gasoline use would decrease 3.3% with a 10% increase in the price of gasoline and would increase 9.8% with a 10% increase in per capita income.

Using similar methodology, Cato et al. (1975) estimated that gasoline use would decrease 2.4% in the short run and 3.6% in the long run with a 10% increase in the real price of gasoline. They also found a 10% increase in per capita income would result in a 9.3% increase in per capita gasoline use in the long run.

Summaries of methodology, data, and results for the identified studies are given in Tables 1, 2, and 3.

TABLE 1

SUMMARY OF PREVIOUS ELECTRICITY DEMAND STUDIES

Author (s)	Methodology	Price Variable	Data	Elasticities[1] Price	Income
Halvorsen (1972)	Dynamic Adjustment Model	Average Price	Annual time series from 1961 through 1969 and cross-sectional data for 48 contiguous states	-1.14	0.52
Halvorsen (1972)	Dynamic Adjustment Model	Marginal Price	Annual time series from 1961 through 1969 and cross-sectional data for 48 contiguous states	-1.16	0.52
Berman *et al.* (1972)	Static	Average Price	California cross-sectional data for major cities and income clases	-0.5	(2)
Anderson (1973)	Static	Average Price	Cross-sectional data for 50 states in 1969	-0.87	0.44
Levy (1973)	Static	Typical Bill for 500 kWh/Month	Cross-sectional data for 67 New England utilities in 1969	-1.11	0.44
Tyrell (1973)	Dynamic Adjustment Model	Average Price	Annual time-series from 1966 through 1970 and cross-sectional data for 48 contiguous states	S.R. -0.15 L.R. -1.20	0.20
FEA (1974)	Multiple-Equation Market Share Model-Dynamic	Average Price	Not clear from report	-0.42	1.9
FEA (1976)	Multiple-Equation Regional Market Share Model - Dynamic	Average Price	Annual time-series from 1960 through 1972 and cross-sectional data for 48 contiguous states	-0.53	0.44

1 Long-run (L.R.), unless otherwise indicated as short-run (S.R.)

2 Depends on the level of income

TABLE 2

SUMMARY OF PREVIOUS NATURAL GAS DEMAND STUDIES

Author (s)	Methodology	Data	Price Elasticities[1]
Balestra (1967)	Dynamic Adjustment Model	Annual time-series data from 1950 through 1962 and cross-sectional data for 36 states	SR - 0.00002 LR - 0.70
Tummala (1968)	Simultaneous Equations Model	Annual time-series data from 1946 through 1964 for Michigan	LR - 0.44
FEA (1974)	Multiple Equation Market Share Model - Dynamic	Not clear from report	LR - 0.37
FEA (1976)	Multiple Equation Regional Market Share Model - Dynamic	Annual time-series data from 1960 through 1972 and cross-sectional data for 48 contiguous states	LR - 0.72

[1] SR - Short-run
LR - Long-run

TABLE 3

SUMMARY OF PREVIOUS GASOLINE DEMAND STUDIES

Author (s)	Methodology	Data		Elasticities Price	Elasticities Income
Phlips (1972)	Dynamic Adjustment Model	Annual time-series from 1929 through 1967 (excluding 1942-1945) for the 48 contiguous states and Washington, D.C.	SR LR	-0.11 -0.68	--- ---
Houthakker-Verleger (1973)	Dynamic Adjustment Model	Annual time-series from 1949 through 1971 and cross-sectional data for 48 contiguous states and Washington, D.C.	SR LR	-0.43 -0.75	0.44 0.77
Verleger-Sheehan (1973)	Dynamic Adjustment Model	Quarterly time-series data from 1963 through 1972 and cross-sectional data for 48 contiguous states and Washington, D.C.	SR LR	-0.14 -0.32	0.45 1.03
Adams, *et al.*	System of Equations - Static	Cross-sectional data for 20 OECD countries in 1969	SR LR	N.A. -0.9	N.A. 0.52
FEA (1974)	Dynamic Adjustment Model	Not clear from report	SR LR	-0.20 -0.80	0.15 0.60
FEA (1976)	Multiple-Equation Model - Dynamic	Annual time-series from 1960 through 1972 and cross-sectional data for 48 contiguous states	LR	-0.33	0.98
Cato, *et al.* (1976)	Multiple-Equation Model - Dynamic	Not clear from report	SR LR	-0.24 -0.36	N.A. 0.93

SR - Short-run
LR - Long-run

UNIVERSITY OF HOUSTON STUDIES

Specification of the Demand Functions

The objectives of this study were accomplished by estimating separate demand functions for the residential use of electricity and natural gas and the highway use of gasoline. Each demand function is specified to a function of the respective price and per-capita income; also, the demand functions for electricity and natural gas are specified to be functions of how much the temperature deviates from that of a normal day.

The mathematical form of the demand model estimated in each case measures both the short and long term effects of adjustments in price and income on the consumption of electricity, natural gas, and gasoline. This adjustment process is formulated to account for gradual changes in the stock of energy consuming capital from the time of the initial price (or income) changes until the new long-run equilibrium is achieved. This type of model, known as a "flow adjustment" or "dynamic partial adjustment" model (Houthakker and Taylor, 1970), assumes that consumers cannot adjust instantly to changes in price or income because of incomplete knowledge, inertia, or the costs of change. Instead, consumers adjust gradually over time to their desired or "optimal" level of consumption for a given price and income level.

The model is developed in the following manner:

$$\text{Let } C_t^* = B_0 + B_1P_t + B_2Y_t, \qquad (1)$$

where C_t^* is the desired per-capita consumption at a per-unit price P_t and a per-capita disposable income Y_t in period t.

Because of ignorance, inertia, or the costs of change, desired consumption C_t^* cannot immediately adjust fully to changes in P and Y. Partial adjustment toward the desired value is specified to occur in the following way:

$$C_t - C_{t-1} = \lambda(C_t^* - C_{t-1}), \quad 0 < \lambda < 1 \qquad (2)$$

where λ is the rate of adjustment in each time period from the actual level toward the desired level.

Substituting (1) into (2) gives

$$C_t = B_0^* + B_1^* P_t + B_2^* Y_t + B_3^* C_{t-1} \qquad (3)$$

where $B_i^* = \lambda B_i$, $i = 1,2$; $B_3^* = 1 - \lambda$

Observed consumption, price, and income data are used to estimate equation (3). The estimated coefficients yield estimates of both short and long term elasticities. For example in logs, B_1^* and B_2^* are the short run (one period) price and income elasticities and B_1 and B_2 are the long run price and income elasticities. Large impediments to adjustment are associated with small values of λ (or large values of B_3^*). The reciprocal of λ is an estimate of the length of the adjustment period.

The same model is basically used to estimate each demand function. Inclusion of climatic variables in the electricity and natural gas demand equations is the only difference among the models. Cooling degree days are used to measure the upward deviation of a day's average temperature (at a given location) from a 65° F standard; heating degree days are used to measure the downward deviation of a day's average temperature from this standard. The variable cooling degree days is included in the electricity demand equation to account for increased electricity use for cooling purposes in periods of hot weather. Similarly, the additional variable heating degree days is included in the natural gas demand equation to reflect increased natural gas use for heating purposes in periods of cold weather.

Data Used in the Analyses

Residential Electricity Demand

The standardized reporting requirements by the Federal Power Commission for electric utilities allow the identification of consumption and price data for electricity. One or more Standard Metropolitan Statistical Areas (SMSA's) can be associated with each geographical area and serve as representative reference points for the gathering of readily available income and weather data. In this manner, a data base of cross-sectional and time-series data is constructed for the estimation of a demand function for electricity. Such a data base has several advantages over either pure cross-sectional or pure time-series data. First, it typically exhibits more variability and less correlation between regressors than pure time-series data; secondly, it allows the grouping of various regions and the testing of hypotheses about differences in consumption patterns between those regions; additionally, it efficiently provides for the use of more highly disaggregated, recent, and consistent data.

A cross-sectiontal time-series data base was constructed for the estimation of the residential demand for electricity in Texas, using data for 20 public and private utilities in 27 SMSA's in Texas for the years 1968-1974, and enlarged and updated with two additional years of data for each private utility (1973, 1974), four years of data for Austin Municipal (1971-1974), and two years of data each for Garland and San Antonio Municipal utilities (1973, 1974). These utilities accounted for over 96% of the electrical generating capacity and over 98% of the electrical power generated in Texas for those years. See Appendix A for a description and listing of the data used.

Consumption. The consumption data were obtained from the following two annual Federal Power Commission publications: (1) Statistics of Publicly-Owned Electric Utilities in the United States and (2) Statistics of Privately-Owned Electric Utilities in the United States. Total sales to residential customers were divided by the total residential customers for each utility to obtain average yearly kWh consumed per customer.

Prices. Some disagreement exists among researchers as to the proper price variable to include in the estimation of electricity demand functions. As electricity is typically priced in a declining block-rate structure (decreasing marginal price), the average price calculated from aggregate revenue/sales data will include the effects of the consumer's bill for given electricity use as well as the consumer's response to additional electricity use. The point of contention is whether consumers respond to average price, the marginal price, or perhaps to a typical monthly bill for a particular level of consumption. Anderson (1972) makes a good case for average price, arguing that consumers in general do not have the knowledge of the utility's price structure required to make decisions based on marginal price, and, furthermore, the marginal price declines very slightly between consumption levels of 500 and 1000 kWh per month, which includes most residential customers. By way of a corroboration of this latter claim, a check was made by calculating the marginal price for residential customers in Texas for 1972. Between consumption levels of 250 and 1250 kWh per month, the marginal price exhibited a total variation ofi only 0.21 cents per kWh. The additional explanatory value of using the marginal price in addition to the average price seemed small; thus, the average price was used as the only price variable. This price was calculated by dividing total revenues from residential sales by total sales to residential customers for each utility. These data were obtained from the Federal Power Commission publications mentioned above. The price series was divided by the Consumer Price Index (1967 = 100) to estimate real electricity prices. The Texas CPI was obtained from the U. S. Department of Labor's 1973 Handbook of Labor Statistics.

Personal Income. Per-capita disposable income statistics for SMSA's were obtained from the Survey of Current Business, U. S. Department of Commerce, March 1973. These statistics were also divided by the Texas CPI to estimate real per-capita disposable income.

Degree-Days. Monthly reports and annual summaries of Climatological Data, National Oceanographic and Atmospheric Administration (NOAA), U. S. Department of Commerce, were the statistical basis for calculating cooling and heating degree-days. As defined above, cooling degree-days are the upward deviation of a day's average temperature from a 65° F standard; heating degree-days ane the downward deviation of a day's average temperature from this same standard.

Residential Natural Gas Demand

Data for estimating the natural gas demand were developed in a way similar to that used to organize the data for estimating the electricity demand function. As in electricity use, residential consumers of natural gas are stationary, and the Texas Railroad Commission sets the standardized reporting procedure for all gas utilities. However, because natural gas is transported longer distances than electricity, the service regions are much larger for gas utilities than the service regions for electric utilities. This greater diversity plus the immense detail of the gas data reported to the Railroad Commission necessitates a means of representation to facilitate analysis, yet retain sufficient detail to measure well the price and income effects.

The following procedure was used to develop the representative economic regions for the natural gas demand analysis. Texas was separated into 8 regions which cover the state in both north-south and east-west directions. Within each region, one city (or town) was selected to represent an urban area. Both large and small urban areas were considered. One additional observation from each region was included to represent a rural area, as defined by the Texas Railroad Commission. The final classification includes 14 large urban areas, 9 small urban areas, and 5 rural areas. A description and a listing of the data are given in Appendix A.

Consumption. The consumption data for the years 1967 through 1973 were obtained from the Gas Utilities Division Annual Report of the Texas Railroad Commission. Total sales by gas utilities to residential customers were divided by total residential customers in each representative region to obtain average consumption per customer in thousand cubic feet per year.

Prices. The price variable is the average price per thousand cubic feet obtained by dividing total annual consumption by total annual gas utility revenues in each representative region. The data were obtained from the publications cited above. The price series obtained was transformed to real terms by the regional Consumer Price Index (1967 = 100) of the U. S. Department of Labor. The use of average prices is subject to the same reservations as for average electricity prices, but its use is similarly justified.

Per-Capita Income. Real per-capita disposable income series by state, county, and SMSA were obtained from the same sources used in the electricity analysis.

Degree-Days. The Texas Railroad Commission report cited above gives heating degree-days for the years 1967 through 1971. The data for 1972 and 1973 were obtained from the Climatological Data reports of the National Oceanographic and Atmospheric Administration.

The Highway Use of Gasoline

The gasoline data represent 28 years of annual statistics (1947-1974) for per-capita consumption, price per gallon, and per-capita disposable income in Texas. All of the price and income statistics were divided by the Texas Consumer Price Index (1967 = 100) to convert to real terms.

Consumption. Since the demand function specified would be expected to conform more closely to private consumer behavior (as opposed to commercial), the consumption series used was specified to conform as closely as possible to the highway use of gasoline. Verleger and Sheehan (1973) suggested highway gasoline use may be estimated accurately from two series: (1) highway use of motor fuels and (2) highway use of special fuels. These series are published annually by the Federal Highway Administration in Highway Statistics. Series (2) for Texas was subtracted from series (1) for Texas to estimate the highway use of gasoline in Texas for the years 1947-1974.

Prices. The simple average of the Dallas, El Paso, and Houston retail prices of regular gasoline (including taxes) were obtained from Platt's Oilgram Price Service (McGraw-Hill) for the years 1947-1972 and from The Oil and Gas Journal for the years 1973 and 1974.

Personal Income. The personal income series for Texas for 1947-1974, published by the U. S. Department of Commerce, was transformed to a disposable income series using the ratio of national disposable personal income to national total personal income. This constructed disposable income series for Texas was then deflated by the Texas Consumer Price Index (1967 = 100). Similar procedures were used to obtain disposable income in the electricity and natural gas demand analyses.

Population. Population series were obtained from publications of the U. S. Bureau of the Census. These data were used to convert the consumption and disposable personal income series to a per-capita basis.

See Appendix A for description and listing of data.

METHOD OF ANALYSIS

The economic demand functions for electricity, natural gas, and gasoline, as specified above, were estimated as strictly linear models and as log-linear models. The strictly linear specification assumes the effects of price, income, and climate (if applicable) on consumption are additive. The log-linear form (double-log) assumes percentage changes in these independent variables have an additive effect on percentage changes in consumption.

Ordinary least squares (OLS) methods were used to estimate the economic demand functions. OLS procedures yield consistent and asymptotically efficient estimates of the coefficients, if serial correlation is not present; however, the estimates of the price and income coefficients are known to be downwardly biased in the presence of a lagged dependent variable. The absolute value of the bias, however, decreases as the size of the sample increases.

RESULTS OF THE ANALYSIS

Estimates of both the strictly linear models and the log-linear models yield negative price and positive income coefficients, in accordance with economic theory. Similarly, the estimated coefficient of lagged consumption is positive and less than one.

Both climatic variables (cooling degree-days in the electricity demand models and heating degree-days in the natural gas demand models) have positive signs, as would be expected. Higher temperatures than the standard result in increased electricity use for cooling in the summer; and lower temperatures than the standard result in increased natural gas use for heating in the winter.

Statistical properties of the estimates are generally excellent. More than 91% of the variance in the use of residential electricity, residential natural gas, and highway gasoline is explained by the regression estimates.

Odds are greater than 88 out of 100 that the estimated price and income coefficients have real world meaning. These odds increase to greater than 95 out of 100 for all of estimated price and income coefficients in the three log-linear models.

Durbin's test (1970) for serial correlation reinforces the strength of these probability statements because the likelihood of serial correlation is less than 5 chances in 100. Significant serial correlation would mean that less confidence could be placed in the estimated price and income coefficients. This lower level of confidence would mean less real world meaning could be attached to the resulting price and income elasticities.

Estimates of the strictly linear and log-linear models have logical signs, significant coefficients, and high explanatory value. However, our experience leads us to recommend use of the log-linear demand estimates for policy evaluation purposes.

Texas Residential Electricity Demand

Inclusion of 34 additional data points in this study corroborates the estimates of the strictly linear model reported by Thompson et al. in the 1974 study. Estimates of the coefficients in this study are similar in relative magnitudes to those found in the 1974 study. The additional 5% of the variance explained by the new estimates shows up in higher statistical significance for each of the estimated coefficients. This is particularly evident for the coefficient of cooling degree-days, which goes from a low level of significance in the 74 study to a high level in this study; see Table 4.

At the point of the sample means, the estimate of the strictly linear model in this study indicates a 10% increase in the electricity price will result in a 8/10 of one percent decrease in residential electricity use in

Table 4.

Residential Electricity Demand
Estimates for Texas*

	1974 Study	1976 Study	
	Strictly Linear Model (100 Observations)	Strictly Linear Model (134 Observations)	Log-Linear Model (134 Observations)
Coefficients			
Price	-0.4816 (-2.18)	-0.3922 (-2.59)	-0.0515 (-2.07)
Income	0.0009 (3.09)	0.0007 (3.72)	0.1823 (3.36)
Cooling-degree days	0.0003 (1.84)	0.0004 (3.31)	0.1189 (4.03)
Lagged Consumption	0.8486 (14.2)	0.9069 (28.1)	0.8690 (28.9)
Constant	-0.4811	-0.9798	-2.0104
R^2	0.9	0.95	0.96
Durbin's Statistic		1.75	1.23
Elasticities			
Price			
Short-run	-0.10	-0.08	-0.05
Long-run	-0.67	-0.84	-0.38
Income			
Short-run	0.28	0.22	0.18
Long-run	1.87	2.33	1.37
Length of Adjustment Period (years)	6.6	10.7	7.6

*t-values of coefficients are given in parentheses below each estimate

a short run period of one year. It further indicates this 10% increase in price will result in 8.4% decrease in residential electricity use at the end of a 10.7 year adjustment period. This strictly linear model estimate shows a 10% increase in per-capita income will stimulate a 2.2% increase in per-capita residential electricity use in the short run and a 23.3% increase in use in the long run.

With the log-linear model, the estimate of equation (3) gives constant elasticities for every price and income level considered, in contrast to the strictly linear model where the elasticities are functions of the points on the demand functions considered. Short run price and income elasticities from the log-linear model are slightly smaller (in absolute values) than these elasticities for the strictly linear model at the point of sample means. Less long run price and income sensitivity is indicated by the estimate of the log-linear model than by the estimate of the strictly linear model. With 7.6 years for adjustment, a 10% increase in price decreases residential electricity use 3.8%, and a 10% increase in per-capita income stimulates a 13.7% increase in per-capita electricity use.

Texas Residential Natural Gas Demand

Our new estimates of the strictly linear and log-linear models for residential natural gas demand in Texas have logical-signed coefficients, relatively significant price and income effects, and high statistical explanatory value. The slightly better statistical fit of the log-linear form yields highly significant estimates for both the price and income coefficients. Odds for these coefficients to have real world significance are greater than 99 chances out of 100, which are further reinforced by the lack of any perceptible serial correlation. This log-linear estimate compares favorably with the strictly linear estimate because of the relatively low significance of the estimated price coefficient in the latter case. With a 10% increase in the natural gas price, the residential use of natural gas decreases 1% in a short run period of one year and 2.4% in a long run period of 2.4 years. Increases in real income expand the demand for natural gas in Texas only modestly. A 10% increase in per-capita income increases per-capita use of natural gas 1.7% in the short run and 4% in the long run; see Table 5.

Texas Highway Gasoline Demand

As in the 1974 study, the estimated demand functions for use of highway gasoline in Texas have logical signs, highly significant price and income coefficients, and high explanatory value. Inclusion of the 1973 and 1974 observations in the annual time-series data base from 1947-1972 resulted in considerably larger short and long run price elasticities of demand. With a 10% increase in the gasoline price, gasoline use in the log-linear model decreases 2.8% in one year and 16.2% in 5.8 years. Still larger price elasticities were found at the point of means in the strictly linear model, where a 10% increase in price decreases use 3.8% in the short run and 20.2% in the long run. Income growth was again found to have a relatively small demand expansion effect in a one year period (10% increase in income increases use from 1% to 2%) and only a modest demand stimulation influence in a period of 5.3 to 5.8 years (10% increase in income increases use by 6.9% to 7.8%); see Table 6.

A complete set of statistical results are given in Appendix B for residential electricity demand, residential natural gas demand, and highway use of gasoline in Texas. Sample forecasts for different price and income specifications are provided in Appendix C.

Table 5.

Residential Natural Gas Demand

Estimates for Texas*

	Model	
	Strictly Linear (200 observations)	Log-Linear (200 observations)
Coefficients		
Price	-0.9466 (-1.23)	-0.0980 (-3.84)
Income	0.0052 (4.36)	0.1674 (5.06)
Heating-Degree Days	0.0070 (7.26)	0.1391 (7.48)
Lagged Consumption	0.6828 (16.9)	0.5773 (13.7)
Constant	2.5327	-0.4744
R^2	0.915	0.925
Durbin's Statistic	-2.23	-1.32
Elasticities		
Price		
Short-run	-0.01	-0.10
Long-run	-0.03	-0.24
Income		
Short-run	0.15	0.17
Long-run	0.46	0.40
Length of Adjustment Period (years)	3.2	2.4

*t-values of coefficients are given in parentheses below each estimate

Table 6.

Highway Gasoline Demand

Estimates for Texas*

	1974 Study		1976 Study	
	Strictly Linear	Log-Linear	Strictly Linear	Log-Linear
	(26 time-series observations)		(28 time-series observations)	
Coefficients				
Price	-2.4923 (-2.66)	-0.1657 (-2.08)	-5.0418 (-5.81)	-0.2806 (-4.70)
Income	0.0291 (2.19)	0.1497 (2.12)	0.0287 (1.69)	0.1175 (1.66)
Lagged Consumption	0.8624 (14.8)	0.8299 (15.6)	0.8107 (11.1)	0.8268 (14.8)
Constant	82.47	0.47	180.27	1.12
R^2	0.996	0.994	0.994	0.994
Durbin's Statistic	-0.454	-0.528	1.113	0.092
Elasticities				
Price				
Short-run	-0.20	-0.17	-0.38	-0.28
Long-run	-1.43	-0.97	-2.02	-1.62
Income				
Short-run	0.15	0.15	0.15	0.12
Long-run	1.07	0.88	0.78	0.69
Length of Adjustment Period (years)	7.3	5.8	5.3	5.8

*t-values of coefficients are given in parentheses below each estimate

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Per-Capita Income

Survey of Current Business, March 1973, U.S. Department of Commerce, Bureau of Economic Analysis.

Weather

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Data Sources - Natural Gas

Consumption

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Price

Same as above

Per-Capita Income

Survey of Current Business, March 1973, U. S. Department of Commerce, Bureau of Economic Analysis.

Survey of Current Business, August 1975, U. S. Department of Commerce, Bureau of Economic Analysis

Weather

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APPENDIX A

This Appendix contains a description of the data used in the estimations, along with a listing of the data.

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1337ENERGY*TEXDEMAND(1).DATDOC
        THE ELEMENTS IN FILE 1337ENERGY*DEMDATA CONTAIN THE DATA SETS
        FOR THE REGRESSIONS IN RODMODS. THESE ELEMENTS ARE:
        ***********************************************************************
        DEMDATA.ELECOLD
        100 OBSERVATIONS OF RESIDENTIAL ELECTRICITY DEMAND IN TEXAS,
        ARRANGED AS TIME-SERIES (1968-1972) OF CROSS-SECTIONS.  THE
        CROSS-SECTIONS ARE REPRESENTED BY THE SERVICE AREAS OF 20 TEXAS
        UTILITIES (10 PUBLIC AND 10 PRIVATE) WHICH REPRESENT OVER 95%
        OF TEXAS ELECTRICITY GENERATION.
        OBSERVATION NUMBER    UTILITY             OWNERSHIP
              1-5              BRENHAM             PUBLIC
              6-10             CUERO               PUBLIC
             11-15             DENTON              PUBLIC
             16-20             FREDERICKSBURG      PUBLIC
             21-25             GARLAND             PUBLIC
             26-30             JASPER              PUBLIC
             31-35             LCRA                PUBLIC
             36-40             NEW BRAUNFELS       PUBLIC
             41-45             ROBSTOWN            PUBLIC
             46-50             SAN ANTONIO         PUBLIC
             51-55             CENTRAL PWR&LT      PRIVATE
             56-60             DALLAS PWR&LT       PRIVATE
             61-65             EL PASO EL.         PRIVATE
             66-70             HOUSTON LT&PWR      PRIVATE
             71-75             SWEPC               PRIVATE
             76-80             SWPSC               PRIVATE
             81-85             TESC                PRIVATE
             86-90             TX PWR&LT           PRIVATE
             91-95             W.TX UTIL.          PRIVATE
             96-100            GULF STATES         PRIVATE
        EACH ROW (OBSERVATION) OF THE DATA MATRIX CONTAINS THE FOLLOWING:
        COLUMN 1 - CONSUMPTION IN 10**3 KWH
        COLUMN$2 - REAL PRICE IN C/KWH
        COLUMN 3 - REAL DISPOSABLE INCOME PER CAPITA
        COLUMN 4 - COOLING DEGREE-DAYS PER YEAR
        COLUMN 5 - CONSUMPTION LAGGED ONE YEAR
        ***********************************************************************
        DEMDATA.ELEC
        134 OBSERVATIONS OF ELECTRICITY DEMAND IN TEXAS ARRANGED IN THE
        SAME MANNER AS IN .ELECOLD.  THE 34 ADDITIONAL OBSERVATIONS ARE:
        2 ADDITIONAL YEARS OF DATA FOR EACH PRIVATE UTILITY (20),
        4 YEARS (1971-1974) OF DATA FOR AUSTIN MUNICIPAL, 6 YEARS OF
        DATA (1969-1974) FOR LUBBOCK MUNICIPAL, AND 2 ADDITIONAL
        YEARS OF DATA EACH FOR GARLAND AND SAN ANTONIO (1973,1974).
        OBSERVATION NUMBER    UTILITY             OWNERSHIP
              1-4              AUSTIN              PUBLIC
              5-9              BRENHAM             PUBLIC
             10-14             CUERO               PUBLIC
             15-19             DENTON              PUBLIC
             20-24             FREDERICKSBURG      PUBLIC
             25-31             GARLAND             PUBLIC
             32-36             JASPER              PUBLIC
             37-41             LCRA                PUBLIC
             42-47             LUBBOCK             PUBLIC
             48-52             NEW BRAUNFELS       PUBLIC
             53-57             ROBSTOWN            PUBLIC
             58-64             SAN ANTONIO         PUBLIC
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      65-71               CENTRAL PWR&LT     PRIVATE
      72-78               DALLAS PWR&LT      PRIVATE
      79-85               EL PASO EL.        PRIVATE
      86-92               HOUSTON LT&PWR     PRIVATE
      93-99               SWEPC              PRIVATE
     100-106              SWPSC              PRIVATE
     107-113              TESC               PRIVATE
     114-120              TX PWR&LT          PRIVATE
     121-127              W.TX UTIL.         PRIVATE
     128-134              GULF STATES        PRIVATE
*****************************************************************************
DEMDATA.GSLNOLD
26 OBSERVATIONS OF GASOLINE DEMAND IN HIGHWAY USE IN TEXAS FOR
THE YEARS 1947-1972. STRICTLY A TIME SERIES.
EACH ROW REPRESENTS A YEAR. THE COLUMNS ARE:
COLUMN 1 - CONSUMPTION IN GALLONS PER CAPITA
COLUMN 2 - REAL PRICE IN CENTS PER GALLON
COLUMN 3 - REAL DISPOSABLE INCOME PER CAPITA
COLUMN 4 - CONSUMPTION LAGGED 1 YEAR
*****************************************************************************
DEMDATA.GSLN
28 OBSERVATIONS OF GASOLINE DEMAND IN HIGHWAY USE IN TEXAS FOR
THE YEARS 1947-1974.  STRICTLY A TIME SERIES.
THE DATA ARRANGEMENT IS THE SAME AS IN GSLNOLD.
*****************************************************************************
DEMDATA.NGASR
200 OBSERVATIONS ON RESIDENTIAL NATURAL GAS USE IN TEXAS ARRANGED
AS A TIME SERIES (1967-1973) OF CROSS-SECTIONS.  THE SECTIONS
ARE REPRESENTED BY 14 LARGE URBAN COMMUNITIES,9 SMALL URBAN
COMMUNITIES, AND 5 RURAL AREAS.  THE ARRANGEMENT IS AS
FOLLOWS:
OBSERVATION   REGION     COMMUNITY
      1-7     PANHANDLE LUBBOCK
      8-14    PANHANDLE AMARILLO
     15-21    FAR WEST  EL PASO
     22-28    CENT WEST MIDLAND
     29-35    CENT WEST ODESSA
     36-42    N.CENTRAL DALLAS
     43-49    N.CENTRAL FT. WORTH
     50-56    CENTRAL   AUSTIN
     57-63    EAST      TEXARKANA
     64-70    S.EAST    HOUSTON
     71-77    S.EAST    HOUSTON2
     78-84    S.CENTRAL CORPUS CHRISTI
     85-91    S.CENTRAL BROWNSVILLE
     92-98    S.CENTRAL HARLINGEN
     99-105   S.CENTRAL MCALLEN
    106-112   PANHANDLE ABERNATHY
    113-119   FAR WEST  PECOS
    120-126   CENT WEST CRANE
    127-133   N.CENTRAL GARLAND
    134-140   CENTRAL   BELTON
    141-147   EAST      NEW BOSTON
    148-154   S.EAST    HOUSTON SUBURBAN
    155-161   S.EAST    PASADENA
    162-168   S.CENTRAL BISHOP
    169-175   FAR WEST  RURAL-SOUTHERN UNION GAS
    176-179   N.CENTRAL RURAL - BRAZOS RIVER GAS CO.
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180-186   CENTRAL    RURAL - BROWN OIL AND GAS CO.
187-193   EAST       RURAL - ARK-LA. GAS CO.
194-200   S.EAST     RURAL - MORAN GAS CO.
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1337ENERGY*TEXDEMAND(1).ELEC

1	10.48	1.60	2581.00	3100.00	10.20
2	11.23	1.51	2703.00	3107.00	10.48
3	10.89	1.61	2823.00	2653.00	11.23
4	10.24	2.24	2811.00	2751.00	10.89
5	7.09	1.29	2246.00	2772.00	6.58
6	7.56	1.19	2117.00	3042.00	7.09
7	8.98	1.06	2113.00	2751.00	7.56
8	9.08	1.03	2267.00	2890.00	8.98
9	9.97	.96	2446.00	2847.00	9.08
10	6.18	1.34	2117.00	3403.00	5.74
11	6.73	1.23	2100.00	3256.00	6.18
12	6.63	1.20	2196.00	2962.00	6.73
13	7.85	1.08	2253.00	3370.00	6.63
14	8.02	1.03	2446.00	3408.00	7.85
15	7.88	1.95	3034.00	2781.00	7.32
16	7.43	2.17	2994.00	2919.00	7.88
17	8.34	1.83	2973.00	2793.00	7.43
18	8.74	1.78	3015.00	2774.00	8.34
19	10.38	1.65	3475.00	2952.00	8.74
20	6.14	1.35	2117.00	1845.00	5.70
21	6.62	1.23	2100.00	2843.00	6.14
22	7.09	1.13	2196.00	2744.00	6.62
23	7.42	1.07	2253.00	3100.00	7.09
24	7.47	1.03	2446.00	3107.00	7.42
25	9.06	2.03	3102.00	2781.00	8.41
26	10.43	1.85	3114.00	2919.00	9.06
27	12.20	1.56	3115.00	2793.00	10.43
28	13.46	1.56	3174.00	2774.00	12.20
29	14.98	1.50	3475.00	2952.00	13.46
30	16.44	1.85	3474.00	2541.00	14.98
31	15.92	1.93	3373.00	2578.00	16.44
32	6.37	1.83	2117.00	2707.00	5.91
33	6.87	1.75	2100.00	2876.00	6.37
34	7.51	1.64	2196.00	3163.00	6.87
35	7.73	1.53	2253.00	2791.00	7.51
36	8.34	1.52	2446.00	2581.00	7.73
37	9.16	.96	2416.00	2771.00	8.51
38	9.27	1.14	2361.00	2843.00	9.16
39	10.64	.96	2425.00	2744.00	9.27
40	10.89	.79	2581.00	3100.00	10.64
41	11.10	.75	2703.00	3107.00	10.89
42	5.69	2.14	2434.00	2054.00	5.50
43	5.84	2.02	2605.00	1881.00	5.69
44	5.37	2.09	2670.00	1664.00	5.84
45	5.88	1.91	2896.00	1509.00	5.37
46	6.50	1.90	2891.00	1594.00	5.88
47	6.36	1.87	2959.00	1740.00	6.50
48	7.10	1.09	2416.00	2771.00	6.59
49	8.54	1.03	2361.00	2843.00	7.10
50	10.34	.90	2425.00	2744.00	8.54
51	10.82	.86	2581.00	3100.00	10.34
52	10.82	.83	2703.00	3107.00	10.82
53	4.71	2.57	2305.00	3403.00	4.37
54	4.94	2.15	2304.00	3722.00	4.71
55	5.40	2.21	2435.00	3591.00	4.94
56	6.29	1.99	2507.00	4002.00	5.40
57	7.00	2.06	2639.00	3003.00	6.29

58	5.82	1.91	2331.00	2298.00	5.22
59	6.24	1.77	2350.00	2969.00	5.82
60	7.30	1.63	2407.00	2967.00	6.24
61	7.57	1.56	2564.00	3366.00	7.30
62	8.38	1.49	2639.00	3003.00	7.57
63	8.78	1.48	2806.00	2846.00	8.38
64	8.29	2.31	2811.00	2684.00	8.78
65	6.17	2.31	1785.00	3403.00	5.63
66	6.97	2.11	1758.00	3722.00	6.17
67	6.99	2.00	1866.00	3591.00	6.97
68	7.90	1.89	1952.00	4002.00	6.99
69	8.71	1.81	2060.00	3831.00	7.90
70	8.79	1.90	2230.00	3650.00	8.71
71	8.58	2.15	2181.00	3769.00	8.79
72	8.10	1.83	3102.00	2781.00	7.46
73	13.02	1.65	3114.00	2919.00	8.10
74	14.25	1.53	3115.00	2793.00	13.02
75	15.08	1.47	3174.00	2774.00	14.25
76	17.18	1.45	3475.00	2952.00	15.08
77	17.14	1.42	3474.00	2541.00	17.18
78	17.19	1.45	3373.00	2578.00	17.14
79	5.03	2.11	2204.00	1465.00	4.80
80	5.39	1.97	2177.00	2054.00	5.03
81	5.50	1.87	2207.00	1881.00	5.39
82	5.72	1.81	2284.00	1664.00	5.50
83	5.98	1.74	2446.00	1509.00	5.72
84	6.21	1.68	2554.00	2053.00	5.98
85	6.11	1.81	2506.00	1730.00	6.21
86	9.13	1.77	2873.00	2763.00	8.46
87	10.35	1.62	2879.00	2868.00	9.13
88	10.59	1.54	3016.00	2611.00	10.35
89	11.77	1.51	3163.00	2818.00	10.59
90	12.75	1.44	3315.00	2756.00	11.77
91	13.02	1.41	3626.00	2655.00	12.75
92	13.02	1.40	3554.00	2821.00	13.02
93	5.51	2.40	2799.00	2535.00	4.94
94	6.51	2.17	2672.00	2919.00	5.51
95	6.92	2.04	2529.00	2793.00	6.51
96	7.25	1.95	2514.00	2774.00	6.92
97	8.06	1.88	2896.00	2952.00	7.25
98	8.32	1.81	3135.00	2124.00	8.06
99	8.31	1.65	3038.00	2706.00	8.32
100	4.91	2.65	2417.00	1465.00	4.50
101	5.41	2.45	2388.00	2054.00	4.91
102	5.67	2.31	2680.00	1881.00	5.41
103	5.78	2.22	2770.00	1664.00	5.67
104	6.04	2.15	2992.00	1509.00	5.78
105	6.36	2.04	3219.00	1621.00	6.04
106	6.52	2.00	3225.00	1730.00	6.36
107	7.25	2.11	2956.00	2126.00	6.36
108	8.80	1.87	2797.00	2428.00	7.25
109	9.56	1.72	2810.00	2380.00	8.80
110	10.11	1.64	2879.00	2225.00	9.56
111	11.45	1.62	3177.00	2335.00	10.11
112	11.48	1.55	3287.00	2088.00	11.45
113	11.60	1.51	3225.00	2334.00	11.48
114	6.70	2.16	2341.00	2781.00	6.06
115	8.32	1.94	3014.00	2919.00	6.70

116	9.07	1.81	2419.00	2793.00	8.32
117	9.68	1.71	2489.00	2774.00	9.07
118	11.18	1.69	2703.00	2952.00	9.68
119	11.44	1.63	2766.00	2500.00	11.18
120	11.61	1.71	2713.00	2706.00	11.44
121	4.91	2.61	2435.00	2126.00	4.61
122	5.55	2.39	2400.00	2428.00	4.91
123	5.86	2.24	2596.00	2380.00	5.55
124	5.99	2.17	2687.00	2225.00	5.86
125	6.59	2.06	2928.00	2335.00	5.99
126	6.89	2.06	3076.00	2088.00	6.59
127	7.09	1.99	3077.00	2334.00	6.89
128	7.06	2.41	2670.00	2707.00	6.82
129	8.60	2.02	2649.00	2876.00	7.06
130	9.04	1.90	2772.00	3163.00	8.60
131	9.64	1.81	2858.00	2791.00	9.04
132	10.57	1.78	3089.00	2581.00	9.64
133	10.82	1.85	3223.00	2602.00	10.57
134	10.55	1.92	3130.00	2665.00	10.82

1337ENERGY*TEXDEMAND(1).GSLN

1	241.36	31.13	1551.30	235.40
2	261.30	32.24	1515.60	241.36
3	278.47	32.32	1605.20	261.30
4	301.80	32.04	1625.30	278.47
5	305.32	30.38	1604.50	301.80
6	317.38	30.52	1623.00	305.32
7	327.11	30.76	1630.00	317.38
8	337.05	31.43	1678.00	327.11
9	355.63	31.90	1755.20	337.05
10	358.46	32.78	1779.10	355.63
11	357.03	34.36	1792.30	358.46
12	362.82	33.18	1834.20	357.03
13	374.73	31.84	1921.00	362.82
14	370.29	32.87	1890.00	374.73
15	377.39	31.85	1943.00	370.29
16	386.01	30.12	1946.00	377.39
17	398.89	28.65	2001.90	386.01
18	412.39	29.22	2113.80	398.89
19	423.58	29.87	2227.50	412.39
20	439.11	29.98	2356.90	423.58
21	454.48	29.82	2458.00	439.11
22	479.05	28.83	2532.80	454.48
23	501.07	27.32	2528.20	479.05
24	521.66	27.50	2608.60	501.07
25	540.35	27.15	2662.80	521.66
26	574.95	25.48	2746.50	540.35
27	616.31	25.65	3012.50	574.95
28	577.65	34.36	2933.50	616.31

1337ENERGY*TEXDEMAND(1).NGASR

1	114.298	0.655	2410.0	3401.0	122.714
2	126.734	0.688	2452.0	3883.0	114.298
3	124.783	0.648	2434.0	3590.0	126.734
4	126.182	0.623	2605.0	3656.0	124.783
5	124.56	0.648	2670.0	3641.0	126.182
6	123.475	0.654	2896.0	3744.0	124.56
7	131.91	0.618	2891.0	3575.0	123.475
8	145.703	0.464	2731.0	3740.0	157.646
9	159.962	0.439	2482.0	4113.0	145.703
10	164.467	0.409	2342.0	4219.0	159.962
11	162.631	0.386	2755.0	4270.0	164.467
12	160.0	0.375	2871.0	4171.0	162.631
13	156.85	0.368	3089.0	4467.0	160.0
14	163.822	0.351	2831.0	4220.0	156.85
15	83.268	0.9273	2106.0	2621.0	85.793
16	95.698	0.874	2204.0	2814.0	83.268
17	94.33	0.846	2177.0	2448.0	95.698
18	95.847	0.819	2207.0	2443.0	94.33
19	90.0	0.85	2284.0	2600.0	95.847
20	87.622	0.862	2446.0	2289.0	90.0
21	101.1	0.863	2595.0	2836.0	87.622
22	107.367	0.659	3474.0	2498.0	113.659
23	121.167	0.652	3582.0	2844.0	107.367
24	121.054	0.65	3257.0	2628.0	121.167
25	128.14	0.621	3193.0	2821.0	121.054
26	121.0	0.65	3291.0	2397.0	128.14
27	121.538	0.705	3765.0	2698.0	121.0
28	135.747	0.618	3413.0	3612.0	121.538
29	99.04	0.669	2655.0	2498.0	105.652
30	108.556	0.705	2813.0	2844.0	99.04
31	105.305	0.666	2649.0	2628.0	108.556
32	111.623	0.637	2629.0	2821.0	105.305
33	105.0	0.65	2706.0	2397.0	111.623
34	103.667	0.677	2961.0	2698.0	105.0
35	113.965	0.634	2758.0	3612.0	103.667
36	110.735	0.818	2964.0	1993.0	113.313
37	127.484	0.782	3102.0	2461.0	110.735
38	128.53	0.744	3114.0	2250.0	127.484
39	129.823	0.757	3115.0	2341.0	128.53
40	115.0	0.73	3174.0	1905.0	129.823
41	124.721	0.71	3475.0	2372.0	115.0
42	125.945	0.674	3678.0	2074.0	124.721
43	83.936	0.884	2833.0	2122.0	87.812
44	96.018	0.841	2967.0	2590.0	83.936
45	96.179	0.811	2874.0	2320.0	96.018
46	97.636	0.865	2830.0	2497.0	96.179
47	88.0	0.85	2821.0	2284.0	97.636
48	92.371	0.832	3057.0	2372.0	88.0
49	96.976	0.823	3248.0	2074.0	92.371
50	80.328	0.91	2195.0	1592.0	82.991
51	93.303	0.852	2416.0	2098.0	80.328
52	91.181	0.798	2361.0	1727.0	93.303
53	96.404	0.745	2425.0	1898.0	91.181
54	88.0	0.75	2581.0	1309.0	96.404
55	86.391	0.784	2703.0	1738.0	88.0
56	95.538	0.741	2823.0	1672.0	86.391
57	103.403	0.659	2598.0	2728.0	105.635

58	93.303	0.602	2799.0	2966.0	103.403
59	117.44	0.574	2672.0	2622.0	93.303
60	117.546	0.567	2529.0	2[illegible]83.0	117.44
61	105.0	0.57	2514.0	2400.0	117.546
62	105.763	0.578	2896.0	2803.0	105.0
63	113.397	0.556	2674.0	2421.0	105.763
64	81.043	1.008	2835.0	1077.0	86.027
65	93.462	0.97	2873.0	1462.0	81.043
66	88.185	1.005	2879.0	1339.0	93.462
67	94.486	0.95	3016.0	1758.0	88.185
68	84.0	0.96	3163.0	1262.0	94.486
69	82.857	0.986	3315.0	1494.0	84.0
70	88.756	0.923	3525.0	1562.0	82.857
71	70.349	10.54	2835.0	1077.0	75.948
72	82.107	0.993	2873.0	1462.0	70.349
73	77.52	1.053	2879.0	1339.0	82.107
74	82.555	1.002	3016.0	1758.0	77.52
75	80.0	1.01	3163.0	1262.0	82.55
76	74.263	1.023	3315.0	1494.0	80.0
77	80.793	0.955	3525.0	1562.0	74.263
78	62.249	0.923	2314.0	797.0	68.244
79	74.422	0.835	2305.0	1068.0	62.249
80	65.184	0.809	2304.0	731.0	74.422
81	68.995	0.805	2435.0	865.0	65.184
82	62.0	0.825	2507.0	578.0	68.995
83	61.445	0.866	2639.0	869.0	62.0
84	67.015	0.809	2586.0	962.0	61.445
85	50.822	1.252	1490.0	608.0	52.518
86	57.708	1.147	1639.0	779.0	50.822
87	49.013	1.189	1606.0	462.0	57.708
88	56.509	1.222	1712.0	547.0	49.013
89	50.0	1.2	1811.0	456.0	56.509
90	47.37	1.212	1931.0	579.0	50.0
91	54.115	1.086	1955.0	706.0	47.37
92	46.06	1.317	1270.0	745.0	48.416
93	53.355	1.201	1410.0	1039.0	46.06
94	46.853	1.212	1364.0	654.0	53.355
95	58.703	1.203	1451.0	837.0	46.853
96	52.0	1.213	1538.0	456.0	58.703
97	45.916	1.223	1609.0	568.0	52.0
98	54.339	1.081	1755.0	706.0	45.916
99	44.793	1.331	1270.0	735.0	49.87
100	50.118	1.226	1410.0	1039.0	44.793
101	45.073	1.234	1364.0	691.0	50.118
102	54.177	1.23	1451.0	849.0	45.073
103	48.0	1.22	1538.0	456.0	54.177
104	45.46	1.226	1609.0	702.0	48.0
105	54.339	1.081	1755.0	706.0	45.46
106	116.263	0.656	2731.0	3401.0	120.454
107	122.126	0.687	2484.0	3883.0	116.265
108	123.606	0.643	2342.0	3590.0	122.126
109	126.508	0.623	2755.0	3656.0	123.606
110	120.0	0.64	2871.0	3641.0	126.508
111	106.509	0.664	3089.0	3744.0	120.0
112	129.441	0.615	2831.0	3575.0	106.509
113	103.963	0.884	2655.0	2309.0	99.114
114	105.021	0.92	2813.0	2655.0	103.963
115	103.504	0.872	2649.0	2513.0	105.021

116	104.275	0.824	2629.0	2677.[illegible]	103.504
117	104.0	0.83	2706.0	2397.0	104.275
118	96.659	0.839	3009.0	2356.[illegible]	104.0
119	102.526	0.832	2838.0	2636.[illegible]	96.659
120	89.542	0.951	2400.0	2355.0	87.711
121	94.808	0.977	2548.0	2871.0	89.542
122	93.695	0.923	2399.0	2601.0	94.808
123	97.316	0.86	2381.0	2650.0	93.695
124	90.0	0.845	2460.0	2397.0	93.695
125	87.049	0.839	2552.0	2356.0	90.0
126	93.4	0.857	2916.0	3612.0	87.049
127	95.595	0.842	2964.0	1993.0	98.479
128	109.384	0.81	3102.0	2461.0	95.595
129	107.863	0.771	3114.0	2250.0	109.384
130	97.437	0.835	3115.0	2341.0	107.863
131	96.0	0.75	3174.0	1905.0	97.437
132	109.031	0.691	3475.0	2372.0	96.0
133	118.786	0.674	3678.0	2074.0	109.031
134	69.242	0.965	2341.0	1967.0	72.962
135	77.815	0.854	2729.0	2354.0	69.242
136	75.083	0.814	2747.0	2188.0	77.815
137	80.223	0.915	2885.0	2276.[illegible]	75.083
138	75.0	0.9	2782.0	1872.0	80.223
139	77.093	0.872	2763.0	2161.[illegible]	75.0
140	81.592	0.873	3293.0	2360.0	77.093
141	97.895	0.72	2598.0	2728.0	101.473
142	110.35	0.666	2799.0	2966.0	97.895
143	106.77	0.663	2672.0	2822.0	110.35
144	106.555	0.615	2529.0	2883.0	106.77
145	100.0	0.63	2514.0	2400.0	106.555
146	91.985	0.6	2896.0	2803.0	100.0
147	103.516	0.608	2674.0	2421.0	91.985
148	77.565	1.049	2835.0	1077.0	82.276
149	92.287	0.998	2873.0	1462.0	77.565
150	89.061	1.023	2879.0	1339.0	92.287
151	90.073	1.023	3016.0	1758.0	89.061
152	90.0	1.0	3163.0	1262.0	90.073
153	84.367	0.998	3315.0	1494.0	90.0
154	92.656	0.924	3525.0	1562.0	84.367
155	76.744	1.049	2835.0	1077.0	83.0
156	90.165	0.985	2873.0	1462.0	76.744
157	83.617	1.04	2879.0	1339.0	90.165
158	88.341	0.969	3016.0	1758.0	83.617
159	80.0	1.0	3163.0	1262.0	88.341
160	75.02	1.037	3315.0	1494.0	80.0
161	80.551	0.989	3525.0	1562.0	75.02
162	61.677	1.246	2314.0	932.0	66.431
163	71.562	1.258	2305.0	1253.0	61.677
164	64.295	1.209	2304.0	900.0	71.562
165	70.727	1.132	2435.0	1059.0	64.295
166	60.0	1.132	2507.0	578.0	70.727
167	64.535	1.132	2639.0	1017.0	60.0
168	64.778	1.102	2586.0	962.0	64.535
169	78.421	1.042	2013.0	2300.0	83.952
170	112.1	0.785	2117.0	2655.0	78.421
171	83.678	0.954	2100.0	2513.0	112.1
172	76.035	0.96	2196.0	2677.0	83.678
173	80.0	0.98	2253.0	2397.0	76.035

174	65.271	0.997	2446.0	2356.0	80.0
175	71.262	0.968	2586.0	2836.0	65.271
176	89.162	0.914	2013.0	2569.0	101.291
177	76.77	0.856	2117.0	3053.0	89.162
178	100.197	0.798	2100.0	2893.0	76.77
179	103.776	0.731	2196.0	3002.0	100.197
180	71.935	0.813	1716.0	2024.0	80.153
181	84.665	0.741	1793.0	2412.0	71.935
182	84.91	0.709	1874.0	2403.0	84.665
183	83.417	0.718	1958.0	2522.0	84.91
184	78.0	0.7	2046.0	1800.0	83.417
185	82.635	0.675	2137.0	2426.0	78.0
186	77.204	0.769	2286.0	1800.0	82.635
187	95.972	0.713	2598.0	2032.0	95.975
188	107.638	0.634	2799.0	2374.0	95.972
189	109.578	0.632	2672.0	2048.0	107.638
190	113.091	0.615	2529.0	2093.0	109.578
191	105.0	0.62	2514.0	1800.0	113.091
192	107.406	0.639	2896.0	2059.0	105.0
193	110.955	0.599	2674.0	2421.0	107.406
194	110.062	0.901	2829.0	1656.0	120.584
195	128.469	0.877	2933.0	2156.0	110.062
196	108.195	0.983	3042.0	1740.0	128.469
197	115.347	0.939	3155.0	1936.0	108.195
198	105.0	0.92	3271.0	1450.0	115.347
199	97.845	0.895	3415.0	1710.0	105.0
200	107.895	0.844	3521.0	1562.0	97.845

APPENDIX B

This Appendix contains a complete printout of the results of the estimations, including data input, transformations of the data, the moment matrix, the correlation matrix, the sums of squares and products matrix, the variance-covariance matrix of coefficients, the values, standard errors, and t-values of the estimates, the standard error, R^2, and F-value. In addition, plottings are given for actual vs. predicted values, and for each of the dependent variables vs. the residuals.

This Appendix is organized as follows:

The test for serial correlation in the presence of lagged variables cannot be made with the standard Durbin-Watson (DW) statistic given in the printouts. Rather, Durbin's special test [1970] must be performed (see references). The values of Durbin's statistic for the models estimated were as follows:

Electricity Demand Model:

Linear	h = 1.752
Log-linear	h = 1.235

Natural Gas Demand Model

Linear	h = -2.225
Log-linear	h = 1.322

Gasoline Demand Model

Linear	$h = 1.113$
Log-linear	$h = 0.0925$

Note: h is distributed as a standard normally-distributed variable with mean = 0 and variance = 1.

```
VARIABLE NAMES:
CONPC - CONSUMPTION OF ELECTRICITY PER CUSTOMER IN 10**3 KWH
PCKWH - REAL PRICE IN CENTS/KWH (AVERAGE PRICE). 1967 DOLLARS.
RDIPC - REAL DISPOSABLE INCOME PER CAPITA IN 1967 DOLLARS
CDDYR - COOLING DEGREE-DAYS PER YEAR
CONLG - CONSUMPTION LAGGED ONE YEAR
LCONP - LOG OF CONSUMPTION
LPKWH - LOG OF PRICE
LRDIP - LOG OF DISPOSABLE INCOME
LDDS  - LOG OF COOLING DEGREE-DAYS
LCONL - LOG OF LAGGED CONSUMPTION
*******************************************************************
```

```
@STOPAG,NO
@ASG,A ECON*REGR.,F2
FACILITY WARNING  100000000000
@ASG,T DATFILE.
FACILITY WARNING  100000000000
@DATA,I DATFILE.
DATA T7 RL70-5 07/14-16:09:41
@ADD,DP DEMDATA.ELEC
END DATA.  IMAGE COUNT: 134
@XQT ECON*REGR.ECON
          ECONOMETRIC PROGRAM WRITTEN BY M.R.NORMAN
  DATA STORED  134    5    0    0    0    1    0    1    1    0     ELECTRICITY DEMAND - TEXAS RESIDENTIAL
 VARIABLE FORMAT WAS  (5F10.2)
```

	1	2	3	4	5
1	10.43	1.60	2531.00	3100.00	10.20
2	11.23	1.51	2703.00	3107.00	10.48
3	10.39	1.61	2323.00	2653.00	11.23
4	10.24	2.24	2311.00	2751.00	10.89
5	7.09	1.29	2246.00	2772.00	6.58
6	7.56	1.19	2117.00	3042.00	7.09
7	8.98	1.05	2113.00	2751.00	7.56
8	9.08	1.03	2267.00	2990.00	8.98
9	8.97	.96	2446.00	2847.00	9.08
10	6.18	1.34	2117.00	3403.00	5.74
11	6.73	1.23	2100.00	3256.00	6.18
12	6.63	1.20	2136.00	2962.00	6.73
13	7.85	1.09	2253.00	3370.00	6.63
14	8.02	1.03	2446.00	3408.00	7.85
15	7.38	1.95	3034.00	2781.00	7.32
16	7.43	2.17	2994.00	2919.00	7.88
17	8.34	1.33	2973.00	2793.00	7.43
18	8.74	1.73	3015.00	2774.00	8.34
19	10.38	1.65	3475.00	2952.00	8.74
20	6.14	1.35	2117.00	1845.00	5.70
21	6.62	1.23	2100.00	2343.00	6.14
22	7.09	1.13	2196.00	2744.00	6.62
23	7.42	1.07	2253.00	3100.00	7.09
24	7.47	1.03	2446.00	3107.00	7.42
25	9.06	2.03	3102.00	2781.00	8.41
26	10.43	1.85	3114.00	2919.00	9.06
27	12.20	1.56	3115.00	2793.00	10.43
28	13.46	1.55	3174.00	2774.00	12.20
29	14.98	1.50	3475.00	2952.00	13.46
30	16.44	1.85	3474.00	2541.00	14.98
31	15.92	1.33	3373.00	2578.00	16.44
32	6.37	1.83	2117.00	2707.00	5.91
33	6.87	1.75	2100.00	2876.00	6.37
34	7.51	1.64	2196.00	3163.00	6.87
35	7.73	1.53	2253.00	2791.00	7.51
36	8.34	1.52	2446.00	2581.00	7.73
37	9.15	.96	2416.00	2771.00	8.51
38	9.27	1.14	2361.00	2343.00	9.16
39	10.64	.95	2425.00	2744.00	9.27
40	10.89	.79	2581.00	3100.00	10.64
41	11.10	.75	2703.00	3107.00	10.89
42	5.69	2.14	2434.00	2054.00	5.50
43	5.84	2.02	2005.00	1881.00	5.69

44	5.37	2.09	2670.00	1664.00	5.84
45	5.38	1.91	2895.00	1509.00	5.37
46	6.50	1.90	2891.00	1594.00	5.82
47	6.36	1.87	2959.00	1740.00	6.50
48	7.10	1.03	2416.00	2771.00	6.53
49	8.54	1.03	2361.00	2843.00	7.10
50	10.34	.90	2425.00	2744.00	8.54
51	10.82	.86	2531.00	3100.00	10.34
52	10.32	.83	2703.00	3107.00	10.82
53	4.71	2.57	2305.00	3403.00	4.37
54	4.94	2.15	2304.00	3722.00	4.71
55	5.40	2.21	2435.00	3591.00	4.94
56	6.29	1.99	2507.00	4002.00	5.40
57	7.00	2.05	2639.00	3003.00	6.29
58	5.82	1.91	2331.00	2298.00	5.22
59	6.24	1.77	2350.00	2369.00	5.82
60	7.30	1.63	2407.00	2967.00	6.24
61	7.57	1.56	2504.00	3366.00	7.30
62	8.38	1.49	2639.00	3003.00	7.57
63	9.78	1.43	2805.00	2046.00	8.38
64	8.29	2.31	2811.00	2694.00	8.78
65	6.17	2.31	1735.00	3403.00	5.63
66	6.97	2.11	1758.00	3722.00	6.17
67	6.99	2.03	1855.00	3591.00	6.97
68	7.90	1.89	1952.00	4002.00	6.99
69	9.71	1.31	2060.00	3831.00	7.90
70	8.79	1.90	2230.00	3650.00	8.71
71	3.53	2.15	2181.00	3769.00	8.79
72	8.10	1.83	3102.00	2781.00	7.46
73	13.02	1.55	3114.00	2919.00	8.10
74	14.25	1.53	3115.00	2793.00	13.02
75	15.08	1.47	3174.00	2774.00	14.25
76	17.18	1.45	3475.00	2952.00	15.08
77	17.14	1.42	3474.00	2541.00	17.18
78	17.19	1.45	3373.00	2579.00	17.14
79	5.03	2.11	2204.00	1465.00	4.80
80	5.39	1.97	2177.00	2054.00	5.03
81	5.50	1.87	2207.00	1801.00	5.39
82	5.72	1.81	2284.00	1664.00	5.50
83	5.93	1.74	2446.00	1509.00	5.72
84	6.21	1.68	2554.00	2053.00	5.98
85	6.11	1.81	2505.00	1730.00	6.21
86	9.13	1.77	2873.00	2763.00	8.46
87	10.35	1.62	2879.00	2368.00	9.13
88	10.59	1.54	3016.00	2611.00	10.35
89	11.77	1.51	3163.00	2810.00	10.59
90	12.75	1.44	3315.00	2756.00	11.77
91	13.02	1.41	3525.00	2555.00	12.75
92	13.02	1.40	3554.00	2821.00	13.02
93	5.51	2.40	2799.00	2535.00	4.94
94	6.51	2.17	2672.00	2919.00	5.51
95	6.32	2.04	2529.00	2733.00	6.51
96	7.25	1.95	2514.00	2774.00	6.92
97	8.06	1.83	2395.00	2952.00	7.25
98	8.32	1.81	3135.00	2124.00	8.06
99	8.31	1.65	3038.00	2706.00	8.32
100	4.91	2.65	2417.00	1465.00	4.50
101	5.41	2.45	2388.00	2054.00	4.91

102	5.67	2.31	2690.00	1881.00	5.41
103	5.73	2.22	2770.00	1584.00	5.67
104	6.04	2.15	2902.00	1503.00	5.73
105	6.36	2.04	3219.00	1921.00	6.04
106	6.52	2.00	3225.00	1730.00	6.36
107	7.25	2.11	2936.00	2120.00	6.36
108	8.80	1.97	2707.00	2428.00	7.25
109	9.56	1.77	2310.00	2390.00	8.80
110	10.11	1.64	2673.00	2225.00	9.56
111	11.45	1.57	3177.00	2335.00	10.11
112	11.43	1.55	3207.00	2080.00	11.45
113	11.00	1.51	3225.00	2334.00	11.43
114	6.70	2.10	2341.00	2781.00	6.06
115	8.32	1.94	3014.00	2919.00	6.70
116	9.07	1.91	2419.00	2790.00	8.32
117	9.93	1.71	2400.00	2774.00	9.07
118	11.18	1.69	2703.00	2952.00	9.93
119	11.44	1.67	2736.00	2500.00	11.18
120	11.61	1.71	2713.00	2706.00	11.44
121	4.31	2.61	2435.00	2120.00	4.61
122	5.55	2.30	2400.00	2428.00	4.31
123	5.86	2.24	2505.00	2380.00	5.55
124	5.93	2.17	2607.00	2225.00	5.86
125	6.59	2.06	2903.00	2333.00	5.93
126	6.93	2.66	3076.00	2038.00	6.59
127	7.09	1.97	3077.00	2334.00	6.93
128	7.06	2.41	2670.00	2707.00	6.92
129	8.60	2.32	2643.00	2870.00	7.06
130	9.04	1.90	2772.00	3100.00	8.60
131	9.64	1.31	2853.00	2701.00	9.04
132	10.57	1.70	3000.00	2581.00	9.64
133	10.32	1.35	3223.00	2002.00	10.57
134	10.55	1.92	3170.00	2605.00	10.32

AUTOMATIC TRAN

5 0 0 0 0

6 =	0 LOC	1	.0000
7 =	0 LOC	2	.0000
8 =	0 LOC	3	.0000
9 =	0 LOC	4	.0000
10 =	0 LOC	5	.0000

	1	2	3	4	5	6	7	8	9	10	11
1	10.43	1.07	2081.00	3100.00	10.20	2.35	.47	7.86	8.04	2.32	1.00
2	11.23	1.51	2703.00	3107.00	10.43	2.42	.41	7.90	8.04	2.35	1.00
3	10.89	1.31	2323.00	2850.00	11.23	2.33	.49	7.95	7.33	2.42	1.00
4	10.24	2.24	2811.00	2751.00	10.89	2.33	.81	7.94	7.92	2.39	1.00
5	7.03	1.29	2240.00	2772.00	6.58	1.95	.25	7.72	7.33	1.33	1.00
6	7.50	1.19	2117.00	3042.00	7.03	2.02	.17	7.66	8.02	1.96	1.00
7	8.93	1.00	2113.00	2751.00	7.56	2.13	.06	7.66	7.32	2.02	1.00
8	9.03	1.07	2207.00	2900.00	8.98	2.21	.03	7.73	7.97	2.19	1.00
9	9.87	.96	2440.00	2347.00	9.03	2.30	-.04	7.90	7.95	2.21	1.00
10	6.10	1.74	2117.00	3400.00	5.74	1.82	.29	7.66	8.13	1.75	1.00
11	6.73	1.23	2100.00	3250.00	6.10	1.31	.21	7.65	8.09	1.82	1.00
12	6.63	1.20	2166.00	2992.00	6.73	1.89	.18	7.69	7.99	1.31	1.00
13	7.85	1.38	2353.00	3370.00	6.63	2.06	.08	7.72	8.12	1.39	1.00
14	8.02	1.53	2446.00	3450.00	7.85	2.08	.03	7.80	8.13	2.06	1.00
15	7.33	1.95	3034.00	2731.00	7.32	2.06	.67	8.02	7.33	1.99	1.00
16	7.43	2.17	2934.00	2810.00	7.33	2.01	.77	8.00	7.98	2.06	1.00
17	8.34	1.37	2973.00	2730.00	7.43	2.12	.50	8.00	7.33	2.01	1.00

18	8.74	1.78	3015.00	2774.00	8.34	2.17	.58	8.01	7.93	2.12	1.00
19	10.39	1.65	3475.00	2952.00	8.74	2.34	.50	8.15	7.93	2.17	1.00
20	6.14	1.35	2117.00	1645.00	5.70	1.81	.30	7.66	7.52	1.74	1.00
21	6.62	1.23	2100.00	2843.00	6.14	1.89	.21	7.65	7.95	1.81	1.00
22	7.09	1.13	2196.00	2744.00	6.62	1.96	.12	7.69	7.92	1.89	1.00
23	7.42	1.07	2253.00	3100.00	7.09	2.00	.07	7.72	8.04	1.96	1.00
24	7.47	1.03	2446.00	3107.00	7.42	2.01	.03	7.80	8.04	2.00	1.00
25	9.06	2.03	3102.00	2781.00	8.41	2.20	.71	8.04	7.93	2.13	1.00
26	10.43	1.85	3114.00	2919.00	9.06	2.34	.62	8.04	7.98	2.20	1.00
27	12.20	1.56	3115.00	2793.00	10.43	2.50	.44	8.04	7.93	2.34	1.00
28	13.46	1.56	3174.00	2774.00	12.20	2.60	.44	8.06	7.93	2.50	1.00
29	14.98	1.50	3475.00	2952.00	13.46	2.71	.41	8.15	7.93	2.60	1.00
30	16.44	1.85	3474.00	2541.00	14.98	2.80	.62	8.15	7.84	2.71	1.00
31	15.92	1.93	3373.00	2578.00	16.44	2.77	.65	8.12	7.85	2.80	1.00
32	5.37	1.83	2117.00	2707.00	5.91	1.85	.60	7.66	7.90	1.78	1.00
33	6.37	1.75	2100.00	2976.00	6.37	1.93	.56	7.65	7.96	1.85	1.00
34	7.51	1.64	2196.00	3163.00	6.37	2.02	.49	7.69	8.06	1.93	1.00
35	7.73	1.53	2253.00	2791.00	7.51	2.05	.43	7.72	7.93	2.02	1.00
36	8.34	1.52	2446.00	2581.00	7.73	2.12	.42	7.80	7.86	2.05	1.00
37	9.16	.95	2416.00	2771.00	8.51	2.21	-.04	7.79	7.93	2.14	1.00
38	9.27	1.14	2361.00	2843.00	9.16	2.23	.13	7.77	7.95	2.21	1.00
39	10.64	.96	2425.00	2744.00	9.27	2.36	-.04	7.79	7.92	2.23	1.00
40	10.89	.79	2581.00	3100.00	10.64	2.39	-.24	7.86	8.04	2.36	1.00
41	11.10	.75	2703.00	3107.00	10.39	2.41	-.29	7.90	8.04	2.39	1.00
42	5.69	2.14	2434.00	2054.00	5.50	1.74	.76	7.80	7.63	1.70	1.00
43	5.34	2.02	2605.00	1081.00	5.69	1.76	.70	7.87	7.54	1.74	1.00
44	5.37	2.09	2670.00	1664.00	5.84	1.68	.74	7.89	7.42	1.76	1.00
45	5.89	1.91	2896.00	1509.00	5.37	1.77	.65	7.97	7.32	1.68	1.00
46	6.50	1.90	2891.00	1594.00	5.98	1.87	.64	7.97	7.37	1.77	1.00
47	6.36	1.87	2959.00	1740.00	6.50	1.85	.63	7.99	7.46	1.87	1.00
48	7.10	1.09	2410.00	2771.00	6.59	1.96	.09	7.79	7.93	1.89	1.00
49	8.54	1.03	2361.00	2843.00	7.10	2.14	.03	7.77	7.95	1.96	1.00
50	10.34	.90	2425.00	2744.00	8.54	2.34	-.11	7.79	7.92	2.14	1.00
51	10.82	.86	2581.00	3100.00	10.34	2.33	-.15	7.86	8.04	2.34	1.00
52	10.92	.83	2703.00	3107.00	10.82	2.38	-.19	7.90	8.04	2.38	1.00
53	4.71	2.57	2305.00	3403.00	4.37	1.55	.94	7.74	8.13	1.47	1.00
54	4.94	2.15	2304.00	3722.00	4.71	1.60	.77	7.74	8.22	1.55	1.00
55	5.40	2.21	2435.00	3591.00	4.94	1.69	.79	7.80	8.19	1.60	1.00
56	6.29	1.99	2507.00	4002.00	5.40	1.84	.69	7.83	8.29	1.69	1.00
57	7.00	2.06	2639.00	3003.00	6.29	1.95	.72	7.83	8.01	1.84	1.00
58	5.82	1.91	2331.00	2298.00	5.22	1.76	.65	7.75	7.74	1.65	1.00
59	6.24	1.77	2350.00	2900.00	5.32	1.83	.57	7.76	8.00	1.76	1.00
60	7.30	1.63	2407.00	2967.00	6.24	1.99	.49	7.79	8.00	1.83	1.00
61	7.57	1.56	2504.00	3366.00	7.30	2.02	.44	7.85	8.12	1.99	1.00
62	8.38	1.49	2639.00	3003.00	7.57	2.13	.40	7.88	8.01	2,02	1.00
63	8.73	1.43	2806.00	2346.00	8.38	2.17	.39	7.94	7.85	2.13	1.00
64	8.29	2.31	2811.00	2084.00	8.78	2.12	.84	7.94	7.90	2.17	1.00
65	6.17	2.31	1785.00	3403.00	5.53	1.82	.84	7.49	8.13	1.73	1.00
66	6.97	2.11	1750.00	3722.00	6.17	1.94	.75	7.47	8.22	1.82	1.00
67	6.99	2.00	1366.00	3591.00	6.97	1.94	.69	7.53	8.19	1.94	1.00
68	7.90	1.89	1952.00	4002.00	6.99	2.07	.64	7.58	8.29	1.94	1.00
69	8.71	1.81	2060.00	3831.00	7.90	2.16	.69	7.63	8.25	2.07	1.00
70	8.79	1.80	2230.00	3650.00	8.71	2.17	.64	7.71	8.20	2.16	1.00
71	8.58	2.15	2131.00	3769.00	8.79	2.15	.77	7.69	8.23	2.17	1.00
72	8.10	1.83	3102.00	2781.00	7.48	2.09	.60	8.04	7.93	2.01	1.00
73	13.02	1.65	3114.00	2919.00	8.10	2.57	.50	8.04	7.98	2.09	1.00
74	14.25	1.53	3115.00	2793.00	13.02	2.66	.43	8.04	7.93	2.57	1.00
75	15.08	1.47	3174.00	2774.00	14.25	2.71	.39	8.06	7.93	2.66	1.00

76	17.18	1.45	3475.00	2952.00	15.08	2.84	.37	8.15	7.39	2.71	1.00
77	17.14	1.42	3474.00	2541.00	17.18	2.84	.35	8.15	7.34	2.84	1.00
78	17.19	1.45	3373.00	2578.00	17.14	2.84	.37	8.12	7.35	2.84	1.00
79	5.03	2.11	2204.00	1465.00	4.80	1.62	.75	7.70	7.29	1.57	1.00
80	5.39	1.97	2177.00	2054.00	5.03	1.68	.68	7.69	7.63	1.62	1.00
81	5.50	1.87	2207.00	1881.00	5.39	1.70	.63	7.70	7.54	1.68	1.00
82	5.72	1.81	2234.00	1664.00	5.50	1.74	.59	7.73	7.42	1.70	1.00
83	5.93	1.74	2446.00	1509.00	5.72	1.79	.55	7.80	7.32	1.74	1.00
84	6.21	1.68	2554.00	2053.00	5.98	1.83	.52	7.85	7.63	1.79	1.00
85	6.11	1.81	2506.00	1730.00	6.21	1.81	.59	7.83	7.46	1.83	1.00
86	9.13	1.77	2873.00	2763.00	8.46	2.21	.57	7.96	7.92	2.14	1.00
87	10.35	1.62	2379.00	2368.00	9.13	2.34	.48	7.97	7.86	2.21	1.00
88	10.59	1.54	3016.00	2611.00	10.35	2.36	.43	8.01	7.87	2.34	1.00
89	11.77	1.51	3183.00	2818.00	10.59	2.47	.41	8.06	7.94	2.36	1.00
90	12.75	1.44	3315.00	2756.00	11.77	2.55	.36	8.11	7.92	2.47	1.00
91	13.02	1.41	3625.00	2655.00	12.75	2.57	.34	8.20	7.83	2.55	1.00
92	13.02	1.40	3554.00	2821.00	13.02	2.57	.34	8.18	7.94	2.57	1.00
93	5.51	2.40	2799.00	2535.00	4.94	1.71	.83	7.94	7.84	1.60	1.00
94	6.51	2.17	2672.00	2918.00	5.51	1.87	.77	7.89	7.98	1.71	1.00
95	6.92	2.04	2529.00	2793.00	6.51	1.93	.71	7.84	7.93	1.87	1.00
96	7.25	1.95	2514.00	2774.00	6.92	1.98	.67	7.83	7.93	1.93	1.00
97	8.06	1.83	2836.00	2352.00	7.25	2.09	.63	7.97	7.99	1.98	1.00
98	8.32	1.81	3135.00	2124.00	8.06	2.12	.59	8.05	7.66	2.09	1.00
99	8.31	1.65	3039.00	2706.00	8.32	2.12	.50	8.02	7.90	2.12	1.00
100	4.91	2.65	2417.00	1465.00	4.50	1.59	.97	7.79	7.29	1.50	1.00
101	5.41	2.45	2333.00	2054.00	4.91	1.69	.90	7.78	7.63	1.59	1.00
102	5.67	2.31	2600.00	1881.00	5.41	1.74	.84	7.89	7.54	1.69	1.00
103	5.78	2.22	2770.00	1664.00	5.67	1.75	.80	7.93	7.42	1.74	1.00
104	6.04	2.15	2992.00	1509.00	5.78	1.80	.77	8.00	7.32	1.75	1.00
105	6.36	2.04	3219.00	1621.00	6.04	1.85	.71	8.08	7.39	1.80	1.00
106	6.52	2.00	3225.00	1730.00	6.36	1.87	.69	8.08	7.46	1.85	1.00
107	7.25	2.11	2959.00	2126.00	6.36	1.98	.75	7.99	7.66	1.85	1.00
108	8.90	1.87	2797.00	2428.00	7.25	2.17	.63	7.94	7.79	1.98	1.00
109	9.56	1.72	2810.00	2380.00	8.90	2.26	.54	7.94	7.77	2.17	1.00
110	10.11	1.64	2879.00	2225.00	9.56	2.31	.49	7.97	7.71	2.26	1.00
111	11.45	1.62	3177.00	2335.00	10.11	2.44	.43	8.06	7.76	2.31	1.00
112	11.48	1.55	3287.00	2088.00	11.45	2.44	.44	8.10	7.64	2.44	1.00
113	11.60	1.51	3225.00	2334.00	11.48	2.45	.41	8.08	7.76	2.44	1.00
114	6.70	2.16	2341.00	2781.00	6.06	1.90	.77	7.76	7.93	1.80	1.00
115	8.32	1.94	3014.00	2913.00	6.70	2.12	.66	8.01	7.98	1.90	1.00
116	9.07	1.81	2419.00	2723.00	8.32	2.20	.59	7.79	7.93	2.12	1.00
117	9.68	1.71	2433.00	2774.00	9.07	2.27	.54	7.82	7.93	2.20	1.00
118	11.18	1.69	2703.00	2952.00	9.68	2.41	.52	7.90	7.99	2.27	1.00
119	11.44	1.63	2765.00	2500.00	11.18	2.44	.49	7.93	7.82	2.41	1.00
120	11.61	1.71	2713.00	2706.00	11.44	2.45	.54	7.91	7.90	2.44	1.00
121	4.91	2.61	2435.00	2120.00	4.61	1.59	.96	7.80	7.66	1.53	1.00
122	5.55	2.39	2400.00	2428.00	4.91	1.71	.87	7.78	7.79	1.59	1.00
123	5.86	2.24	2595.00	2380.00	5.55	1.77	.81	7.86	7.77	1.71	1.00
124	5.99	2.17	2687.00	2225.00	5.86	1.79	.77	7.90	7.71	1.77	1.00
125	6.59	2.06	2928.00	2335.00	5.99	1.89	.72	7.98	7.76	1.79	1.00
126	6.89	2.06	3078.00	2088.00	6.59	1.93	.72	8.03	7.64	1.89	1.00
127	7.09	1.99	3077.00	2334.00	6.89	1.96	.69	8.03	7.76	1.93	1.00
128	7.06	2.41	2870.00	2707.00	6.82	1.95	.68	7.89	7.90	1.92	1.00
129	8.60	2.02	2843.00	2376.00	7.06	2.15	.70	7.88	7.86	1.95	1.00
130	9.04	1.90	2772.00	3163.00	8.60	2.20	.64	7.93	8.06	2.15	1.00
131	9.64	1.81	2858.00	2791.00	9.04	2.27	.59	7.96	7.93	2.20	1.00
132	10.57	1.78	3089.00	2581.00	9.64	2.36	.58	8.04	7.86	2.27	1.00
133	10.82	1.85	3223.00	2602.00	10.57	2.38	.62	8.08	7.86	2.36	1.00

134 10.55 1.92 3130.00 2665.00 10.82 2.36 .65 8.05 7.89 2.38 1.00

CONPC PCKWH RDIPC CDDYR CONLG LCONP LPKWH LRDIP LDDS LCONL

MOMENT MATRIX

	CONPC	PCKWH	RDIPC	CDDYR	CONLG	LCONP	LPKWH	LRDIP	LDDS	LCONL
CONPC	7.955									
PCKWH	-.499	.173								
RDIPC	740.239	7.420	173794.733							
CDDYR	320.323	-61.625	-62508.829	303084.419						
CONLG	7.430	-.456	703.383	254.329	7.319					
LCONP	.846	-.061	76.721	43.763	.787	.093				
LPKWH	-.235	.111	10.157	-40.135	-.262	-.035	.073			
LRDIP	.267	.003	65.283	-25.425	.254	.028	.004	.025		
LDDS	.167	-.023	-20.123	121.537	.138	.022	-.018	-.008	.050	
LCONL	.836	-.060	77.625	37.052	.819	.092	-.035	.028	.019	.095
CONS	8.945	1.722	2690.515	2681.303	8.087	2.109	.510	7.882	7.871	2.041

CORRELATION MATRIX

	CONPC	PCKWH	RDIPC	CDDYR	CONLG	LCONP	LPKWH	LRDIP	LDDS
PCKWH	-.42								
RDIPC	.63	.04							
CDDYR	.21	-.27	-.27						
CONLG	.97	-.40	.62	.17					
LCONP	.93	-.43	.60	.26	.95				
LPKWH	-.37	.99	.09	-.27	-.36	-.43			
LRDIP	.60	.05	1.00	-.29	.60	.53	.09		
LDDS	.27	-.30	-.22	.99	.23	.32	-.30	-.24	
LCONL	.96	-.47	.60	.22	.98	.98	-.42	.58	.28

EQUATION NUMBER 1

134 10 ELECTRICITY DEMAND - TEXAS RESIDENTIAL

0 0 0 5 2 3 4 5 1 3 0 5 1 2 3 4 5

	1	2	3	4	5	6
1	420.351	619462.030	610599.390	1805.176	230.730	1923.245
2	619462.030	************	************	2998236.282	359189.000	3203587.082
3	610599.390	************	************	2940016.302	359375.000	3149346.182
4	1805.176	2998236.282	2940016.302	9736.567	1083.630	10355.992
5	230.730	359189.000	359375.000	1083.630	134.000	1158.410
6	1928.245	3203587.082	3149346.182	10355.992	1158.410	11072.297

ORDINARY LEAST SQUARES

VARIANCE-COVARIANCE MATRIX OF COEFFICIENTS

.022995				
-.000011	.000000			
.000000	.000000	.000000		
.002456	-.000005	-.000001	.001040	
-.031605	-.000075	-.000050	.003893	.359491

DEPENDENT VARIABLE CONPC

A(PCKWH)= -.33213533 T= -2.586

(.15163979)

```
A( RDIPC  )=      .00073793     T=  3.718
            (      .00019848)

A( CDDYR  )=      .00036829     T=  3.307
            (      .00011136)

A( CONLG  )=      .90693414     T= 28.124
            (      .03224775)

A( CONS   )=     -.97973574     T= -1.634
            (      .59957600)

VARIANCE=       .36770557

STAND DEV=      .60638730

R-SQUARED=      .9538          (ADJUSTED FOR D. OF FREEDOM)

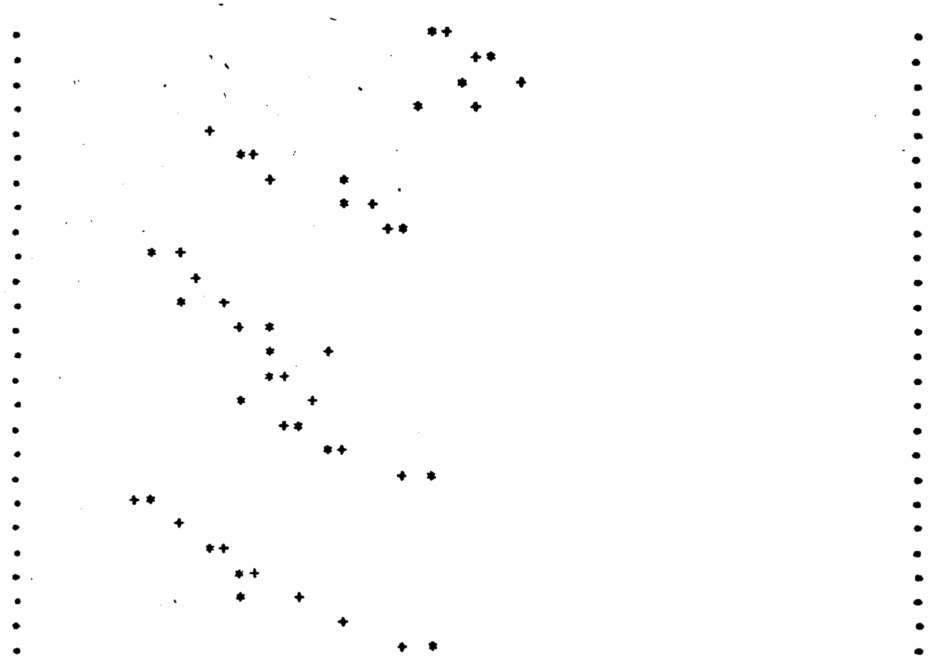
F-TEST( 4,129)=    687.09
```

ELECTRICITY DEMAND - TEXAS RESIDENTIAL

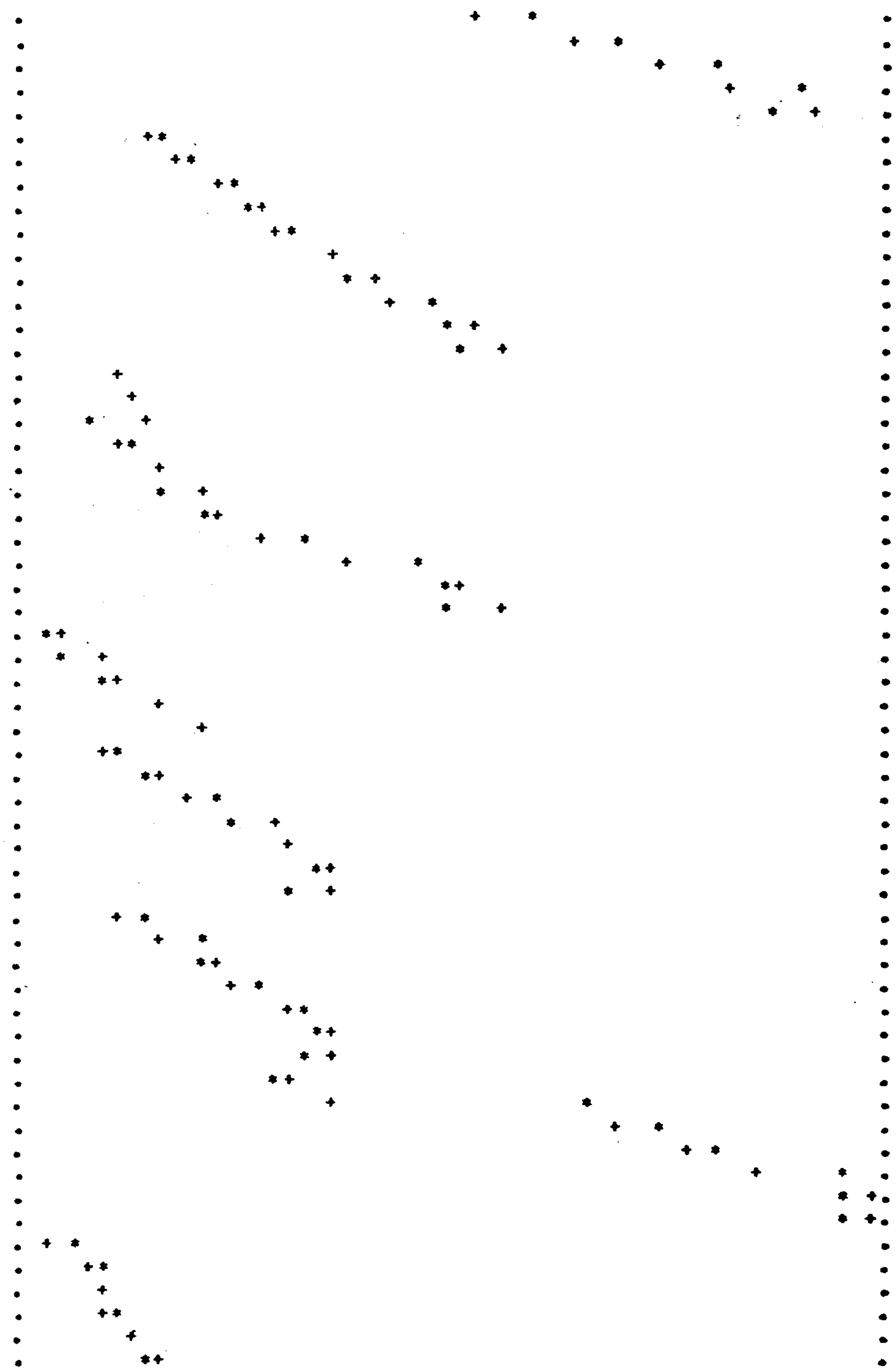
1 CONPC	PCKWH	RDIPC	CDDYR	CONLG	CONS	R/SE	DW/F
OLS	-.3922	.0007	.0004	.9069	-.9798	.9538	1.7192
	-2.5363	3.7173	3.3072	28.1240	-1.6341	.6064	687.0861

RANGE 4.39 TO 17.54

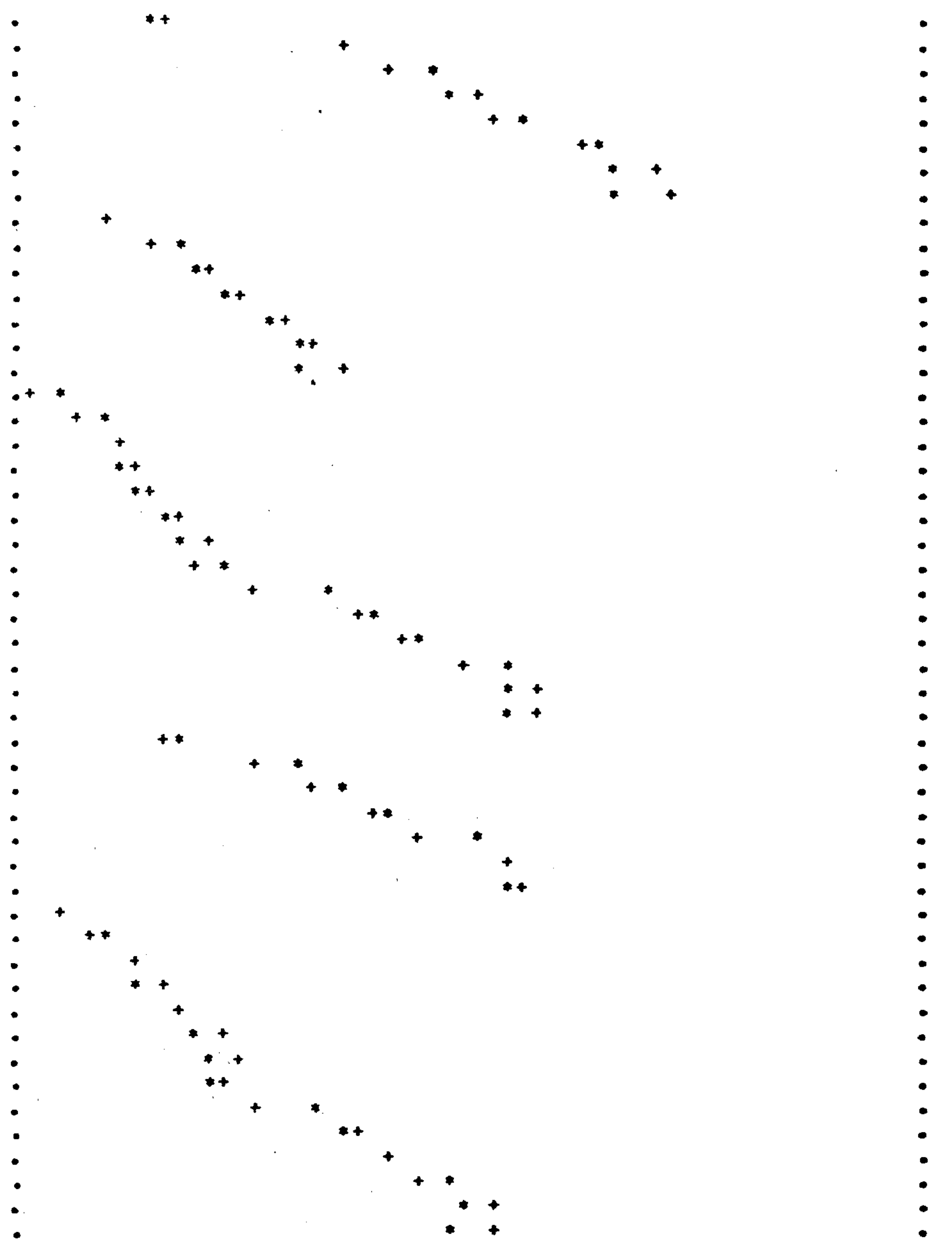
ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
10.480	10.690	-.210	-2.001	1
11.230	11.072	.158	1.411	2
10.890	11.634	-.744	-6.831	3
10.240	11.106	-.866	-8.454	4
7.090	7.160	-.070	-.990	5
7.560	7.666	-.106	-1.405	6
8.980	8.033	.947	10.542	7
9.080	9.438	-.418	-4.601	8
9.970	9.732	.238	2.385	9
6.180	6.516	-.336	-5.436	10
6.730	6.891	-.161	-2.399	11
6.630	7.365	-.735	-11.080	12
7.850	7.513	.337	4.289	13
8.020	8.796	-.776	-9.673	14
7.880	8.157	-.277	-3.519	15
7.430	8.600	-1.170	-15.750	16
8.340	8.264	.076	.917	17
8.740	9.132	-.392	-4.490	18
10.380	9.951	.429	4.131	19
6.140	5.902	.238	3.877	20
6.620	6.703	-.083	-1.255	21
7.090	7.212	-.122	-1.721	22
7.420	7.835	-.415	-5.593	23
7.470	8.295	-.825	-11.044	24
9.060	9.165	-.105	-1.155	25
10.430	9.884	.546	5.231	26



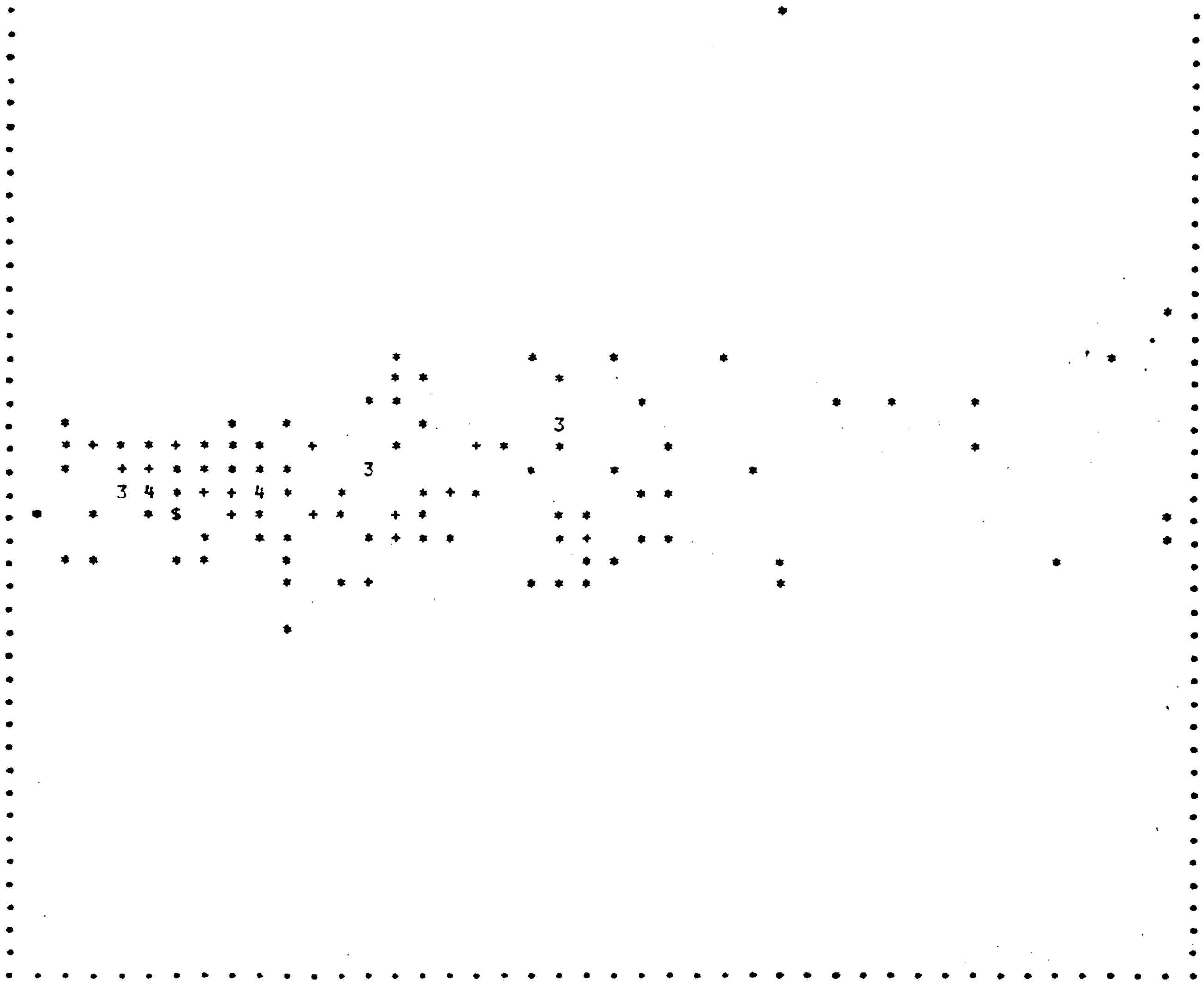
12.200	11.195	1.005	8.238	27
13.450	12.837	.623	4.630	28
14.980	14.291	.689	4.601	29
16.440	15.380	1.060	6.448	30
15.920	16.612	-.692	-4.345	31
6.370	6.222	.148	2.329	32
6.870	6.720	.150	2.185	33
7.510	7.393	.117	1.557	34
7.730	7.922	-.192	-2.480	35
8.340	8.190	.150	1.796	36
9.160	9.165	-.005	-.056	37
9.270	9.670	-.400	-4.314	38
10.640	9.851	.789	7.415	39
10.890	11.406	-.516	-4.742	40
11.100	11.741	-.641	-5.779	41
5.690	5.722	-.032	-.556	42
5.840	6.004	-.164	-2.800	43
5.370	6.080	-.710	-13.224	44
5.880	5.834	.046	.780	45
6.500	6.328	.172	2.642	46
6.360	7.006	-.646	-10.161	47
7.100	7.373	-.273	-3.342	48
8.540	7.845	.695	8.141	49
10.340	9.213	1.127	10.904	50
10.820	11.107	-.287	-2.652	51
10.820	11.647	-.827	-7.640	52
4.710	4.930	-.220	-4.667	53
4.940	5.520	-.580	-11.733	54
5.400	5.753	-.353	-6.539	55
6.290	6.461	-.171	-2.720	56
7.000	6.970	.030	.424	57
5.820	5.572	.248	4.265	58
6.240	6.432	-.192	-3.077	59
7.300	6.909	.391	5.354	60
7.570	8.161	-.591	-7.804	61
8.380	8.355	.025	.302	62
8.780	9.159	-.379	-4.313	63
8.290	9.140	-.850	-10.253	64
6.170	5.791	.379	6.146	65
6.970	6.457	.513	7.367	66
6.990	7.257	-.267	-3.815	67
7.900	7.533	.367	4.643	68
8.710	8.406	.304	3.488	69
8.790	9.164	-.374	-4.258	70
8.580	9.146	-.566	-6.602	71
8.100	8.400	-.300	-3.639	72
13.020	9.097	3.923	30.167	73
14.250	13.556	.694	4.872	74
15.080	14.731	.349	2.312	75
17.130	15.730	1.400	8.151	76
17.140	17.544	-.404	-2.356	77
17.190	17.435	-.245	-1.425	78
5.030	4.712	.318	6.324	79
5.390	5.172	.218	4.037	80
5.500	5.497	.003	.063	81
5.720	5.597	.123	2.155	82
5.980	5.886	.094	1.569	83
6.210	6.426	-.216	-3.471	84



6.110	6.429	-.319	-5.218	85
9.130	9.136	-.006	-.070	86
10.350	9.846	.504	4.870	87
10.530	10.930	-.400	-3.779	88
11.770	11.404	.366	3.107	89
12.750	12.591	.159	1.245	90
13.020	13.684	-.664	-5.101	91
13.020	13.941	-.921	-7.074	92
5.510	5.558	-.048	-.876	93
6.510	6.213	.297	4.560	94
6.920	7.019	-.099	-1.433	95
7.250	7.408	-.158	-2.182	96
8.060	8.082	-.022	-.278	97
8.320	8.716	-.396	-4.758	98
8.310	9.157	-.847	-10.195	99
4.910	4.385	.525	10.688	100
5.410	5.031	.379	7.005	101
5.670	5.691	-.021	-.374	102
5.780	5.949	-.169	-2.920	103
6.040	6.133	-.143	-2.363	104
6.360	6.670	-.310	-4.881	105
6.520	7.021	-.501	-7.583	106
7.250	6.925	.325	4.481	107
8.800	7.820	.980	11.133	108
9.560	9.277	.283	2.963	109
10.110	9.991	.119	1.175	110
11.450	10.758	.692	6.041	111
11.480	11.991	-.511	-4.454	112
11.600	12.079	-.479	-4.130	113
6.700	6.421	.279	4.167	114
8.320	7.635	.685	8.233	115
9.070	8.670	.400	4.413	116
9.680	9.434	.246	2.543	117
11.180	10.218	.962	8.602	118
11.440	11.482	-.042	-.370	119
11.610	11.723	-.113	-.978	120
4.910	4.757	.153	3.108	121
5.550	5.201	.349	6.285	122
5.860	5.967	-.107	-1.833	123
5.930	6.236	-.306	-4.943	124
6.590	6.665	-.075	-1.145	125
6.890	7.228	-.338	-4.904	126
7.090	7.619	-.529	-7.457	127
7.060	7.228	-.168	-2.373	128
8.600	7.645	.955	11.106	129
9.040	9.285	-.245	-2.712	130
9.640	9.646	-.006	-.062	131
10.570	10.295	.275	2.602	132
10.820	11.218	-.398	-3.675	133
10.550	11.371	-.321	-7.786	134



DURBIN-WATSON D STATISTIC= 1.71922
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -3.928 3.928
X-AXIS CONPC RANGE 4.710 17.190
CODE OF SYMBOL *=1 +=2 $=OVER 4



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    X-AXIS      CONPC
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS    RESO  RANGE        -3.928          3.928
X-AXIS    PCKWH RANGE          .750          2.650
CODE OF SYMBOL   *=1   +=2   $=OVER 4
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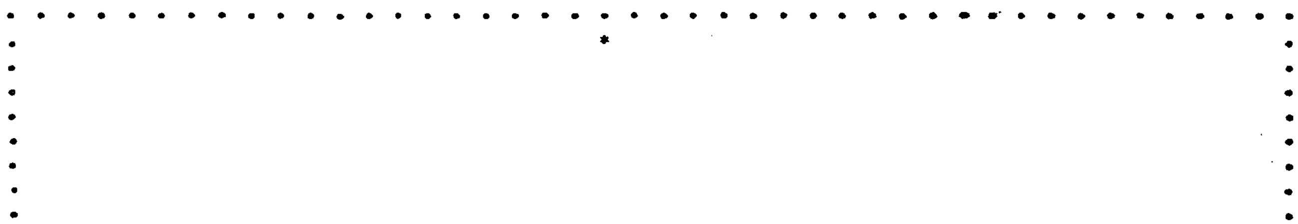
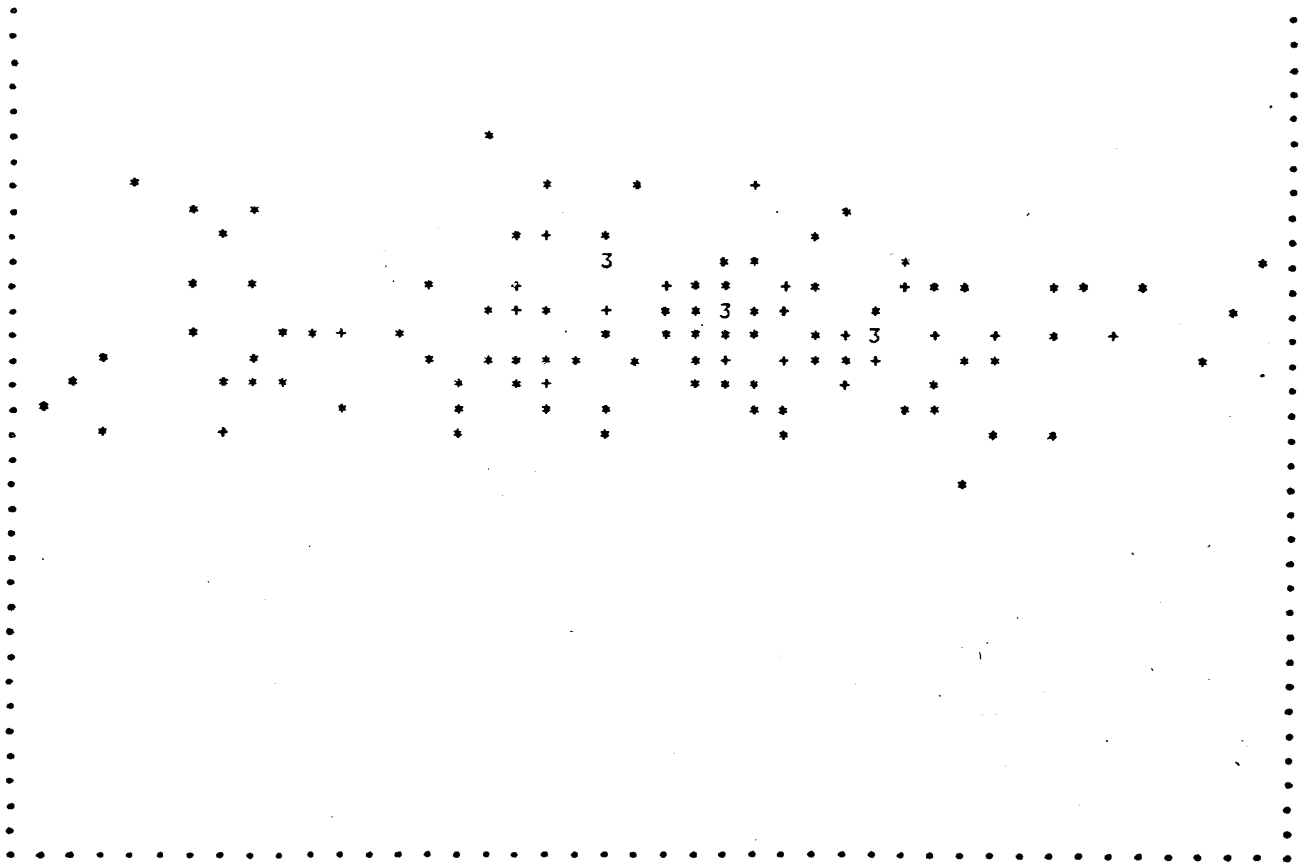
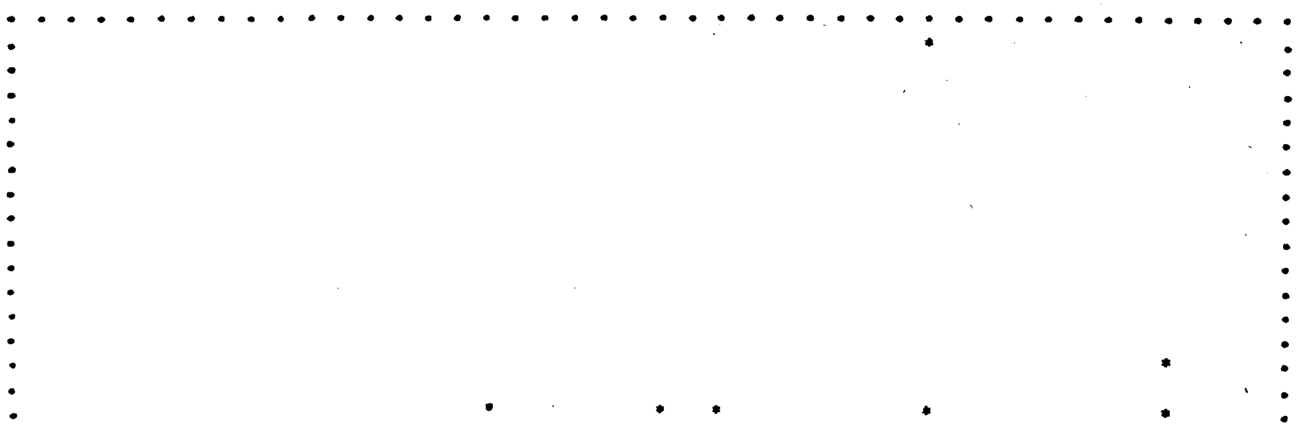
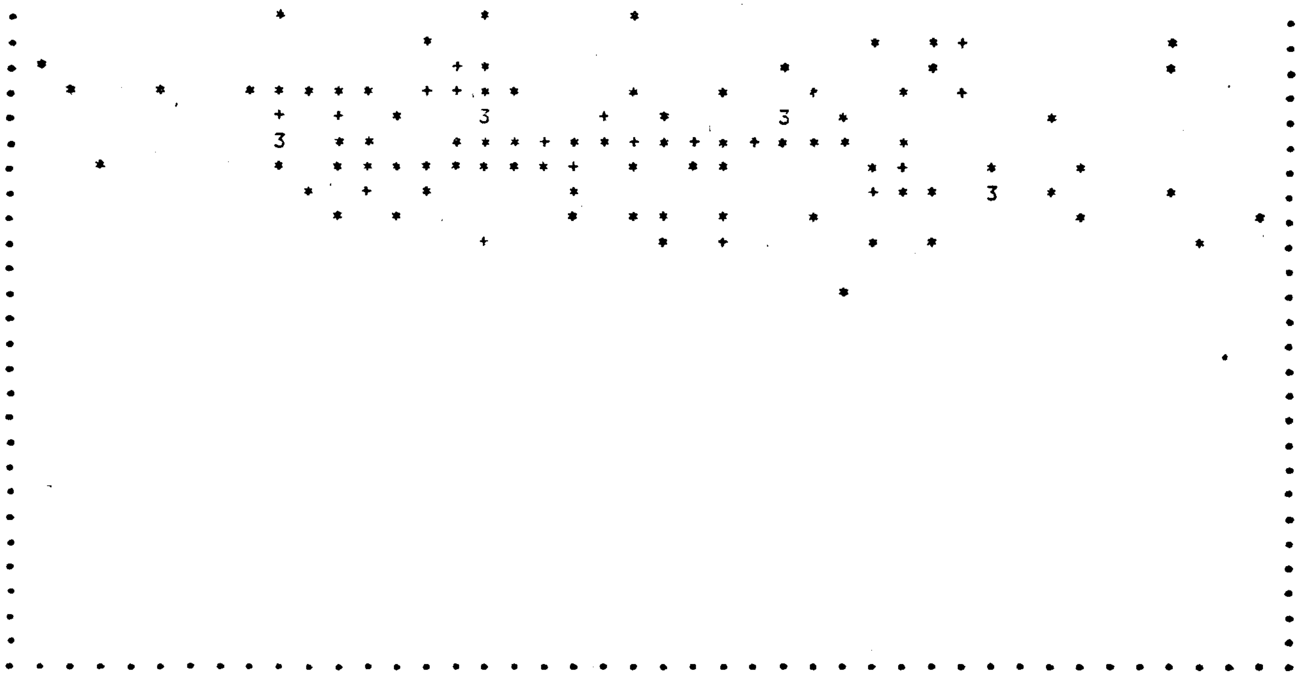




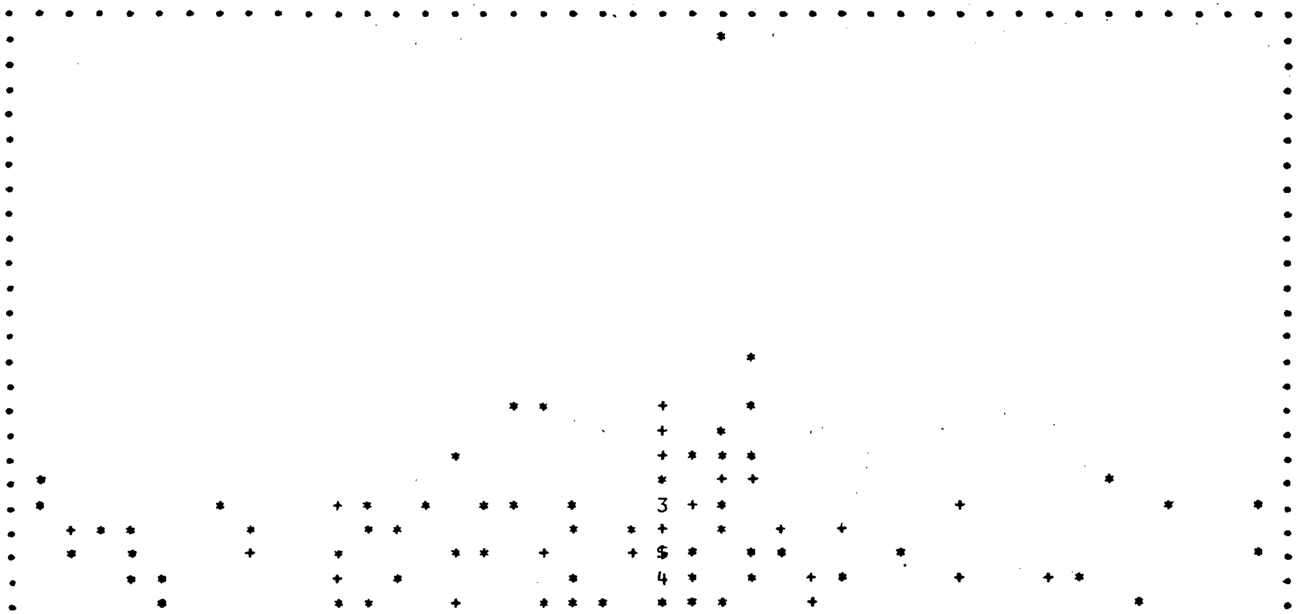
X-AXIS PCKWH

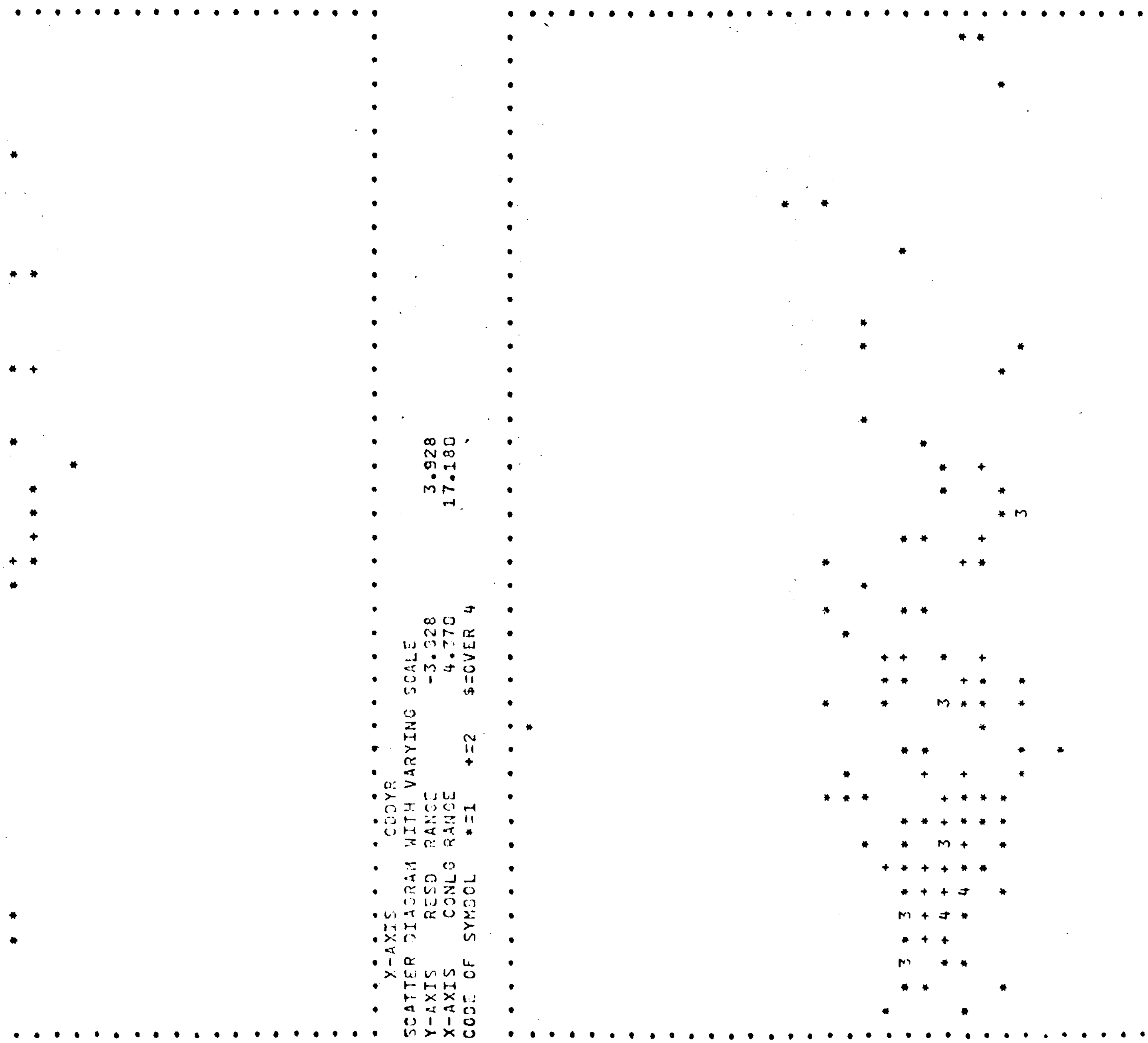
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -3.928 3.928
X-AXIS RDIPC RANGE 1758.000 3626.000
CODE OF SYMBOL *=1 +=2 $=OVER 4





X-AXIS   RDIPC
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS   RESD RANGE   -3.928   3.928
X-AXIS   CDDYR RANGE   1465.CDD   4CC2.000
CODE OF SYMBOL   *=1   +=2 $=OVER 4




X-AXIS CDOYR
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -3.928 3.928
X-AXIS CONLG RANGE 4.770 17.180
CODE OF SYMBOL *=1 +=2 $=OVER 4

TOTAL CUMULATIVE TIME IN SECONDS--- 4.531
EQUATION NUMBER 2
134 10 ELECTRICITY DEMAND - TEXAS RESIDENTIAL
0 1 0 5 7 8 9 10 6 3 0 5 6 7 8 9 10

	1	2	3	4	5	6
1	44.554	539.241	535.594	134.891	68.352	139.461
2	539.241	8327.343	8311.021	2159.313	1056.136	2231.234
3	535.594	8311.021	8308.423	2155.244	1054.723	2227.493
4	134.891	2159.313	2155.244	570.811	273.493	589.022
5	68.352	1056.136	1054.723	273.493	134.000	282.624
6	139.461	2231.234	2227.493	589.022	282.624	608.457

ORDINARY LEAST SQUARES

VARIANCE-COVARIANCE MATRIX OF COEFFICIENTS

.000617				
-.000553	.002940			
-.000020	.000763	.000871		
.000394	-.001231	-.000411	.000905	
.003395	-.026382	-.012022	.010893	.278624

DEPENDENT VARIABLE LCONP

A(LPKWH)= -.05143139 T= -2.072
(.02484403)

A(LRDIP)= .18226582 T= 3.362
(.05421732)

A(LDDS)= .11885642 T= 4.028
(.02950972)

A(LCONL)= .86904969 T= 28.892
(.03007915)

A(CONS)= -2.01040295 T= -3.809

.52784887)

VARIANCE= .00392295

STAND DEV= .06263345

R-SQUARED= .9578 (ADJUSTED FOR D. OF FREEDOM)

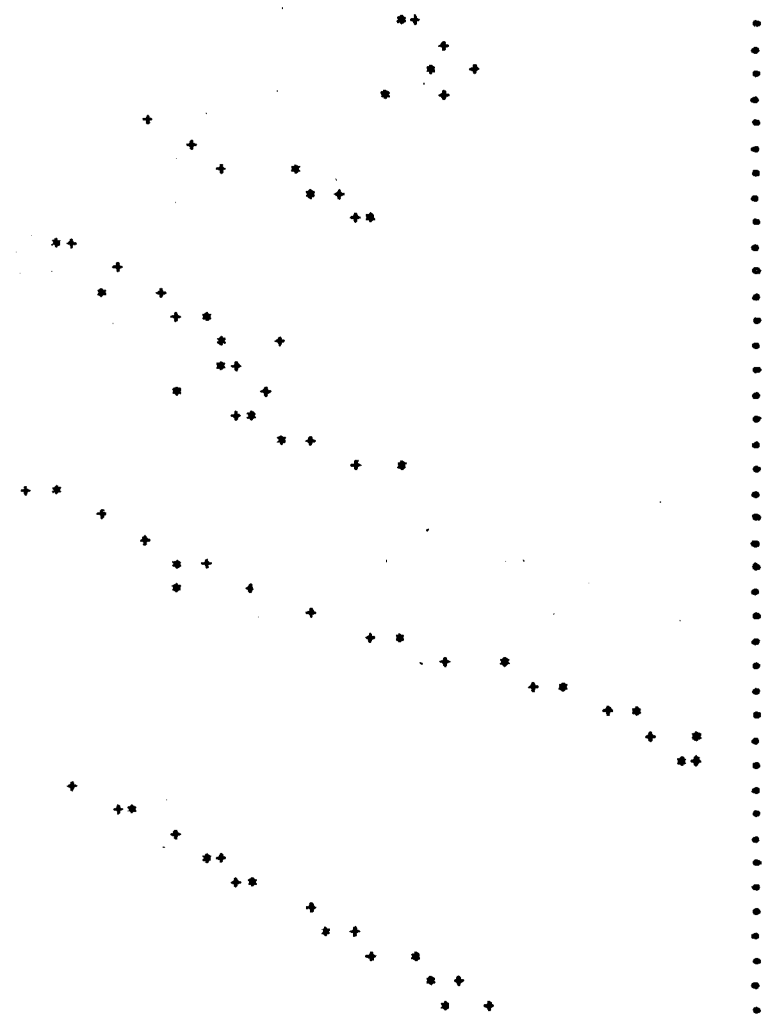
F-TEST(4,129)= 755.74

ELECTRICITY DEMAND - TEXAS RESIDENTIAL

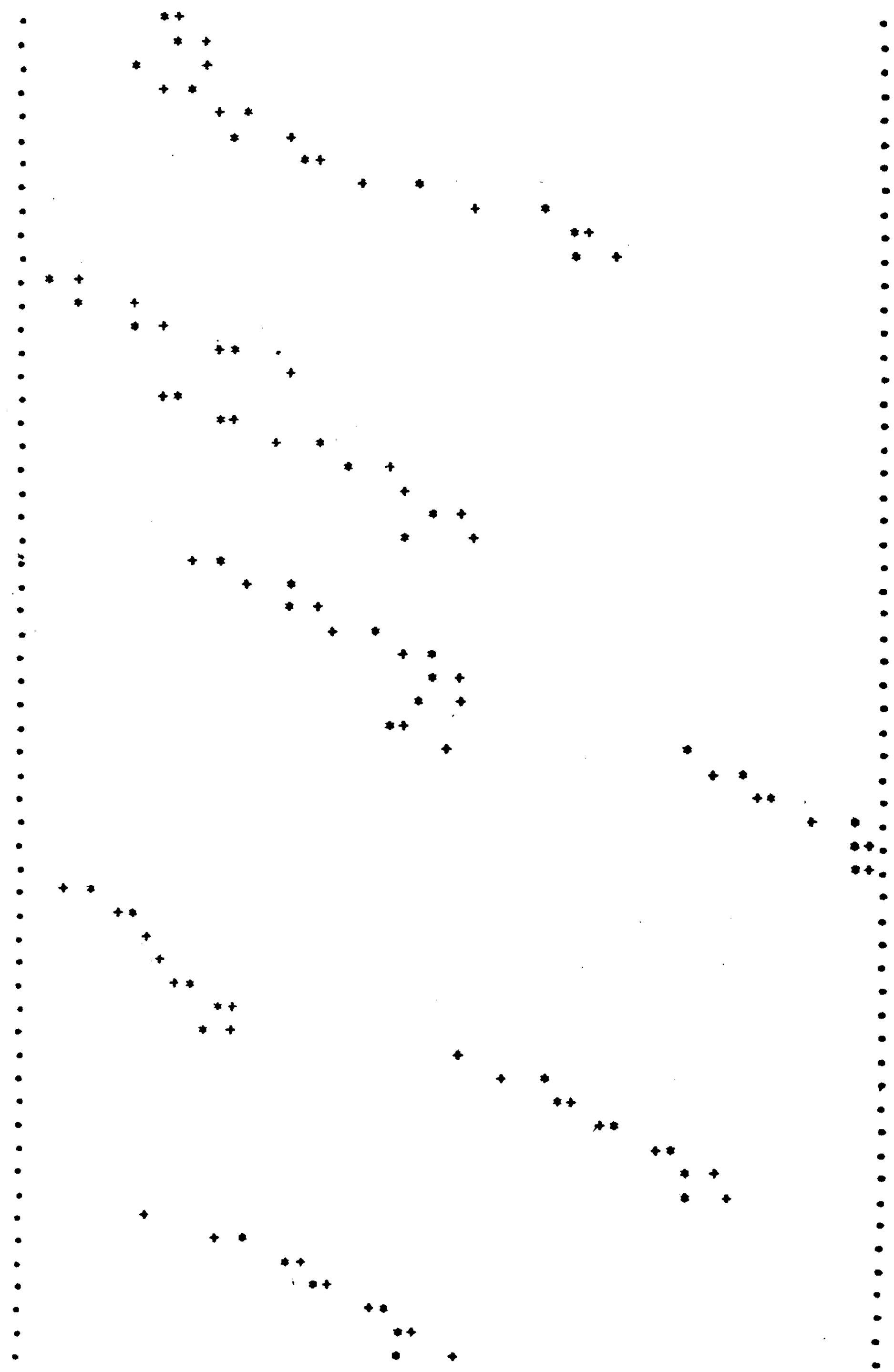
2 LCONP	LPKWH	LRDIP	LDDS	LCONL	CONS	R/SE	DW/F
OLS	-.0515	.1823	.1189	.8690	-2.0104	.9578	1.8003
	-2.0721	3.3618	4.0277	23.8921	-3.8087	.0626	755.7405

RANGE 1.53 TO 2.86

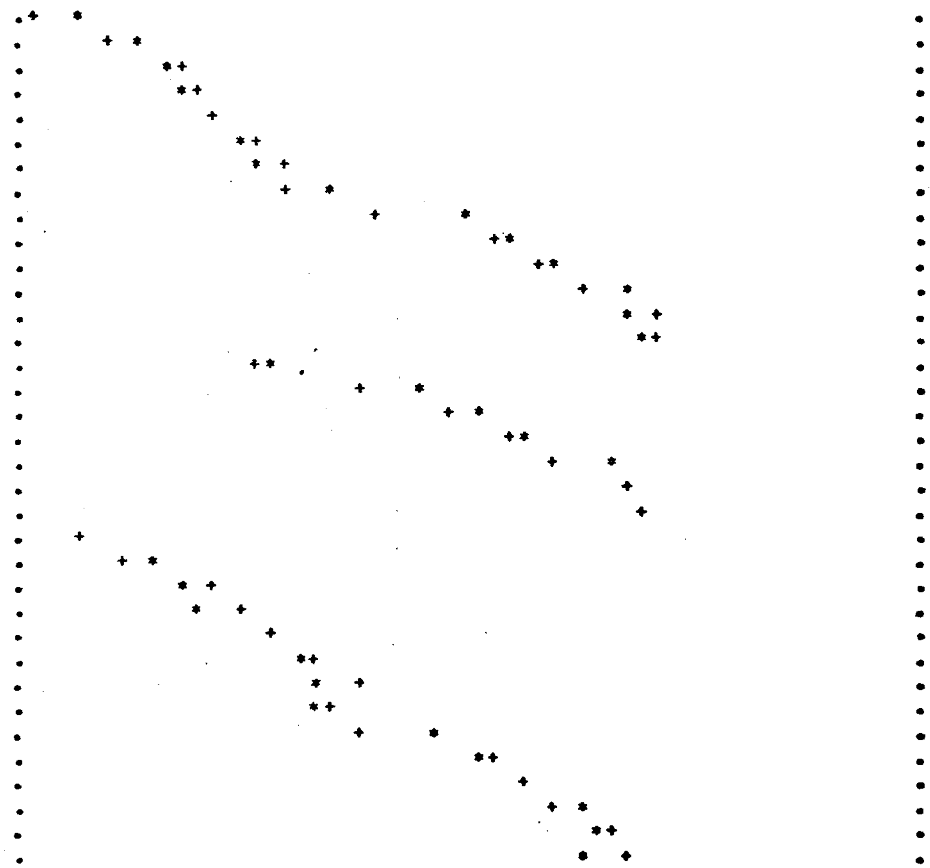
ACTUALS	PREDICTED	RESIDUALS	C/D ERROR	
2.349	2.371	-.022	-.918	1
2.419	2.406	.012	.510	2
2.388	2.452	-.064	-2.693	3
2.326	2.412	-.086	-3.683	4
1.959	1.963	-.004	-.197	5
2.023	2.032	-.009	-.444	6
2.195	2.081	.114	5.181	7
2.206	2.251	-.045	-2.038	8
2.300	2.276	.023	1.010	9
1.821	1.855	-.034	-1.377	10
1.907	1.917	-.011	-.566	11
1.832	1.930	-.098	-5.183	12
2.061	2.002	.058	2.837	13
2.082	2.168	-.086	-4.115	14
2.064	2.089	-.025	-1.200	15
2.006	2.151	-.145	-7.253	16
2.121	2.102	.019	.892	17
2.168	2.206	-.038	-1.744	18
2.340	2.284	.056	2.405	19
1.817	1.778	.039	2.124	20
1.990	1.996	-.006	-.292	21
1.959	1.969	-.011	-.543	22
2.004	2.051	-.047	-2.332	23
2.011	2.108	-.097	-4.812	24
2.204	2.212	-.008	-.355	25
2.345	2.288	.057	2.433	26
2.501	2.414	.088	3.511	27
2.600	2.552	.047	1.813	28
2.707	2.664	.043	1.586	29
2.800	2.728	.072	2.558	30
2.768	2.803	-.036	-1.283	31
1.852	1.838	.014	.755	32
1.927	1.911	.016	.850	33
2.016	1.999	.017	.842	34
2.045	2.070	-.025	-1.213	35
2.121	2.101	.020	.939	36
2.215	2.215	.000	.014	37
2.227	2.269	-.042	-1.874	38
2.365	2.288	.076	3.224	39
2.388	2.444	-.056	-2.355	40
2.407	2.476	-.069	-2.853	41



1.739	1.760	-.021	-1.207	42
1.765	1.794	-.029	-1.665	43
1.691	1.805	-.124	-7.381	44
1.772	1.740	.032	1.793	45
1.872	1.825	.047	2.494	46
1.850	1.928	-.078	-4.199	47
1.960	1.936	-.026	-1.311	48
2.145	2.052	.092	4.309	49
2.336	2.220	.116	4.948	50
2.381	2.415	-.033	-1.405	51
2.391	2.465	-.083	-3.502	52
1.550	1.600	-.051	-3.278	53
1.597	1.635	-.038	-5.509	54
1.686	1.731	-.045	-2.656	55
1.939	1.932	.007	.370	56
1.946	1.938	.008	.397	57
1.761	1.726	.036	2.026	58
1.831	1.856	-.025	-1.367	59
1.988	1.925	.063	3.153	60
2.024	2.090	-.066	-3.262	61
2.126	2.116	.010	.471	62
2.172	2.209	-.037	-1.696	63
2.115	2.220	-.105	-4.976	64
1.820	1.780	.040	2.206	65
1.942	1.872	.070	3.602	66
1.944	1.987	-.043	-2.187	67
2.067	2.013	.053	2.592	68
2.164	2.127	.038	1.745	69
2.174	2.218	-.044	-2.030	70
2.149	2.219	-.070	-3.240	71
2.092	2.115	-.023	-1.115	72
2.566	2.196	.370	14.428	73
2.657	2.607	.049	1.359	74
2.713	2.690	.023	.844	75
2.844	2.764	.079	2.794	76
2.841	2.861	-.019	-.682	77
2.844	2.854	-.010	-.341	78
1.615	1.584	.032	1.853	79
1.595	1.580	.013	1.101	80
1.705	1.721	-.016	-.941	81
1.744	1.732	.012	.703	82
1.788	1.769	.020	1.103	83
1.826	1.854	-.027	-1.502	84
1.810	1.859	-.043	-2.697	85
2.212	2.209	.002	.109	86
2.337	2.285	.052	2.235	87
2.300	2.334	-.034	-1.431	88
2.466	2.432	.033	1.346	89
2.546	2.533	.013	.511	90
2.566	2.615	-.049	-1.891	91
2.566	2.637	-.071	-2.753	92
1.707	1.711	-.004	-.257	93
1.873	1.819	.054	2.382	94
1.934	1.952	-.018	-.919	95
1.981	2.006	-.025	-1.246	96
2.087	2.081	.006	.272	97
2.119	2.151	-.032	-1.506	98
2.117	2.206	-.089	-4.180	99



1.591	1.533	.058	3.671	100	
1.688	1.651	.038	2.227	101	
1.735	1.749	-.013	-.763	102	
1.754	1.783	-.028	-1.619	103	
1.798	1.804	-.005	-.283	104	
1.850	1.866	-.016	-.883	105	
1.875	1.920	-.045	-2.424	106	
1.981	1.926	.055	2.767	107	
2.175	2.052	.123	5.647	108	
2.258	2.223	.034	1.528	109	
2.314	2.294	.020	.846	110	
2.438	2.367	.071	2.916	111	
2.441	2.470	-.030	-1.214	112	
2.451	2.484	-.033	-1.331	113	
1.902	1.872	.030	1.562	114	
2.119	2.017	.102	4.799	115	
2.205	2.163	.042	1.884	116	
2.270	2.246	.024	1.071	117	
2.414	2.325	.089	3.677	118	
2.437	2.437	.000	.010	119	
2.452	2.460	-.008	-.342	120	
1.591	1.600	-.009	-.564	121	
1.714	1.673	.041	2.397	122	
1.768	1.794	-.026	-1.489	123	
1.790	1.842	-.052	-2.378	124	
1.836	1.835	.001	.043	125	
1.930	1.963	-.033	-1.727	126	
1.959	2.017	-.058	-2.986	127	
1.954	1.990	-.036	-1.830	128	
2.152	2.035	.117	5.421	129	
2.202	2.229	-.028	-1.256	130	
2.266	2.266	.000	.002	131	
2.358	2.327	.031	1.295	132	
2.381	2.414	-.033	-1.378	133	
2.356	2.430	-.074	-3.140	134	



DURBIN-WATSON D STATISTIC= 1.80030
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -.370 .370
X-AXIS LCONP RANGE 1.550 2.844
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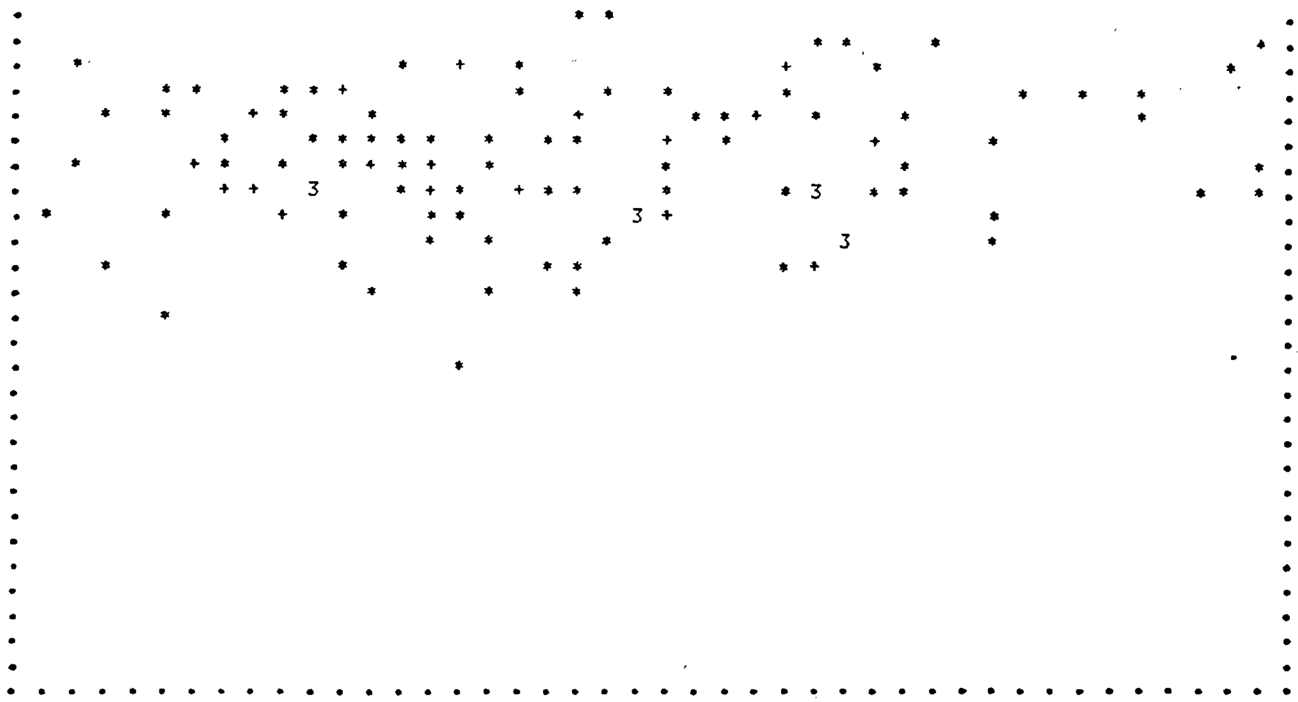

```
    X-AXIS      LCONP
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS    RESD  RANGE          -.370          .370
X-AXIS    LPKWH RANGE          -.288          .975
CODE OF SYMBOL   *=1   +=2   $=OVER 4
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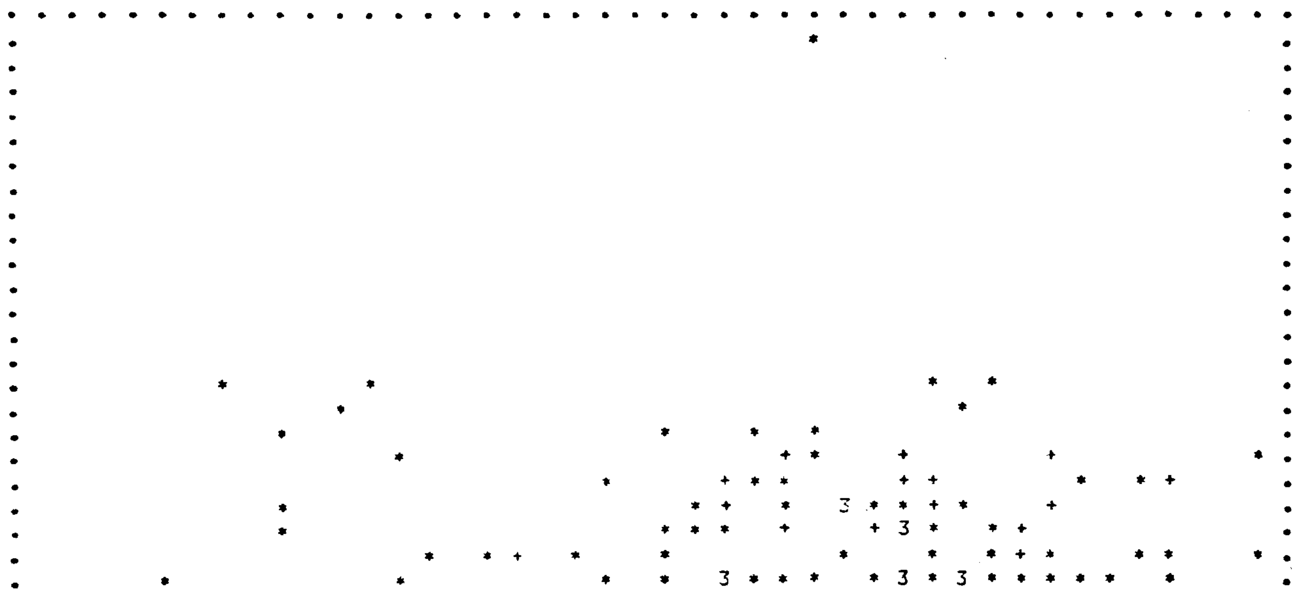


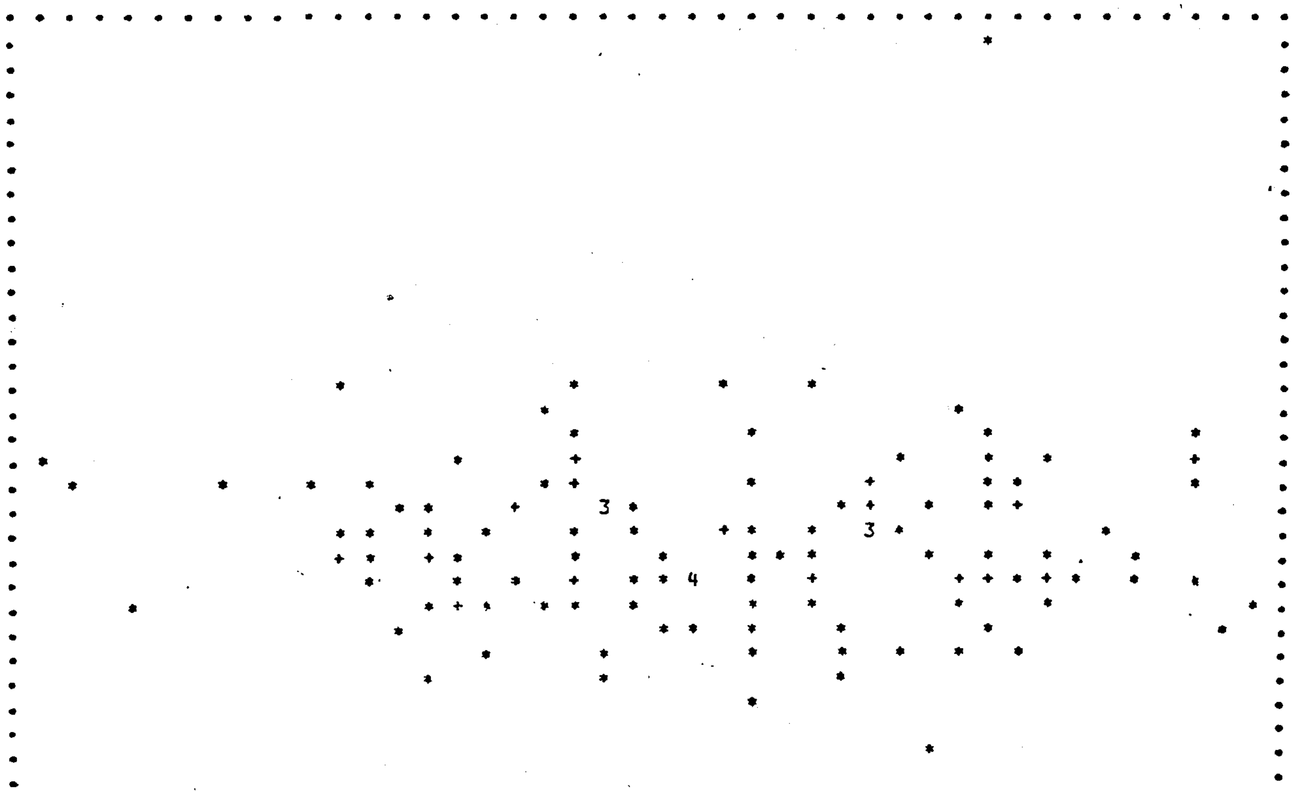
X-AXIS LPKWH

SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS RESD RANGE -.370 .370

X-AXIS LRDIP RANGE 7.472 8.196

CODE OF SYMBOL *=1 +=2 $=OVER 4

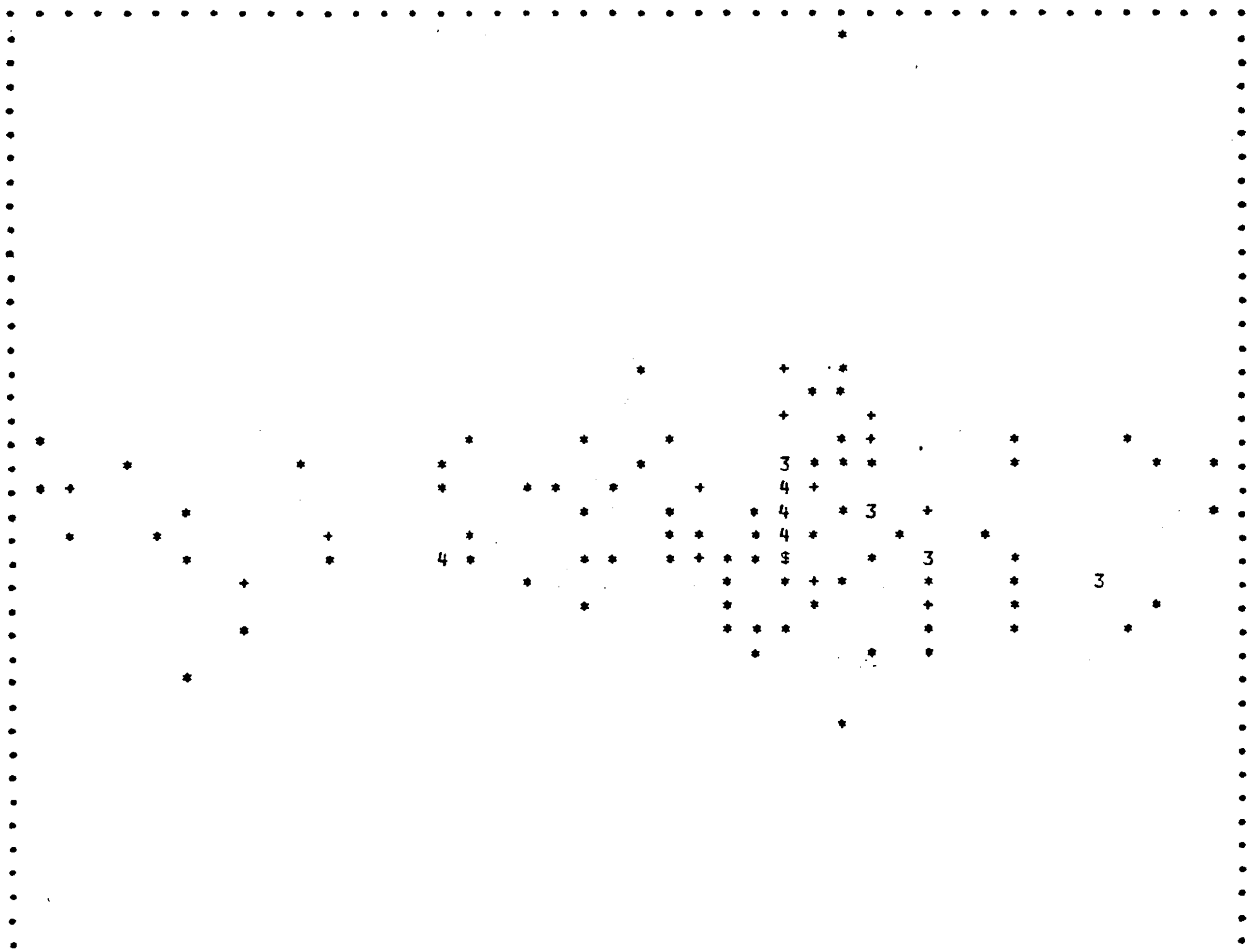


X-AXIS LRDIP

SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS	RESD	RANGE	-.370	.370
X-AXIS	LODS	RANGE	7.290	8.295

CODE OF SYMBOL *=1 +=2 $=OVER 4



```
    X-AXIS        LODS
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS     RESD  RANGE          -.370           .370
X-AXIS     LCONL RANGE          1.475          2.844
CODE OF SYMBOL    *=1   +=2   $=OVER 4
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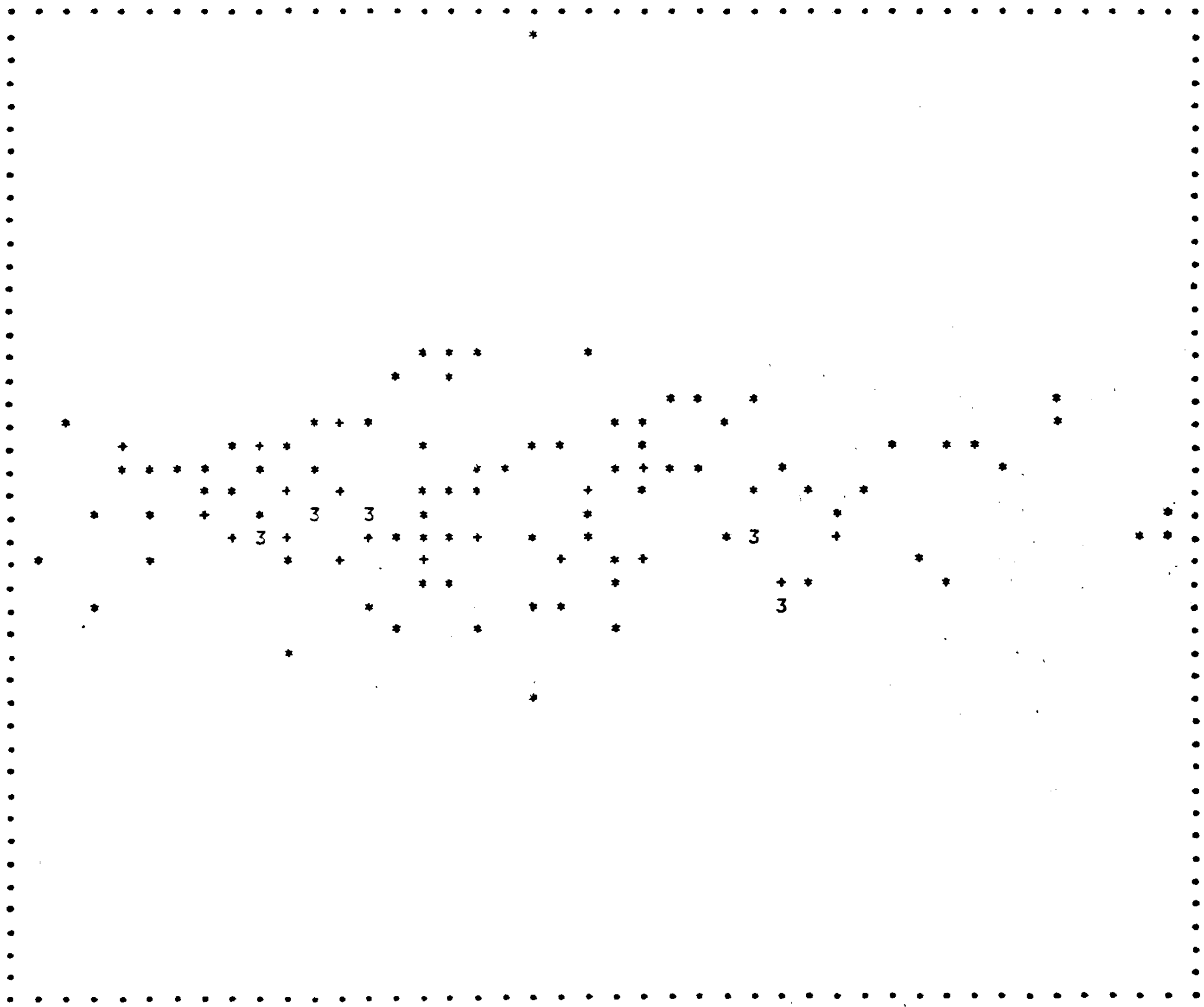

```
    X-AXIS       LCONL

TOTAL CUMULATIVE TIME IN SECONDS---      7.096
```

```
VARIABLE NAMES:
GALPC - CONSUMPTION IN GALLONS PER CAPITA.
PPGAL - REAL PRICE PER GALLON IN CENTS. 1967 DOLLARS.
DIPC  - REAL DISPOSABLE INCOME PER CAPITA IN 1967 DOLLARS.
CONLG - LAGGED CONSUMPTION (ONE-YEAR LAG)
LGALS - LOG OF CONSUMPTION
LPRPG - LOG OF PRICE
LDIPC - LOG OF DISPOSABLE INCOME
LCONL - LOG OF LAGGED CONSUMPTION
*****************************************************************
```

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@ASG,A ECON*REGR.,F2
FACILITY WARNING  100000000000
@ASG,T DATFILE.
FACILITY WARNING  100000000000
@DATA,I DATFILE.
DATA T7 RL70-5 07/10-14:37:13
@ADD,DP DEMDATA.GSLN
END DATA.  IMAGE COUNT: 28
@XQT ECON*REGR.ECON
          ECONOMETRIC PROGRAM WRITTEN BY M.R.NORMAN
 DATA STORED   28    4    0    0    0    1    0    1    1    0     GASOLINE DEMAND - TEXAS HIGHWAY USE
VARIABLE FORMAT WAS  (4F10.2)
```

	1	2	3	4
1	241.36	31.13	1551.30	235.40
2	261.30	32.24	1515.60	241.36
3	278.47	32.32	1605.20	261.30
4	301.80	32.04	1625.30	278.47
5	305.32	30.38	1604.50	301.80
6	317.38	30.52	1623.00	305.32
7	327.11	30.76	1630.00	317.38
8	337.05	31.40	1678.00	327.11
9	355.63	31.90	1755.20	337.05
10	358.46	32.78	1779.10	355.63
11	357.03	34.36	1792.30	358.46
12	362.82	33.18	1834.20	357.03
13	374.73	31.84	1921.00	362.82
14	370.29	32.87	1890.00	374.73
15	377.39	31.85	1943.00	370.29
16	386.01	30.12	1946.00	377.39
17	398.89	28.65	2001.90	386.01
18	412.39	29.22	2113.80	398.89
19	423.58	29.87	2227.50	412.39
20	439.11	29.98	2356.90	423.58
21	454.48	29.82	2458.00	439.11
22	479.05	28.83	2532.80	454.48
23	501.07	27.32	2528.20	479.05
24	521.66	27.50	2608.60	501.07
25	540.35	27.15	2662.80	521.66
26	574.95	25.48	2746.50	540.35
27	616.31	25.65	3012.50	574.95
28	577.65	34.36	2933.50	616.31

```
AUTOMATIC TRAN
  4    0    0    0    0
  5 =   0 LOG  1      .0000
  6 =   0 LOG  2      .0000
  7 =   0 LOG  3      .0000
  8 =   0 LOG  4      .0000
```

	1	2	3	4	5	6	7	8	9
1	241.36	31.13	1551.30	235.40	5.49	3.44	7.35	5.46	1.00
2	261.30	32.24	1515.60	241.36	5.57	3.47	7.32	5.49	1.00
3	278.47	32.32	1605.20	261.30	5.63	3.48	7.38	5.57	1.00
4	301.80	32.04	1625.30	278.47	5.71	3.47	7.39	5.63	1.00
5	305.32	30.38	1604.50	301.80	5.72	3.41	7.38	5.71	1.00
6	317.38	30.52	1623.00	305.32	5.76	3.42	7.39	5.72	1.00
7	327.11	30.76	1630.00	317.38	5.79	3.43	7.40	5.76	1.00
8	337.05	31.40	1678.00	327.11	5.82	3.45	7.43	5.79	1.00

9	355.63	31.90	1755.20	337.05	5.87	3.46	7.47	5.82	1.00
10	358.46	32.78	1779.10	355.63	5.88	3.49	7.48	5.87	1.00
11	357.03	34.36	1792.30	358.46	5.88	3.54	7.49	5.88	1.00
12	362.82	33.18	1834.20	357.03	5.89	3.50	7.51	5.88	1.00
13	374.73	31.84	1921.00	362.82	5.93	3.46	7.56	5.89	1.00
14	370.29	32.87	1890.00	374.73	5.91	3.49	7.54	5.93	1.00
15	377.39	31.85	1943.00	370.29	5.93	3.46	7.57	5.91	1.00
16	386.01	30.12	1946.00	377.39	5.96	3.41	7.57	5.93	1.00
17	398.89	28.65	2001.90	386.01	5.99	3.36	7.60	5.96	1.00
18	412.39	29.22	2113.80	398.89	6.02	3.37	7.66	5.99	1.00
19	423.58	29.87	2227.50	412.39	6.05	3.40	7.71	6.02	1.00
20	439.11	29.98	2356.90	423.58	6.08	3.40	7.77	6.05	1.00
21	454.48	29.82	2458.00	439.11	6.12	3.40	7.81	6.08	1.00
22	479.05	28.83	2532.90	454.48	6.17	3.36	7.84	6.12	1.00
23	501.07	27.32	2528.20	479.05	6.22	3.31	7.84	6.17	1.00
24	521.66	27.50	2608.60	501.07	6.26	3.31	7.87	6.22	1.00
25	540.35	27.15	2662.80	521.66	6.29	3.30	7.89	6.26	1.00
26	574.95	25.48	2746.50	540.35	6.35	3.24	7.92	6.29	1.00
27	616.31	25.65	3012.50	574.95	6.42	3.24	8.01	6.35	1.00
28	577.65	34.36	2933.50	616.31	6.36	3.54	7.98	6.42	1.00
	GALPC	PPGAL	DIPC	CONLG	LGALS	LPRPG	LDIPC	LCONL	

MOMENT MATRIX

	GALPC	PPGAL	DIPC	CONLG	LGALS	LPRPG	LDIPC	LCONL
GALPC	9928.442							
PPGAL	-146.176	5.613						
DIPC	44505.681	-655.939	206581.848					
CONLG	9692.931	-122.153	43496.260	9654.836				
LGALS	24.165	-.345	107.349	23.656	.060			
LPRPG	-5.083	.188	-22.733	-4.281	-.012	.006		
LDIPC	20.725	-.305	96.008	20.265	.051	-.011	.045	
LCONL	24.453	-.311	108.497	24.325	.061	-.011	.051	.063
CONS	401.844	30.483	2067.025	389.621	5.967	3.414	7.612	5.935

CORRELATION MATRIX

	GALPC	PPGAL	DIPC	CONLG	LGALS	LPRPG	LDIPC
PPGAL	-.62						
DIPC	.98	-.61					
CONLG	.99	-.52	.97				
LGALS	.99	-.60	.97	.98			
LPRPG	-.64	1.00	-.63	-.55	-.61		
LDIPC	.98	-.61	1.00	.97	.97	-.62	
LCONL	.98	-.52	.95	.99	.99	-.54	.96

EQUATION NUMBER 1

28 8 GASOLINE DEMAND - TEXAS HIGHWAY USE

0 0 0 4 2 3 4 1 3 0 3 2 3 4

	1	2	3	4	5
1	26169.278	1746536.822	329251.257	853.520	339035.375
2	1746536.822	************	23724380.855	57876.700	24459074.543
3	329251.257	23724380.855	4511208.793	10909.390	4645585.167
4	853.520	57876.700	10909.390	28.000	11251.640
5	339035.375	24459074.543	4645585.167	11251.640	4789475.158

ORDINARY LEAST SQUARES

VARIANCE-COVARIANCE MATRIX OF COEFFICIENTS

.752625			
.007482	.000288		
-.024183	-.001203	.005350	
-28.984472	-.354751	1.139840	1174.892793

DEPENDENT VARIABLE GALPC

```
A( PPGAL )=     -5.04178192     T= -5.812
           (      .86753988)

A(  DIPC )=       .02872801     T=  1.693
           (      .01697356)

A( CONLG )=       .81073392     T= 11.084
           (      .07314492)

A( CONS  )=    180.27166404     T=  5.259
           (    34.27670919)
```

VARIANCE= 61.31782875

STAND DEV= 7.83057010

R-SQUARED= .9938 (ADJUSTED FOR D. OF FREEDOM)

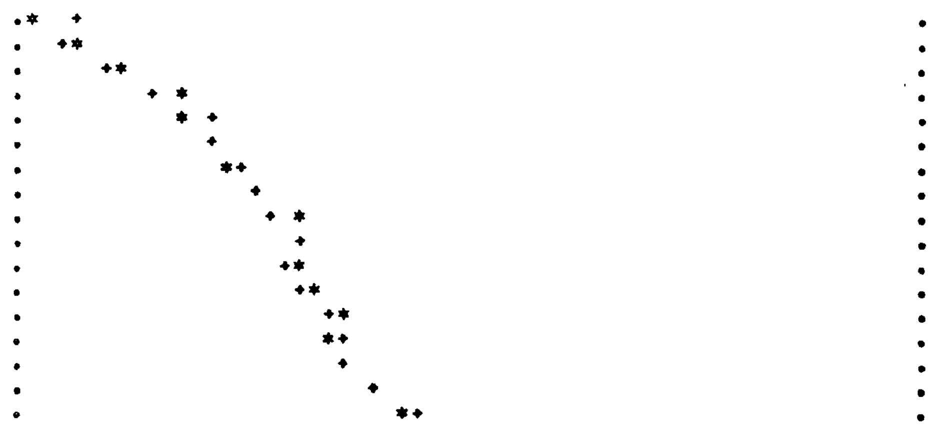
F-TEST(3, 24)= 1449.26

GASOLINE DEMAND - TEXAS HIGHWAY USE

1 GALPC	PPGAL	DIPC	CONLG	CONS	R/SE	DW/F
OLS	-5.0418	.0287	.8107	180.2717	.9938	1.6125
	-5.8116	1.6925	11.0839	5.2593	7.8306	1449.2593

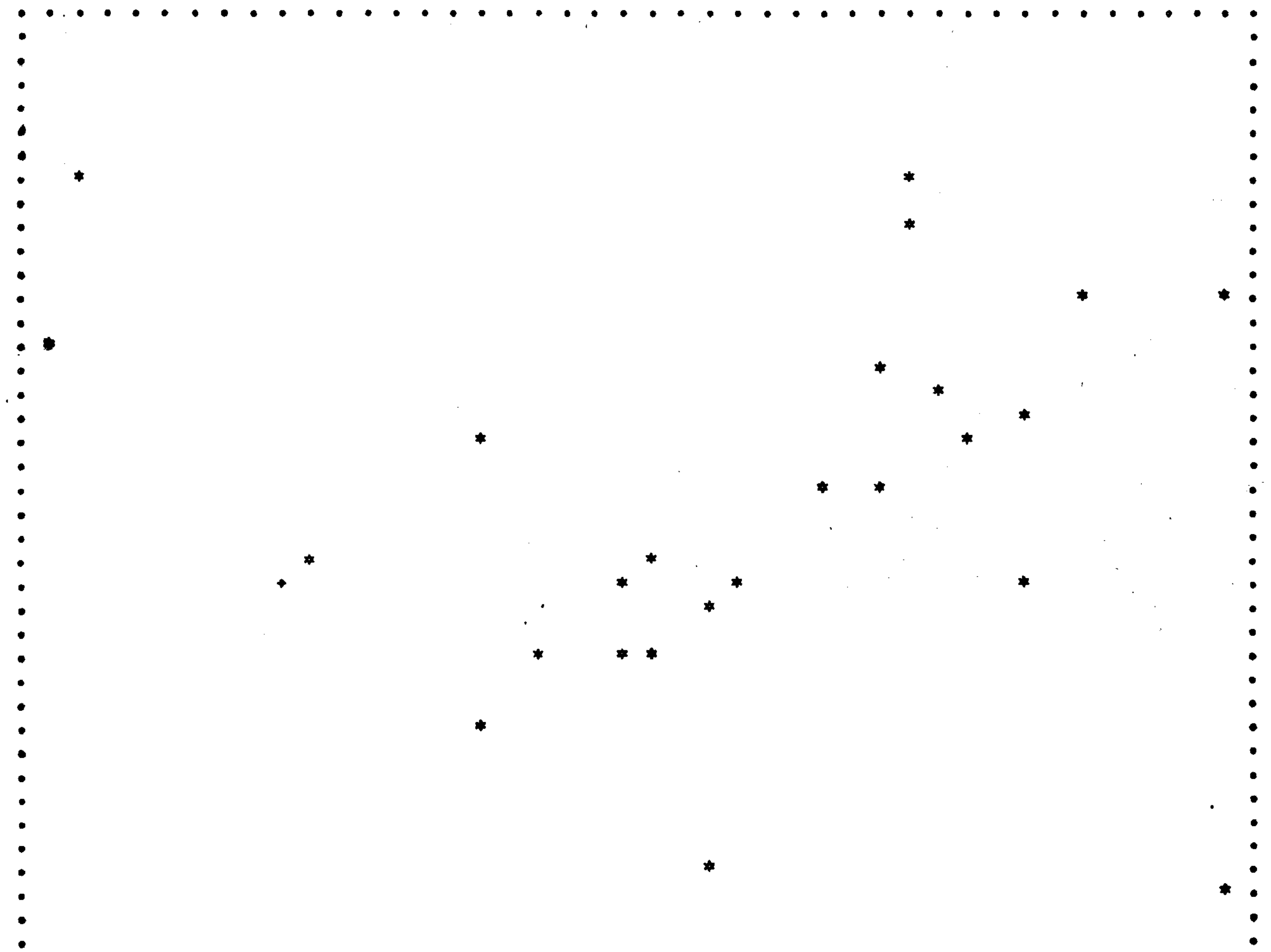
RANGE 241.36 TO 616.31

ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
241.360	258.734	-17.374	-7.198	1
261.300	256.944	4.356	1.667	2
278.470	275.280	3.190	1.145	3
301.800	291.190	10.610	3.516	4
305.320	317.876	-12.556	-4.112	5
317.380	320.555	-3.175	-1.000	6
327.110	329.324	-2.214	-.677	7
337.050	335.364	1.686	.500	8
355.630	343.120	12.510	3.518	9
358.460	354.433	4.027	1.123	10
357.030	349.141	7.889	2.210	11
362.820	355.135	7.685	2.118	12
374.730	369.078	5.652	1.508	13
370.290	372.651	-2.361	-.637	14
377.390	375.716	1.674	.444	15
386.010	390.281	-4.271	-1.106	16
398.890	406.287	-7.397	-1.854	17

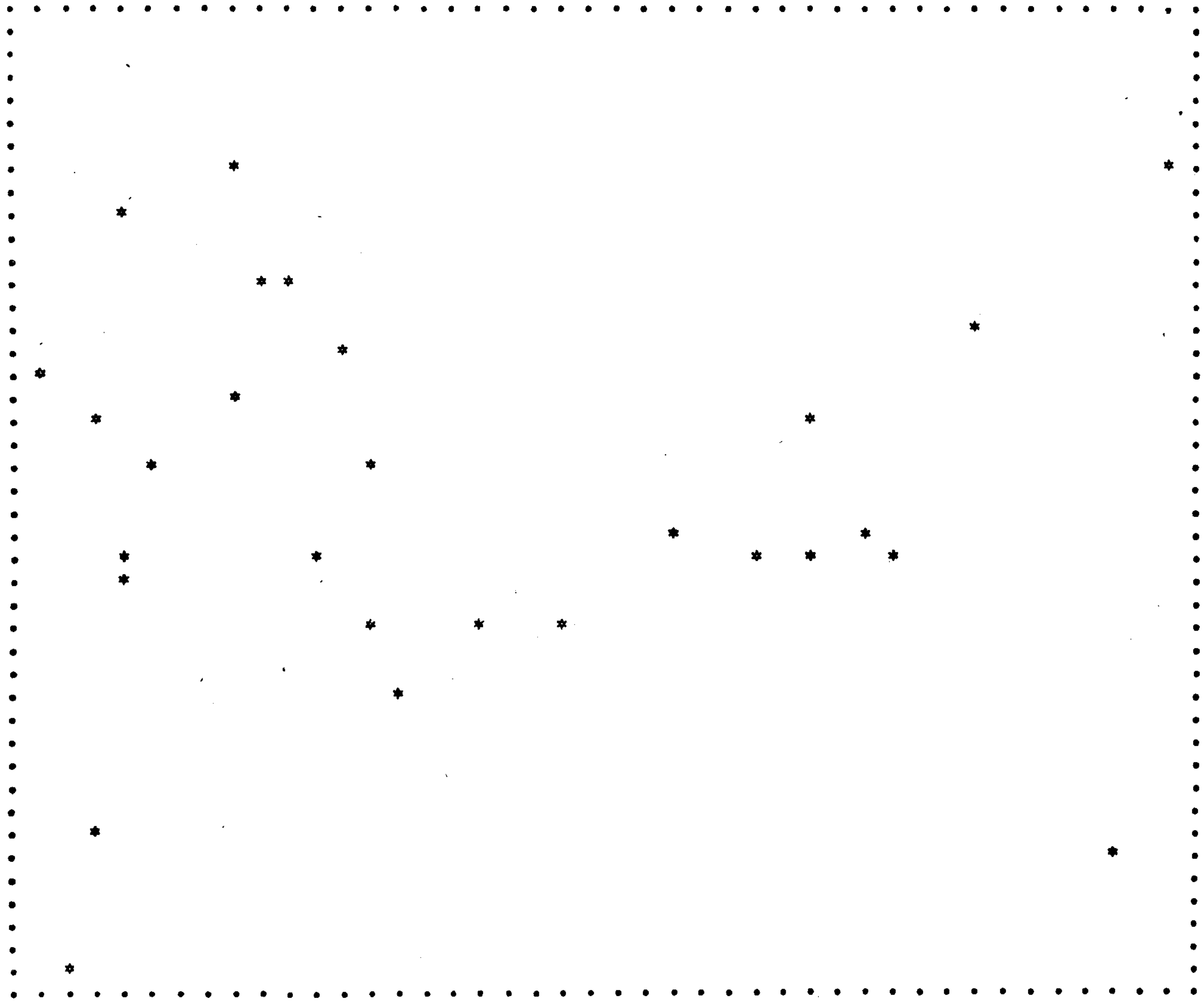


412.390	417.070	-4.680	-1.135	18
423.580	428.004	-4.424	-1.044	19
439.110	440.239	-1.129	-.257	20
454.480	456.541	-2.061	-.453	21
479.050	476.142	2.908	.607	22
501.070	503.542	-2.472	-.493	23
521.660	522.797	-1.137	-.218	24
540.350	542.812	-2.462	-.456	25
574.950	568.789	6.161	1.072	26
616.310	603.625	12.685	2.058	27
577.650	590.973	-13.323	-2.306	28

DURBIN-WATSON D STATISTIC= 1.61246
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -17.374 17.374
X-AXIS PPGAL RANGE 25.480 34.360
CODE OF SYMBOL *=1 +=2 $=OVER 4

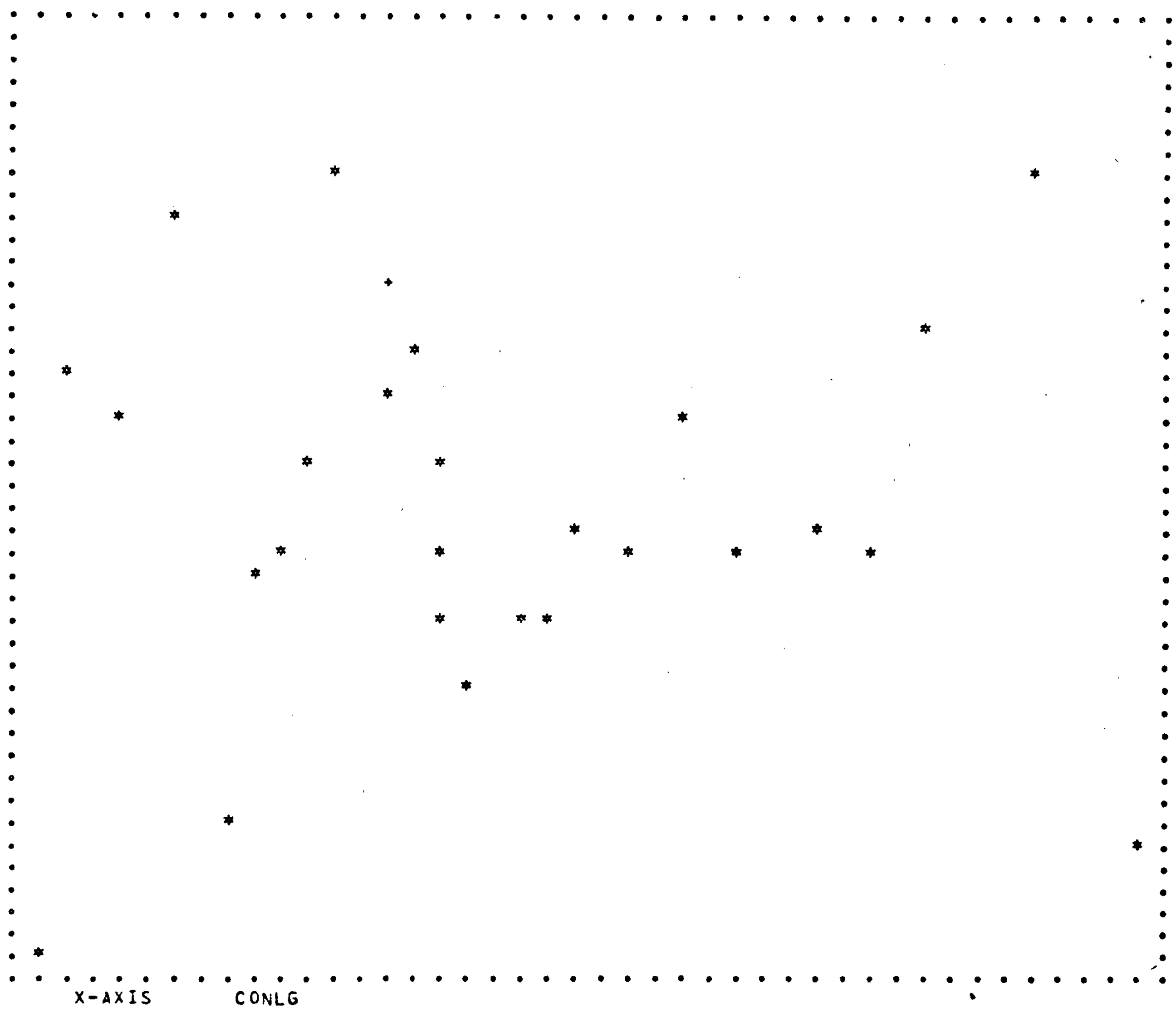


X-AXIS PPGAL
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -17.374 17.374
X-AXIS DIPC RANGE 1515.600 3012.500
CODE OF SYMBOL *=1 +=2 $=OVER 4



X-AXIS DIPC
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -17.374 17.374
X-AXIS CONLG RANGE 235.400 616.310

CODE OF SYMBOL *=1 +=2 $=OVER 4



TOTAL CUMULATIVE TIME IN SECONDS--- 1.577
EQUATION NUMBER 2
28 8 GASOLINE DEMAND - TEXAS HIGHWAY USE
0 1 0 4 6 7 8 5 3 0 3 6 7 8

	1	2	3	4	5
1	326.553	727.365	567.075	95.597	570.109
2	727.365	1623.467	1266.293	213.127	1273.109

3	567.075	1266.293	987.974	166.180	993.254
4	95.597	213.127	166.180	28.000	167.078
5	570.109	1273.109	993.254	167.078	998.585

ORDINARY LEAST SQUARES

VARIANCE-COVARIANCE MATRIX OF COEFFICIENTS

.003576			
.001904	.005023		
-.000937	-.003773	.003124	
-.021144	-.022336	.013382	.162796

DEPENDENT VARIABLE LGALS

A(LPRPG)= -.28062488 T= -4.693
(.05980177)

A(LDIPC)= .11750026 T= 1.658
(.07087091)

A(LCONL)= .82684144 T= 14.794
(.05588942)

A(CONS)= 1.12348371 T= 2.784
(.40348047)

VARIANCE= .00034347

STAND DEV= .01853288

R-SQUARED= .9943 (ADJUSTED FOR D. OF FREEDOM)

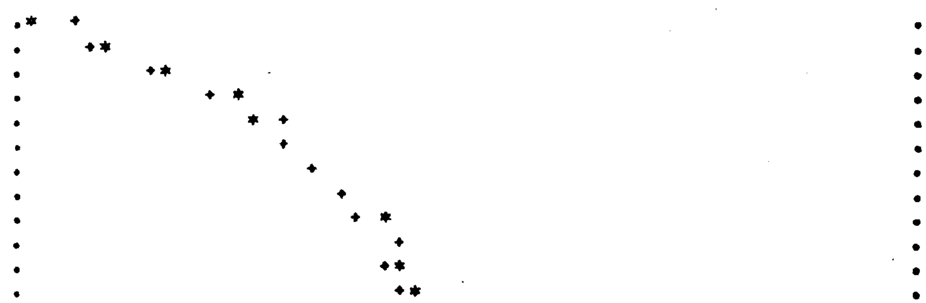
F-TEST(3, 24)= 1561.11

GASOLINE DEMAND - TEXAS HIGHWAY USE

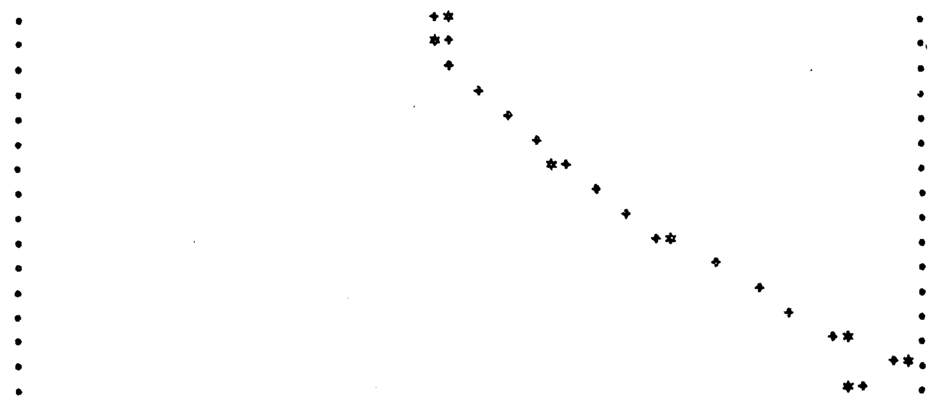
2 LGALS	LPRPG	LDIPC	LCONL	CONS	R/SE	DW/F
OLS	-.2806	.1175	.8268	1.1235	.9943	1.9667
	-4.6926	1.6579	14.7942	2.7845	.0185	1561.1146

RANGE 5.49 TO 6.42

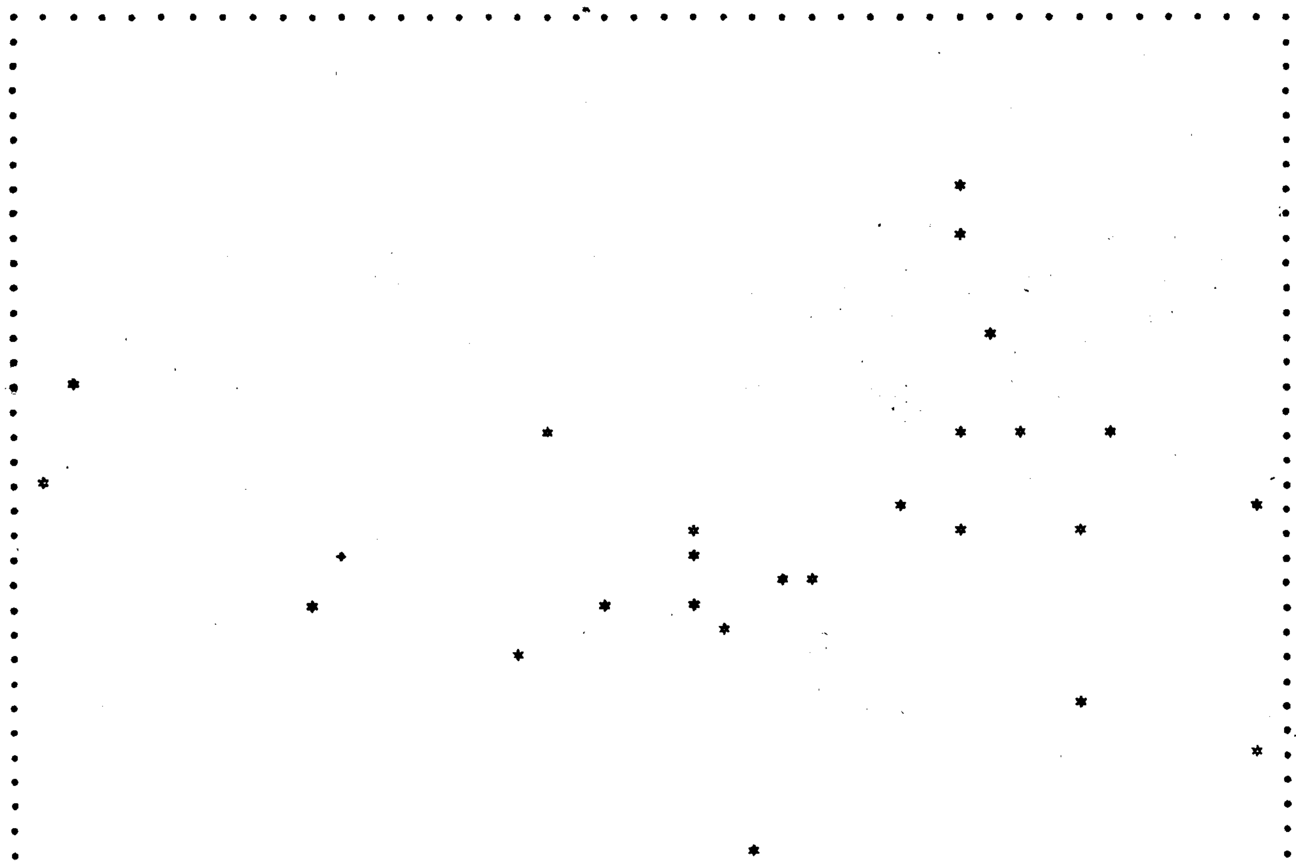
ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
5.486	5.538	-.051	-.934	1
5.566	5.546	.020	.360	2
5.629	5.617	.012	.213	3
5.710	5.674	.036	.629	4
5.721	5.754	-.032	-.567	5
5.760	5.763	-.003	-.058	6
5.790	5.794	-.003	-.060	7
5.820	5.816	.004	.066	8
5.874	5.842	.032	.544	9
5.882	5.880	.002	.026	10
5.878	5.874	.003	.057	11
5.894	5.884	.010	.173	12

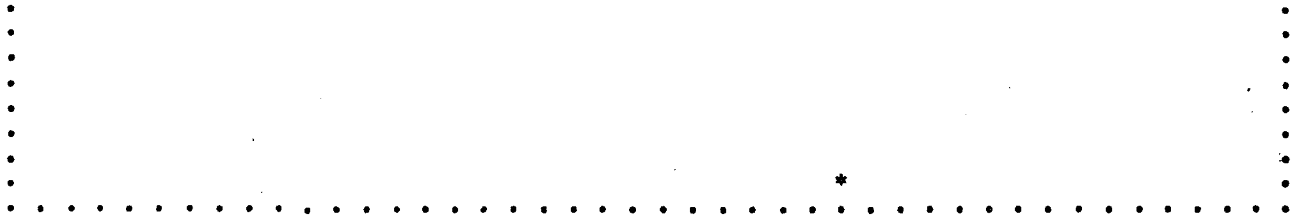


5.926	5.914	.012	.206	13
5.914	5.930	-.016	-.264	14
5.933	5.932	.001	.020	15
5.956	5.964	-.008	-.131	16
5.989	6.000	-.011	-.184	17
6.022	6.028	-.006	-.095	18
6.049	6.055	-.006	-.107	19
6.085	6.083	.002	.029	20
6.119	6.119	-.000	-.000	21
6.172	6.161	.011	.181	22
6.217	6.219	-.002	-.037	23
6.257	6.258	-.001	-.016	24
6.292	6.297	-.005	-.081	25
6.354	6.348	.006	.101	26
6.424	6.408	.016	.242	27
6.359	6.380	-.022	-.338	28

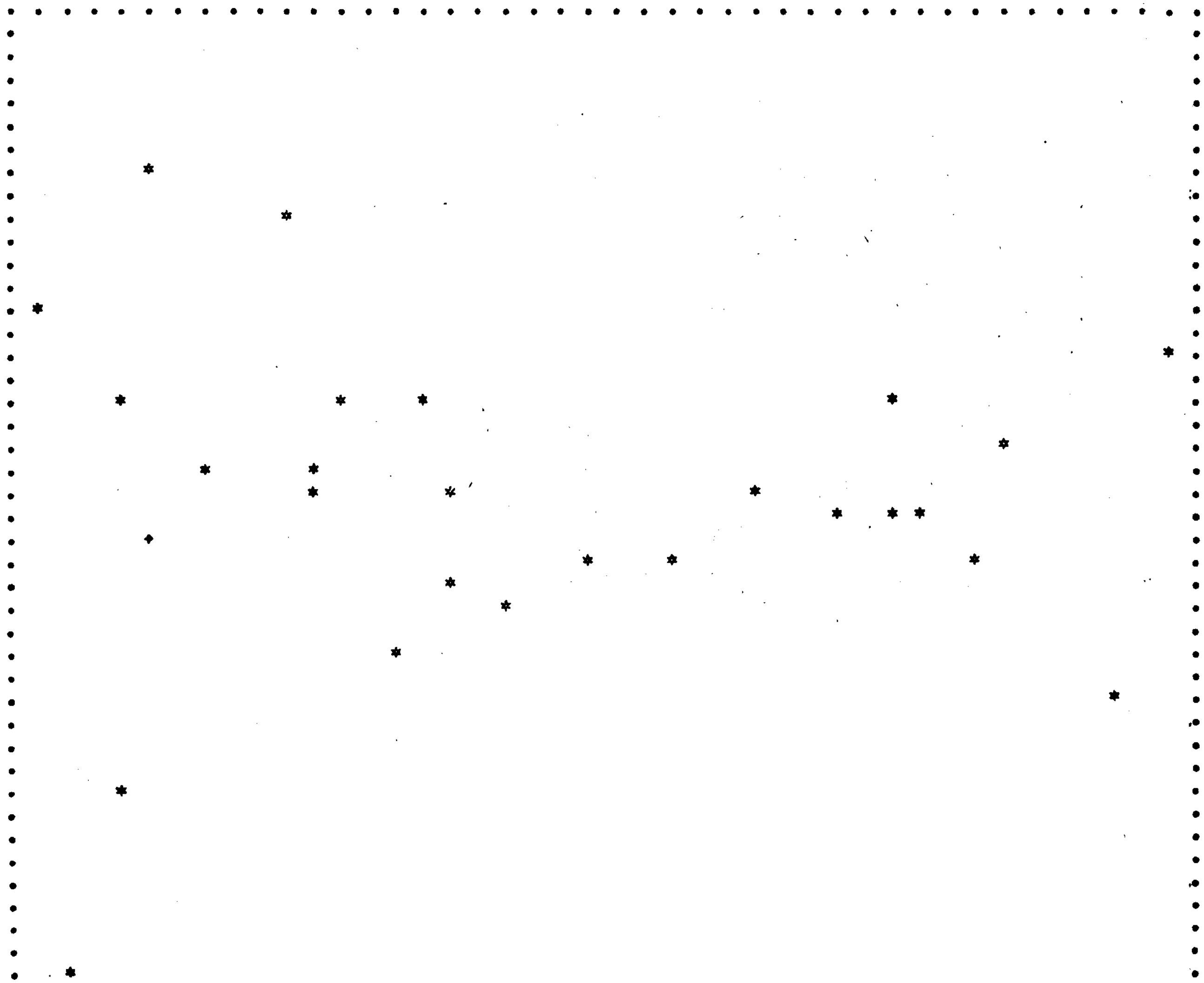


DURBIN-WATSON D STATISTIC= 1.96672
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -.051 .051
X-AXIS LPRPG RANGE 3.238 3.537
CODE OF SYMBOL *=1 +=2 $=OVER 4





```
    X-AXIS      LPRPG
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS    RESD  RANGE          -.051          .051
X-AXIS    LDIPC RANGE          7.324         8.011
CODE OF SYMBOL   *=1   +=2   $=OVER 4
```



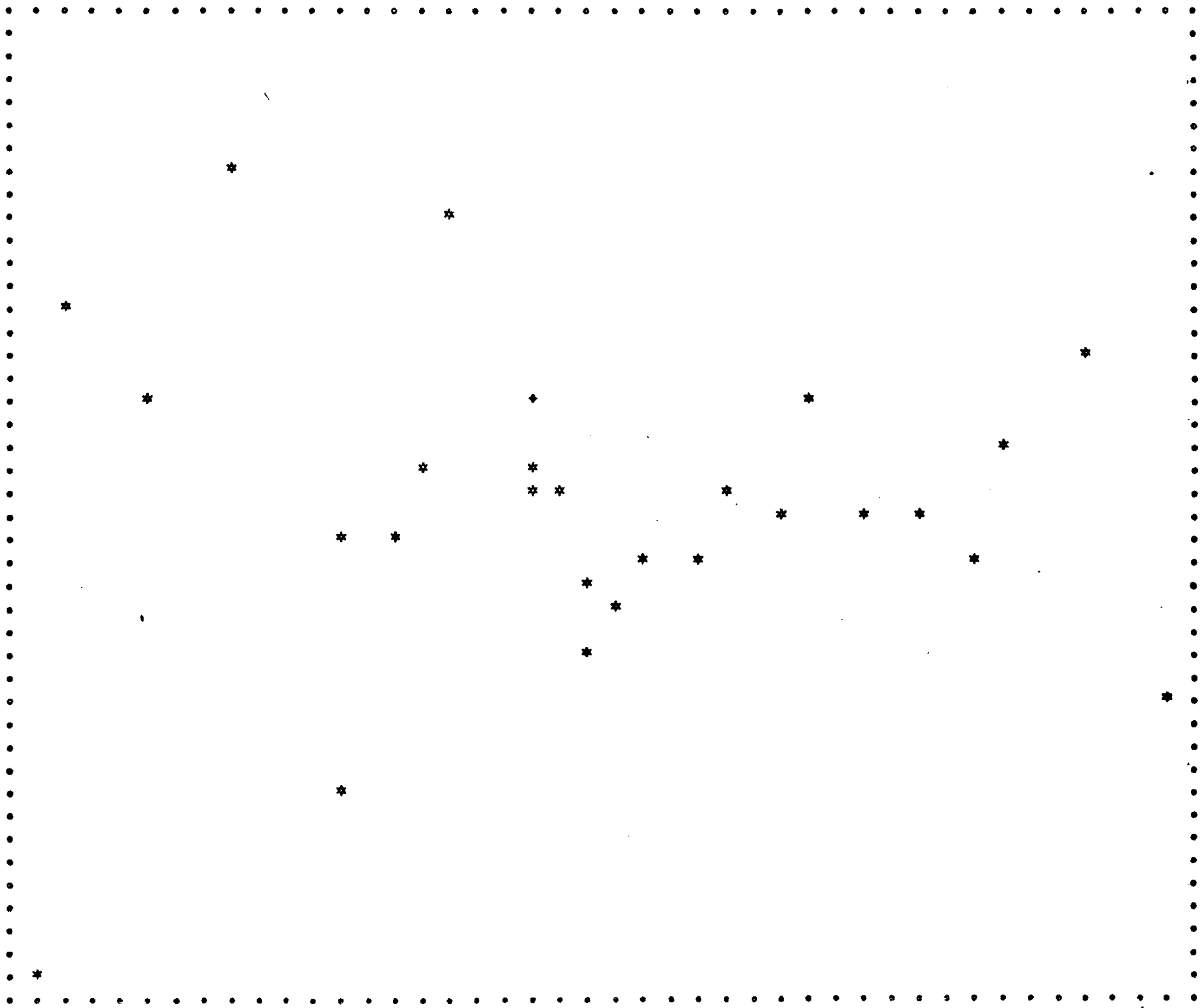
X-AXIS LDIPC

SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS RESD RANGE -.051 .051

X-AXIS LCONL RANGE 5.461 6.424

CODE OF SYMBOL *=1 +=2 $=OVER 4



X-AXIS LCONL

TOTAL CUMULATIVE TIME IN SECONDS--- 2.674

SUMMARY OF RESULTS GASOLINE DEMAND - TEXAS HIGHWAY USE

1 GALPC PPGAL DIPC CONLG CONS R/SE DW/F

```
     OLS      -5.0418     .0287      .8107  180.2717      .9938    1.6125
              -5.8116    1.6925    11.0839    5.2593     7.8306 1449.2593
   2 LGALS     LPRPG      LDIPC      LCONL      CONS       R/SE       DW/F
     OLS       -.2806     .1175      .8268    1.1235      .9943    1.9667
              -4.6926    1.6579    14.7942    2.7845      .0185 1561.1146
EXECUTION TERMINATED BY AN ATTEMPT TO READ PAST AN END-OF-FILE.
FORTRAN V ERROR TERMINATION:
  I/O  CALLED  AT  SEQUENCE  NUMBER 000115  OF  INPUT
INPUT  CALLED  AT  SEQUENCE  NUMBER 000141  OF  MAIN PROGRAM
 ERROR EXIT.  EXECUTION TIME:         2709 MILLISECONDS.
USER DID AN ER EABT$
 REENT ADDR:012447  BDI:000004
     X                    000000 000006  000000 000004  000000 000005  000002 000016  000000 000002  000000 000064  000000 000452
          000000 000007  000001 042276  000000 004264  000000 016273  000000 000000  000000 023070  777777 777776  000000 011022
     A    000000 000000  000000 023070  777777 777776  000000 011022  053012 263212  231012 050523  213606 216524  311525 144063
          113474 130505  627005 050505  242130 050505  606761 606766  000000 000003  524371 000000  777777 777770  777777 777772
          320020 000654  462200 000000
     R                    777777 777776  000000 125053  000000 000307  000000 020000  000020 400001  000000 000000  002001 700214
          000000 000000  000012 000000  000007 000001  000777 000000  000000 000000  000000 000000  777777 777776  777777 777776
@BRKPT PRINT$
```

```
VARIABLE NAMES:
MCFPC - CONSUMPTION IN 1000 CUBIC FEET PER CUSTOMER.
PCMCF - REAL PRICE IN 1967 DOLLARS PER 1000 CUBIC FEET.
DIPC - REAL DISPOSABLE INCOME IN 1967 DOLLARS PER CAPITA.
HDDYS - HEATING DEGREE-DAYS PER YEAR.
MCFLG - LAGGED CONSUMPTION (ONE-YEAR LAG)
LMCFC - LOG OF CONSUMPTION
LPCMC - LOG OF PRICE
LDIPC - LOG OF DISPOSABLE INCOME
LHDDY - LOG OF HEATING DEGREE-DAYS
LMCFL - LOG OF LAGGED CONSUMPTION
*****************************************************************
```

```
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@ASG,A ECON*REGR.,F2
FACILITY WARNING  000000000200
@ASG,T DATFILE.
READY
@DATA,I DATFILE.
DATA T7 RL70-5 07/13-10:15:10
@ADD,DP DEMDATA,NGASR
END DATA.  IMAGE COUNT: 200
@XQT ECON*REGR.ECON
          ECONOMETRIC PROGRAM WRITTEN BY H.R.NORMAN
 DATA STORED  200    5    0    0    0    1    0    1    1    0     NATURAL GAS DEMAND - TEXAS RESIDENTIAL
VARIABLE FORMAT WAS  (5F10.2)
```

	1	2	3	4	5
1	114.30	.66	2410.00	3401.00	122.71
2	126.73	.69	2452.00	3883.00	114.30
3	124.78	.65	2434.00	3590.00	126.73
4	126.18	.62	2605.00	3656.00	124.78
5	124.56	.65	2670.00	3641.00	126.18
6	123.48	.65	2896.00	3744.00	124.56
7	131.91	.62	2891.00	3575.00	123.48
8	145.70	.46	2731.00	3740.00	157.65
9	159.96	.44	2482.00	4113.00	145.70
10	164.47	.41	2342.00	4219.00	159.96
11	162.63	.39	2755.00	4270.00	164.47
12	160.00	.38	2871.00	4171.00	162.63
13	156.85	.37	3089.00	4467.00	160.00
14	163.82	.35	2831.00	4220.00	156.85
15	83.27	.93	2106.00	2621.00	85.79
16	95.70	.87	2204.00	2814.00	83.27
17	94.33	.85	2177.00	2448.00	95.70
18	95.85	.82	2207.00	2443.00	94.33
19	90.00	.85	2284.00	2600.00	95.85
20	87.62	.88	2446.00	2289.00	90.00
21	101.10	.86	2595.00	2836.00	87.62
22	107.37	.66	3474.00	2498.00	113.66
23	121.17	.65	3582.00	2844.00	107.37
24	121.05	.65	3257.00	2628.00	121.17
25	128.14	.62	3193.00	2821.00	121.05
26	121.00	.65	3291.00	2397.00	128.14
27	121.54	.70	3765.00	2698.00	121.00
28	135.75	.62	3413.00	3612.00	121.54
29	99.04	.67	2655.00	2498.00	105.65
30	108.56	.70	2813.00	2844.00	99.04
31	105.31	.67	2649.00	2628.00	105.56
32	111.62	.64	2629.00	2821.00	105.31
33	105.00	.65	2706.00	2397.00	111.62
34	103.67	.68	2961.00	2698.00	105.00
35	113.97	.63	2758.00	3612.00	103.67
36	110.73	.82	2964.00	1993.00	113.31
37	127.48	.78	3102.00	2461.00	110.73
38	128.53	.74	3114.00	2250.00	127.44
39	129.82	.76	3115.00	2341.00	128.53
40	115.00	.73	3174.00	1935.00	129.82
41	124.72	.71	3475.00	2372.00	115.00
42	125.94	.67	3678.00	2074.00	124.72
43	83.94	.88	2833.00	2122.00	87.81

44	96.02	.84	2967.00	2590.00	83.94
45	96.18	.81	2874.00	2320.00	96.02
46	97.64	.87	2830.00	2497.00	96.18
47	88.00	.85	2821.00	2284.00	97.64
48	92.37	.83	3057.00	2372.00	88.00
49	96.98	.82	3248.00	2074.00	92.37
50	80.33	.91	2195.00	1592.00	82.99
51	93.30	.85	2416.00	2098.00	80.33
52	91.18	.80	2361.00	1727.00	93.30
53	96.40	.74	2425.00	1898.00	91.18
54	88.00	.75	2581.00	1309.00	96.40
55	86.39	.78	2703.00	1738.00	88.00
56	95.54	.74	2823.00	1672.00	86.39
57	103.40	.66	2598.00	2728.00	105.64
58	93.30	.60	2799.00	2966.00	103.40
59	117.44	.57	2672.00	2822.00	93.30
60	117.55	.57	2529.00	2883.00	117.44
61	105.00	.57	2514.00	2400.00	117.55
62	105.76	.58	2896.00	2803.00	105.00
63	113.40	.56	2674.00	2421.00	105.76
64	81.04	1.01	2835.00	1077.00	86.03
65	93.46	.97	2873.00	1462.00	81.04
66	88.19	1.00	2879.00	1339.00	93.46
67	94.49	.95	3016.00	1758.00	88.19
68	84.00	.96	3163.00	1262.00	94.49
69	82.86	.99	3315.00	1494.00	84.00
70	88.76	.92	3525.00	1562.00	82.86
71	70.35	10.54	2835.00	1077.00	75.95
72	82.11	.99	2873.00	1462.00	70.35
73	77.52	1.05	2879.00	1339.00	82.11
74	82.56	1.00	3016.00	1758.00	77.52
75	80.00	1.01	3163.00	1262.00	82.55
76	74.26	1.02	3315.00	1494.00	80.00
77	80.79	.95	3525.00	1562.00	74.26
78	62.25	.92	2314.00	797.00	68.24
79	74.42	.84	2305.00	1068.00	62.25
80	65.18	.81	2304.00	731.00	74.42
81	68.99	.80	2435.00	865.00	65.18
82	62.00	.83	2507.00	578.00	68.99
83	61.45	.87	2639.00	869.00	62.00
84	67.02	.81	2586.00	962.00	61.45
85	50.82	1.25	1490.00	608.00	52.52
86	57.71	1.15	1639.00	779.00	50.82
87	49.01	1.19	1606.00	462.00	57.71
88	56.51	1.22	1712.00	547.00	49.01
89	50.00	1.20	1811.00	456.00	56.51
90	47.37	1.21	1931.00	579.00	50.00
91	54.11	1.09	1955.00	706.00	47.37
92	46.06	1.32	1270.00	745.00	48.42
93	53.34	1.20	1410.00	1039.00	46.06
94	46.85	1.21	1364.00	654.00	53.36
95	58.70	1.20	1451.00	837.00	46.85
96	52.00	1.21	1538.00	456.00	58.70
97	45.92	1.22	1609.00	588.00	52.00
98	54.34	1.08	1755.00	706.00	45.92
99	44.79	1.33	1270.00	735.00	49.87
100	50.12	1.23	1410.00	1039.00	44.79
101	45.07	1.23	1364.00	691.00	50.12

102	54.18	1.23	1451.00	849.00	45.07
103	48.00	1.22	1538.00	456.00	54.18
104	45.46	1.23	1609.00	702.00	48.00
105	54.34	1.08	1755.00	706.00	45.46
106	116.26	.66	2731.00	3401.00	120.45
107	122.13	.69	2484.00	3883.00	116.27
108	123.61	.64	2342.00	3590.00	122.13
109	126.51	.62	2755.00	3656.00	123.61
110	120.00	.64	2871.00	3641.00	126.51
111	106.51	.66	3089.00	3744.00	120.00
112	129.44	.62	2831.00	3575.00	106.51
113	103.96	.88	2655.00	2309.00	99.11
114	105.02	.92	2813.00	2655.00	103.96
115	103.50	.87	2649.00	2513.00	105.02
116	104.27	.82	2629.00	2677.00	103.50
117	104.00	.83	2706.00	2397.00	104.27
118	96.66	.84	3009.00	2356.00	104.00
119	102.53	.83	2838.00	2836.00	96.66
120	89.54	.95	2400.00	2355.00	87.71
121	94.81	.98	2548.00	2871.00	89.54
122	93.69	.92	2399.00	2601.00	94.81
123	97.32	.86	2381.00	2650.00	93.69
124	90.00	.84	2460.00	2397.00	93.69
125	87.05	.84	2552.00	2356.00	90.00
126	93.40	.86	2916.00	3612.00	87.05
127	95.60	.84	2964.00	1993.00	98.48
128	109.38	.81	3102.00	2461.00	95.60
129	107.86	.77	3114.00	2250.00	109.38
130	97.44	.84	3115.00	2341.00	107.86
131	96.00	.75	3174.00	1905.00	97.44
132	109.03	.69	3475.00	2372.00	96.00
133	118.79	.67	3678.00	2074.00	109.03
134	69.24	.91	2341.00	1967.00	72.96
135	77.81	.85	2729.00	2354.00	69.24
136	75.08	.81	2747.00	2188.00	77.81
137	80.22	.91	2885.00	2276.00	75.08
138	75.00	.90	2782.00	1872.00	80.22
139	77.09	.87	2703.00	2161.00	75.00
140	81.59	.87	3293.00	2300.00	77.09
141	97.90	.72	2598.00	2728.00	101.47
142	110.35	.67	2799.00	2966.00	97.90
143	106.77	.66	2672.00	2822.00	110.35
144	106.56	.62	2529.00	2883.00	106.77
145	100.00	.63	2514.00	2400.00	106.56
146	91.98	.60	2896.00	2803.00	100.00
147	103.52	.61	2674.00	2421.00	91.98
148	77.56	1.05	2835.00	1077.00	82.28
149	92.29	1.00	2873.00	1462.00	77.56
150	89.06	1.02	2879.00	1339.00	92.29
151	90.07	1.02	3016.00	1758.00	89.06
152	90.00	1.00	3163.00	1262.00	90.07
153	84.37	1.00	3315.00	1494.00	90.00
154	92.66	.92	3525.00	1562.00	84.37
155	76.74	1.05	2835.00	1077.00	83.00
156	90.16	.98	2873.00	1462.00	76.74
157	83.62	1.04	2879.00	1339.00	90.16
158	88.34	.99	3016.00	1758.00	83.62
159	80.00	1.00	3163.00	1262.00	88.34

160	75.02	1.04	3315.00	1494.00	80.00
161	80.55	.99	3525.00	1562.00	75.02
162	61.68	1.25	2314.00	932.00	66.43
163	71.56	1.26	2305.00	1253.00	61.68
164	64.30	1.21	2304.00	900.00	71.56
165	70.73	1.13	2435.00	1059.00	64.30
166	60.00	1.13	2507.00	578.00	70.73
167	64.53	1.13	2639.00	1017.00	60.00
168	64.78	1.10	2586.00	962.00	64.53
169	78.42	1.04	2013.00	2300.00	83.95
170	112.10	.78	2117.00	2655.00	78.42
171	83.68	.95	2100.00	2513.00	112.10
172	76.03	.96	2196.00	2677.00	83.68
173	80.00	.98	2253.00	2397.00	76.03
174	65.27	1.00	2446.00	2356.00	80.00
175	71.26	.97	2586.00	2836.00	65.27
176	89.16	.91	2013.00	2569.00	101.29
177	76.77	.86	2117.00	3053.00	89.16
178	100.20	.80	2100.00	2893.00	76.77
179	103.78	.73	2196.00	3002.00	100.20
180	71.94	.81	1716.00	2024.00	80.15
181	84.66	.74	1793.00	2412.00	71.94
182	84.91	.71	1874.00	2403.00	84.66
183	83.42	.72	1958.00	2522.00	84.91
184	78.00	.70	2046.00	1800.00	83.42
185	82.64	.67	2137.00	2426.00	78.00
186	77.20	.77	2286.00	1800.00	82.64
187	95.97	.71	2598.00	2032.00	95.98
188	107.64	.63	2799.00	2374.00	95.97
189	109.58	.63	2672.00	2048.00	107.64
190	113.09	.62	2529.00	2093.00	109.58
191	105.00	.62	2514.00	1800.00	113.09
192	107.41	.64	2896.00	2059.00	105.00
193	110.95	.60	2674.00	2421.00	107.41
194	110.06	.90	2629.00	1656.00	120.58
195	128.47	.88	2933.00	2156.00	110.06
196	108.19	.98	3042.00	1740.00	128.47
197	115.35	.94	3155.00	1936.00	108.19
198	105.00	.92	3271.00	1450.00	115.35
199	97.85	.90	3415.00	1710.00	105.00
200	107.90	.84	3521.00	1562.00	97.85

AUTOMATIC TRAN

5 0 0 0 0

6 = 0 LOG 1 .0000

7 = 0 LOG 2 .0000

8 = 0 LOG 3 .0000

9 = 0 LOG 4 .0000

10 = 0 LOG 5 .0000

	1	2	3	4	5	6	7	8	9	10	11
1	114.30	.66	2410.00	3401.00	122.71	4.74	-.42	7.79	8.13	4.81	1.00
2	126.73	.69	2452.00	3883.00	114.30	4.84	-.37	7.80	8.26	4.74	1.00
3	124.78	.65	2434.00	3590.00	126.73	4.83	-.43	7.80	8.19	4.84	1.00
4	126.18	.62	2605.00	3656.00	124.78	4.84	-.47	7.87	8.20	4.83	1.00
5	129.56	.65	2870.00	3641.00	126.18	4.82	-.43	7.89	8.20	4.84	1.00
6	123.48	.65	2796.00	3744.00	129.56	4.82	-.42	7.97	8.23	4.82	1.00
7	131.91	.62	2491.00	3579.00	123.48	4.88	-.48	7.97	8.18	4.82	1.00
8	145.70	.96	1731.00	3790.00	137.65	4.98	-.77	7.91	8.23	5.06	1.00
9	159.96	.94	2482.00	4113.00	145.70	5.07	-.82	7.82	8.32	4.98	1.00

10	164.47	.41	2342.00	4219.00	159.96	5.10	-.89	7.76	8.35	5.07	1.00
11	162.63	.39	2755.00	4270.00	164.47	5.09	-.95	7.92	8.36	5.10	1.00
12	160.00	.38	2871.00	4171.00	162.63	5.08	-.98	7.96	8.34	5.09	1.00
13	156.85	.37	3089.00	4467.00	160.00	5.06	-1.00	8.04	8.40	5.08	1.00
14	163.82	.35	2831.00	4220.00	156.85	5.10	-1.05	7.95	8.35	5.06	1.00
15	83.27	.93	2106.00	2621.00	85.79	4.42	-.08	7.65	7.87	4.45	1.00
16	95.70	.87	2204.00	2814.00	83.27	4.56	-.13	7.70	7.94	4.42	1.00
17	94.33	.85	2177.00	2448.00	95.70	4.55	-.17	7.69	7.80	4.56	1.00
18	95.85	.82	2207.00	2443.00	94.33	4.56	-.20	7.70	7.80	4.55	1.00
19	90.00	.85	2284.00	2600.00	95.85	4.50	-.16	7.73	7.86	4.56	1.00
20	87.62	.88	2446.00	2289.00	90.00	4.47	-.13	7.80	7.74	4.50	1.00
21	101.10	.86	2595.00	2836.00	87.62	4.62	-.15	7.86	7.95	4.47	1.00
22	107.37	.66	3474.00	2498.00	113.66	4.68	-.42	8.15	7.82	4.73	1.00
23	121.17	.65	3582.00	2844.00	107.37	4.80	-.43	8.18	7.95	4.68	1.00
24	121.05	.65	3257.00	2628.00	121.17	4.80	-.43	8.09	7.87	4.80	1.00
25	128.14	.62	3193.00	2821.00	121.05	4.85	-.48	8.07	7.94	4.80	1.00
26	121.00	.65	3291.00	2397.00	128.14	4.80	-.43	8.10	7.78	4.85	1.00
27	121.54	.70	3765.00	2698.00	121.00	4.80	-.35	8.23	7.90	4.80	1.00
28	135.75	.62	3413.00	3612.00	121.54	4.91	-.48	8.14	8.19	4.80	1.00
29	99.04	.67	2655.00	2498.00	105.65	4.60	-.40	7.88	7.82	4.66	1.00
30	108.56	.70	2813.00	2844.00	99.04	4.69	-.35	7.94	7.95	4.60	1.00
31	105.31	.67	2649.00	2628.00	103.56	4.66	-.41	7.88	7.87	4.69	1.00
32	111.62	.64	2629.00	2821.00	105.31	4.72	-.45	7.87	7.94	4.66	1.00
33	105.00	.65	2706.00	2397.00	111.62	4.65	-.43	7.90	7.78	4.72	1.00
34	103.67	.68	2961.00	2698.00	105.00	4.64	-.39	7.99	7.90	4.65	1.00
35	113.97	.63	2758.00	3612.00	103.67	4.74	-.46	7.92	8.19	4.64	1.00
36	110.73	.82	2964.00	1993.00	113.31	4.71	-.20	7.99	7.60	4.73	1.00
37	127.48	.78	3102.00	2461.00	110.73	4.85	-.25	8.04	7.81	4.71	1.00
38	128.53	.74	3114.00	2250.00	127.48	4.86	-.30	8.04	7.72	4.85	1.00
39	129.82	.76	3115.00	2341.00	128.53	4.87	-.28	8.04	7.76	4.86	1.00
40	115.00	.73	3174.00	1905.00	129.82	4.74	-.31	8.06	7.55	4.87	1.00
41	124.72	.71	3475.00	2372.00	115.00	4.83	-.34	8.15	7.77	4.74	1.00
42	125.94	.67	3678.00	2074.00	124.72	4.84	-.39	8.21	7.64	4.83	1.00
43	83.94	.88	2833.00	2122.00	87.81	4.43	-.12	7.95	7.66	4.48	1.00
44	96.02	.84	2967.00	2590.00	83.94	4.56	-.17	8.00	7.86	4.43	1.00
45	96.18	.81	2874.00	2320.00	96.02	4.57	-.21	7.96	7.75	4.56	1.00
46	97.64	.87	2830.00	2497.00	96.18	4.58	-.15	7.95	7.82	4.57	1.00
47	88.00	.85	2821.00	2284.00	97.64	4.48	-.16	7.94	7.73	4.58	1.00
48	92.37	.83	3057.00	2372.00	88.00	4.53	-.18	8.03	7.77	4.48	1.00
49	96.98	.82	3248.00	2074.00	92.37	4.57	-.19	8.09	7.64	4.53	1.00
50	80.33	.91	2195.00	1592.00	82.99	4.39	-.09	7.69	7.37	4.42	1.00
51	93.30	.85	2416.00	2098.00	80.33	4.54	-.16	7.79	7.65	4.39	1.00
52	91.18	.80	2361.00	1727.00	93.30	4.51	-.23	7.77	7.45	4.54	1.00
53	96.40	.74	2425.00	1898.00	91.18	4.57	-.29	7.79	7.55	4.51	1.00
54	88.00	.75	2581.00	1309.00	96.40	4.48	-.29	7.86	7.18	4.57	1.00
55	86.39	.78	2703.00	1738.00	88.00	4.46	-.24	7.90	7.46	4.48	1.00
56	95.54	.74	2823.00	1672.00	86.39	4.56	-.30	7.95	7.42	4.46	1.00
57	103.40	.66	2598.00	2728.00	105.64	4.64	-.42	7.86	7.91	4.66	1.00
58	93.30	.60	2799.00	2966.00	103.40	4.54	-.51	7.94	7.99	4.64	1.00
59	117.44	.57	2672.00	2822.00	93.30	4.77	-.56	7.89	7.95	4.54	1.00
60	117.55	.57	2529.00	2883.00	117.44	4.77	-.57	7.84	7.97	4.77	1.00
61	105.00	.57	2514.00	2400.00	117.55	4.65	-.56	7.83	7.78	4.77	1.00
62	105.76	.58	2896.00	2803.00	105.00	4.66	-.55	7.97	7.94	4.65	1.00
63	113.40	.56	2674.00	2421.00	105.76	4.73	-.59	7.89	7.79	4.66	1.00
64	81.04	1.01	2835.00	1077.00	86.03	4.39	.01	7.95	6.98	4.45	1.00
65	93.46	.97	2873.00	1462.00	81.04	4.54	-.03	7.96	7.29	4.39	1.00
66	88.19	1.00	2879.00	1339.00	93.46	4.48	.00	7.97	7.20	4.54	1.00
67	94.49	.95	3016.00	1758.00	88.19	4.55	-.05	8.01	7.47	4.48	1.00

68	84.00	.96	3163.00	1262.00	94.49	4.43	-.04	8.06	7.14	4.55	1.00
69	82.86	.99	3315.00	1494.00	84.00	4.42	-.01	8.11	7.31	4.43	1.00
70	88.76	.92	3525.00	1562.00	82.86	4.49	-.08	8.17	7.35	4.42	1.00
71	70.35	10.54	2835.00	1077.00	75.95	4.25	2.36	7.95	6.98	4.33	1.00
72	82.11	.99	2873.00	1462.00	70.35	4.41	-.01	7.96	7.29	4.25	1.00
73	77.52	1.05	2879.00	1339.00	82.11	4.35	.05	7.97	7.20	4.41	1.00
74	82.56	1.00	3016.00	1758.00	77.52	4.41	.00	8.01	7.47	4.35	1.00
75	80.00	1.01	3163.00	1262.00	82.55	4.38	.01	8.06	7.14	4.41	1.00
76	74.26	1.02	3315.00	1494.00	80.00	4.31	.02	8.11	7.31	4.38	1.00
77	80.79	.95	3525.00	1562.00	74.26	4.39	-.05	8.17	7.35	4.31	1.00
78	62.25	.92	2314.00	797.00	68.24	4.13	-.08	7.75	6.68	4.22	1.00
79	74.42	.84	2305.00	1068.00	62.25	4.31	-.18	7.74	6.97	4.13	1.00
80	65.18	.81	2304.00	731.00	74.42	4.18	-.21	7.74	6.59	4.31	1.00
81	68.99	.80	2435.00	865.00	65.18	4.23	-.22	7.80	6.76	4.18	1.00
82	62.00	.83	2507.00	578.00	68.99	4.13	-.19	7.83	6.36	4.23	1.00
83	61.45	.87	2639.00	869.00	62.00	4.12	-.14	7.88	6.77	4.13	1.00
84	67.02	.81	2586.00	962.00	61.45	4.20	-.21	7.86	6.87	4.12	1.00
85	50.82	1.25	1490.00	608.00	52.52	3.93	.22	7.31	6.41	3.96	1.00
86	57.71	1.15	1639.00	779.00	50.82	4.06	.14	7.40	6.66	3.93	1.00
87	49.01	1.19	1606.00	462.00	57.71	3.89	.17	7.38	6.14	4.06	1.00
88	56.51	1.22	1712.00	547.00	49.01	4.03	.20	7.45	6.30	3.89	1.00
89	50.00	1.20	1811.00	456.00	56.51	3.91	.18	7.50	6.12	4.03	1.00
90	47.37	1.21	1931.00	579.00	50.00	3.86	.19	7.57	6.36	3.91	1.00
91	54.11	1.09	1955.00	706.00	47.37	3.99	.08	7.58	6.56	3.86	1.00
92	46.06	1.32	1270.00	745.00	48.42	3.83	.28	7.15	6.61	3.88	1.00
93	53.34	1.20	1410.00	1039.00	46.06	3.98	.18	7.25	6.95	3.83	1.00
94	46.85	1.21	1364.00	654.00	53.36	3.85	.19	7.22	6.48	3.98	1.00
95	58.70	1.20	1451.00	837.00	46.85	4.07	.18	7.28	6.73	3.85	1.00
96	52.00	1.21	1538.00	456.00	58.70	3.95	.19	7.34	6.12	4.07	1.00
97	45.92	1.22	1609.00	588.00	52.00	3.83	.20	7.38	6.38	3.95	1.00
98	54.34	1.08	1755.00	706.00	45.92	4.00	.08	7.47	6.56	3.83	1.00
99	44.79	1.33	1270.00	735.00	49.87	3.80	.29	7.15	6.60	3.91	1.00
100	50.12	1.23	1410.00	1039.00	44.79	3.91	.20	7.25	6.95	3.80	1.00
101	45.07	1.23	1364.00	691.00	50.12	3.81	.21	7.22	6.54	3.91	1.00
102	54.18	1.23	1451.00	849.00	45.07	3.99	.21	7.28	6.74	3.81	1.00
103	48.00	1.22	1538.00	456.00	54.18	3.87	.20	7.34	6.12	3.99	1.00
104	45.46	1.23	1609.00	702.00	48.00	3.82	.20	7.38	6.55	3.87	1.00
105	54.34	1.08	1755.00	706.00	45.46	4.00	.08	7.47	6.56	3.82	1.00
106	116.26	.66	2731.00	3401.00	120.45	4.76	-.42	7.91	8.13	4.79	1.00
107	122.13	.69	2484.00	3883.00	116.27	4.81	-.38	7.82	8.26	4.76	1.00
108	123.61	.64	2342.00	3590.00	122.13	4.82	-.44	7.76	8.19	4.81	1.00
109	126.51	.62	2755.00	3656.00	123.61	4.84	-.47	7.92	8.20	4.82	1.00
110	120.00	.64	2871.00	3641.00	126.51	4.79	-.45	7.96	8.20	4.84	1.00
111	106.51	.66	3089.00	3744.00	120.00	4.67	-.41	8.04	8.23	4.79	1.00
112	129.44	.62	2831.00	3575.00	106.51	4.86	-.49	7.95	8.18	4.67	1.00
113	103.96	.88	2655.00	2309.00	99.11	4.64	-.12	7.88	7.74	4.60	1.00
114	105.02	.92	2813.00	2655.00	103.96	4.65	-.08	7.94	7.88	4.64	1.00
115	103.50	.87	2649.00	2513.00	105.02	4.64	-.14	7.88	7.83	4.65	1.00
116	104.27	.82	2629.00	2677.00	103.50	4.65	-.19	7.87	7.89	4.64	1.00
117	104.00	.83	2706.00	2397.00	104.27	4.64	-.19	7.90	7.78	4.65	1.00
118	96.66	.84	3009.00	2356.00	104.00	4.57	-.18	8.01	7.76	4.64	1.00
119	102.53	.83	2838.00	2836.00	96.66	4.63	-.18	7.95	7.95	4.57	1.00
120	89.54	.95	2400.00	2355.00	87.71	4.49	-.05	7.78	7.76	4.47	1.00
121	94.81	.98	2548.00	2871.00	89.54	4.55	-.02	7.84	7.96	4.49	1.00
122	93.69	.92	2399.00	2601.00	94.81	4.54	-.08	7.78	7.86	4.55	1.00
123	97.32	.86	2381.00	2650.00	93.69	4.58	-.15	7.78	7.88	4.54	1.00
124	90.00	.84	2460.00	2397.00	93.69	4.50	-.17	7.81	7.78	4.54	1.00
125	87.05	.84	2552.00	2356.00	90.00	4.47	-.18	7.84	7.76	4.50	1.00

126	93.40	.86	2916.00	3612.00	87.05	4.54	-.15	7.98	8.19	4.47	1.00
127	95.60	.84	2964.00	1993.00	98.48	4.56	-.17	7.99	7.60	4.59	1.00
128	109.38	.81	3102.00	2461.00	95.60	4.69	-.21	8.04	7.81	4.56	1.00
129	107.86	.77	3114.00	2250.00	109.38	4.68	-.26	8.04	7.72	4.69	1.00
130	97.44	.84	3115.00	2341.00	107.86	4.58	-.18	8.04	7.76	4.68	1.00
131	96.00	.75	3174.00	1905.00	97.44	4.56	-.29	8.06	7.55	4.58	1.00
132	109.03	.69	3475.00	2372.00	96.00	4.69	-.37	8.15	7.77	4.56	1.00
133	118.79	.67	3678.00	2074.00	109.03	4.78	-.39	8.21	7.64	4.69	1.00
134	69.24	.91	2341.00	1967.00	72.96	4.24	-.10	7.76	7.58	4.29	1.00
135	77.81	.85	2729.00	2354.00	69.24	4.35	-.16	7.91	7.76	4.24	1.00
136	75.08	.81	2747.00	2188.00	77.81	4.32	-.21	7.92	7.69	4.35	1.00
137	80.22	.91	2685.00	2276.00	75.08	4.38	-.09	7.97	7.73	4.32	1.00
138	75.00	.90	2782.00	1872.00	80.22	4.32	-.11	7.93	7.53	4.38	1.00
139	77.09	.87	2703.00	2161.00	75.00	4.35	-.14	7.90	7.68	4.32	1.00
140	81.59	.87	3293.00	2300.00	77.09	4.40	-.14	8.10	7.74	4.35	1.00
141	97.90	.72	2598.00	2728.00	101.47	4.58	-.33	7.86	7.91	4.62	1.00
142	110.35	.67	2799.00	2966.00	97.90	4.70	-.40	7.94	7.99	4.58	1.00
143	106.77	.66	2672.00	2822.00	110.35	4.67	-.41	7.89	7.95	4.70	1.00
144	106.56	.62	2529.00	2883.00	106.77	4.67	-.49	7.84	7.97	4.67	1.00
145	100.00	.63	2514.00	2400.00	106.56	4.61	-.46	7.83	7.78	4.67	1.00
146	91.98	.60	2896.00	2803.00	100.00	4.52	-.51	7.97	7.94	4.61	1.00
147	103.52	.61	2674.00	2421.00	91.98	4.64	-.50	7.89	7.79	4.52	1.00
148	77.56	1.05	2835.00	1077.00	82.28	4.35	.05	7.95	6.98	4.41	1.00
149	92.29	1.00	2873.00	1462.00	77.56	4.52	-.00	7.96	7.29	4.35	1.00
150	89.06	1.02	2879.00	1339.00	92.29	4.49	.02	7.97	7.20	4.52	1.00
151	90.07	1.02	3016.00	1758.00	89.06	4.50	.02	8.01	7.47	4.49	1.00
152	90.00	1.00	3163.00	1262.00	90.07	4.50	.00	8.06	7.14	4.50	1.00
153	84.37	1.00	3315.00	1494.00	90.00	4.44	-.00	8.11	7.31	4.50	1.00
154	92.66	.92	3525.00	1562.00	84.37	4.53	-.08	8.17	7.35	4.44	1.00
155	76.74	1.05	2835.00	1077.00	83.00	4.34	.05	7.95	6.98	4.42	1.00
156	90.16	.98	2873.00	1462.00	76.74	4.50	-.02	7.96	7.29	4.34	1.00
157	83.62	1.04	2879.00	1339.00	90.16	4.43	.04	7.97	7.20	4.50	1.00
158	88.34	.99	3016.00	1758.00	83.62	4.48	-.01	8.01	7.47	4.43	1.00
159	80.00	1.00	3163.00	1262.00	88.34	4.38	.00	8.06	7.14	4.48	1.00
160	75.02	1.04	3315.00	1494.00	80.00	4.32	.04	8.11	7.31	4.38	1.00
161	80.55	.99	3525.00	1562.00	75.02	4.39	-.01	8.17	7.35	4.32	1.00
162	61.68	1.25	2314.00	932.00	66.43	4.12	.22	7.75	6.84	4.20	1.00
163	71.56	1.26	2305.00	1253.00	61.68	4.27	.23	7.74	7.13	4.12	1.00
164	64.30	1.21	2304.00	900.00	71.56	4.16	.19	7.74	6.80	4.27	1.00
165	70.73	1.13	2435.00	1059.00	64.30	4.26	.12	7.80	6.97	4.16	1.00
166	60.00	1.13	2507.00	578.00	70.73	4.09	.12	7.83	6.36	4.26	1.00
167	64.53	1.13	2639.00	1017.00	60.00	4.17	.12	7.88	6.92	4.09	1.00
168	64.78	1.10	2586.00	962.00	64.53	4.17	.10	7.86	6.87	4.17	1.00
169	78.42	1.04	2013.00	2300.00	83.95	4.36	.04	7.61	7.74	4.43	1.00
170	112.10	.78	2117.00	2655.00	78.42	4.72	-.24	7.66	7.88	4.36	1.00
171	83.68	.95	2100.00	2513.00	112.10	4.43	-.05	7.65	7.83	4.72	1.00
172	76.03	.96	2196.00	2677.00	83.68	4.33	-.04	7.69	7.89	4.43	1.00
173	80.00	.98	2253.00	2397.00	76.03	4.38	-.02	7.72	7.78	4.33	1.00
174	65.27	1.00	2446.00	2356.00	80.00	4.18	-.00	7.80	7.76	4.38	1.00
175	71.26	.97	2586.00	2836.00	65.27	4.27	-.03	7.86	7.95	4.18	1.00
176	89.16	.91	2013.00	2569.00	101.29	4.49	-.09	7.61	7.85	4.62	1.00
177	76.77	.86	2117.00	3053.00	89.16	4.34	-.16	7.66	8.02	4.49	1.00
178	100.20	.80	2100.00	2893.00	76.77	4.61	-.23	7.65	7.97	4.34	1.00
179	103.78	.73	2196.00	3002.00	100.20	4.64	-.31	7.69	8.01	4.61	1.00
180	71.94	.81	1716.00	2024.00	80.15	4.28	-.21	7.45	7.61	4.38	1.00
181	84.66	.74	1793.00	2412.00	71.94	4.44	-.30	7.49	7.79	4.28	1.00
182	84.91	.71	1874.00	2403.00	84.66	4.44	-.34	7.54	7.78	4.44	1.00
183	83.42	.72	1958.00	2522.00	84.91	4.42	-.33	7.58	7.83	4.44	1.00

	MCFPC	PCMCF	DIPC	HDDYS	MCFLG	LMCFC	LPCMC	LDIPC	LHDDY	LMCFL	
184	78.00	.70	2046.00	1800.00	83.42	4.36	-.36	7.62	7.50	4.42	1.00
185	82.64	.67	2137.00	2426.00	78.00	4.41	-.39	7.67	7.79	4.36	1.00
186	77.20	.77	2286.00	1800.00	82.64	4.35	-.26	7.73	7.50	4.41	1.00
187	95.97	.71	2598.00	2032.00	95.98	4.56	-.34	7.86	7.62	4.56	1.00
188	107.64	.63	2799.00	2374.00	95.97	4.68	-.46	7.94	7.77	4.56	1.00
189	109.58	.63	2672.00	2048.00	107.64	4.70	-.46	7.89	7.62	4.68	1.00
190	113.09	.62	2529.00	2093.00	109.58	4.73	-.49	7.84	7.65	4.70	1.00
191	105.00	.62	2514.00	1800.00	113.09	4.65	-.48	7.83	7.50	4.73	1.00
192	107.41	.64	2396.00	2059.00	105.00	4.68	-.45	7.97	7.63	4.65	1.00
193	110.95	.60	2674.00	2421.00	107.41	4.71	-.51	7.89	7.79	4.68	1.00
194	110.06	.90	2829.00	1656.00	120.58	4.70	-.10	7.95	7.41	4.79	1.00
195	128.47	.88	2933.00	2156.00	110.06	4.86	-.13	7.98	7.68	4.70	1.00
196	108.19	.98	3042.00	1740.00	128.47	4.68	-.02	8.02	7.46	4.86	1.00
197	115.35	.94	3155.00	1936.00	108.19	4.75	-.06	8.06	7.57	4.68	1.00
198	105.00	.92	3271.00	1450.00	115.35	4.65	-.08	8.09	7.28	4.75	1.00
199	97.85	.90	3415.00	1710.00	105.00	4.58	-.11	8.14	7.44	4.65	1.00
200	107.90	.84	3521.00	1562.00	97.85	4.68	-.17	8.17	7.35	4.58	1.00

MOMENT MATRIX

	MCFPC	PCMCF	DIPC	HDDYS	MCFLG	LMCFC	LPCMC	LDIPC	LHDDY	LMCFL
MCFPC	634.939									
PCMCF	-5.507	.512								
DIPC	7420.063	-36.552	282880.325							
HDDYS	19504.172	-203.963	151697.860	863215.353						
MCFLG	588.540	-4.993	7100.328	18302.232	613.682					
LMCFC	7.057	-.062	94.604	219.385	6.549	.081				
LPCMC	-5.780	.175	-47.072	-203.214	-5.465	-.063	.098			
LDIPC	3.324	-.017	118.937	74.968	3.199	.043	-.022	.051		
LHDDY	10.977	-.114	120.359	471.841	10.256	.130	-.110	.057	.281	
LMCFL	6.602	-.056	91.629	207.748	6.879	.076	-.060	.042	.122	.080
CONS	93.452	.895	2626.205	2122.315	92.604	4.499	-.185	7.850	7.540	4.490

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CORRELATION MATRIX

	MCFPC	PCMCF	DIPC	HDDYS	MCFLG	LMCFC	LPCMC	LDIPC	LHDDY
PCMCF	-.31								
DIPC	.55	-.10							
HDDYS	.83	-.31	.31						
MCFLG	.94	-.28	.54	.80					
LMCFC	.98	-.30	.62	.83	.93				
LPCMC	-.73	.78	-.28	-.70	-.71	-.71			
LDIPC	.58	-.11	.99	.36	.57	.66	-.32		
LHDDY	.82	-.30	.43	.96	.78	.86	-.66	.48	
LMCFL	.93	-.28	.61	.79	.98	.94	-.68	.65	.81

EQUATION NUMBER 1

200 10 NATURAL GAS DEMAND - TEXAS RESIDENTIAL

0 0 0 5 2 3 4 5 1 3 0 5 1 2 3 4 5

	1	2	3	4	5	6
1	262.005	462744.030	339246.960	15580.047	178.972	15629.422
2	462744.030	***********	***********	50052600.892	525241.000	50561653.371
3	339246.960	***********	***********	42949291.888	424463.000	43548439.711
4	15580.047	50052600.892	42949291.888	1837238.321	18520.883	1847941.461
5	178.972	525241.000	424463.000	18520.883	200.000	18690.491
6	15629.422	50561653.371	43548439.711	1847941.461	18690.491	1873025.090

ORDINARY LEAST SQUARES

VARIANCE-COVARIANCE MATRIX OF COEFFICIENTS

.589811				
-.000034	.000001			
.000096	.000000	.000001		
.002326	-.000025	-.000030	.001640	
-.858531	-.002010	.000019	-.025318	8.622119

DEPENDENT VARIABLE MCFPC

A(PCMCF)= -.94662198 T= -1.233
(.76799170)

A(DIPC)= .00522909 T= 4.361
(.00119911)

A(HDDYS)= .00697504 T= 7.257
(.00096114)

A(MCFLG)= .68280718 T= 16.862
(.04049436)

A(CONS)= 2.53269157 T= .863
(2.93634454)

VARIANCE= 54.11107954

STAND DEV= 7.35602331

R-SQUARED= .9148 (ADJUSTED FOR D. OF FREEDOM)

F-TEST(4,195)= 535.02

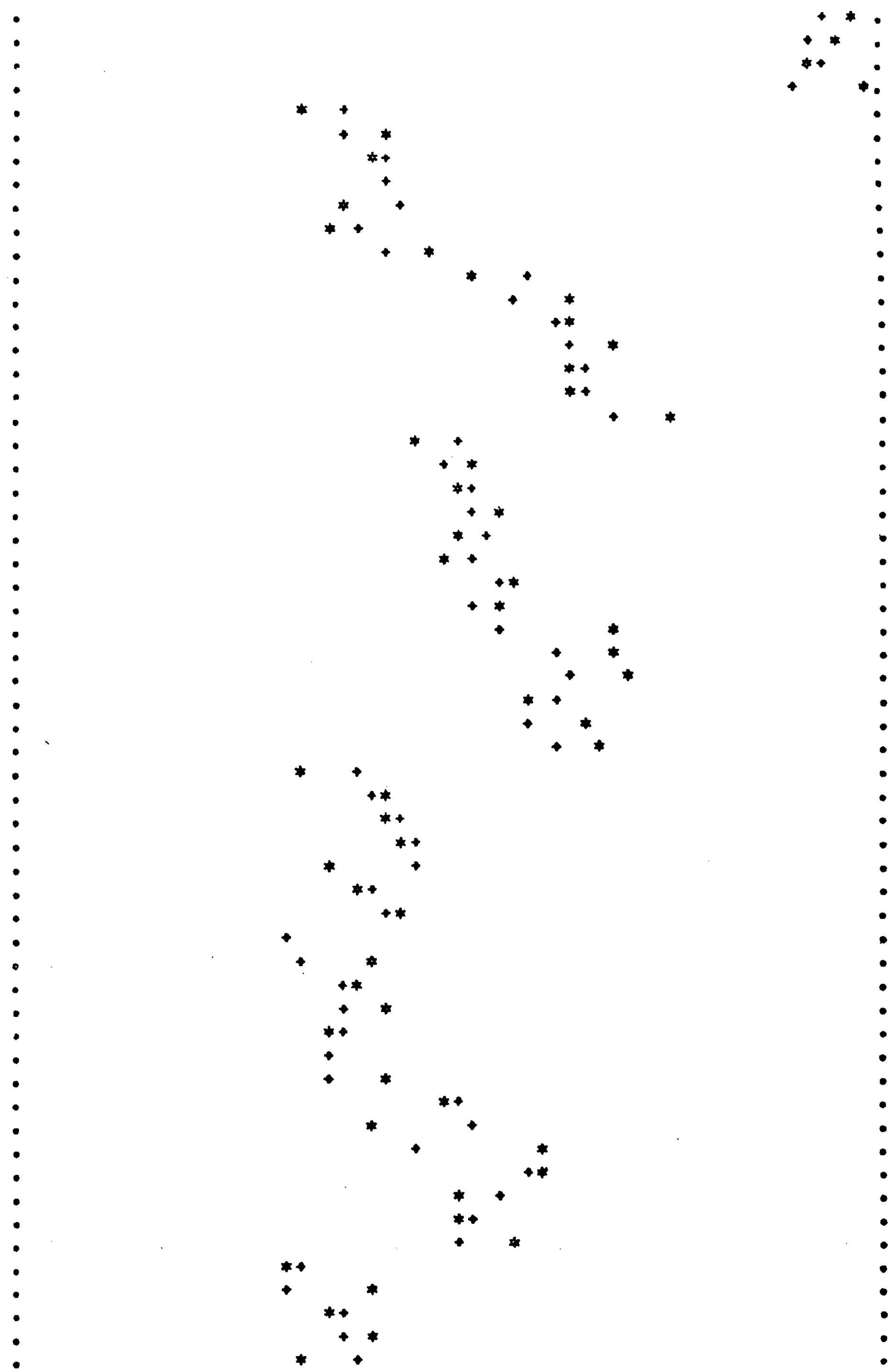
NATURAL GAS DEMAND - TEXAS RESIDENTIAL

1 MCFPC	PCMCF	DIPC	HDDYS	MCFLG	CONS	R/SE	DW/F
OLS	-.9466	.0052	.0070	.6828	2.5327	.9148	2.2583
	-1.2326	4.3608	7.2570	16.8618	.8625	7.3560	535.0159

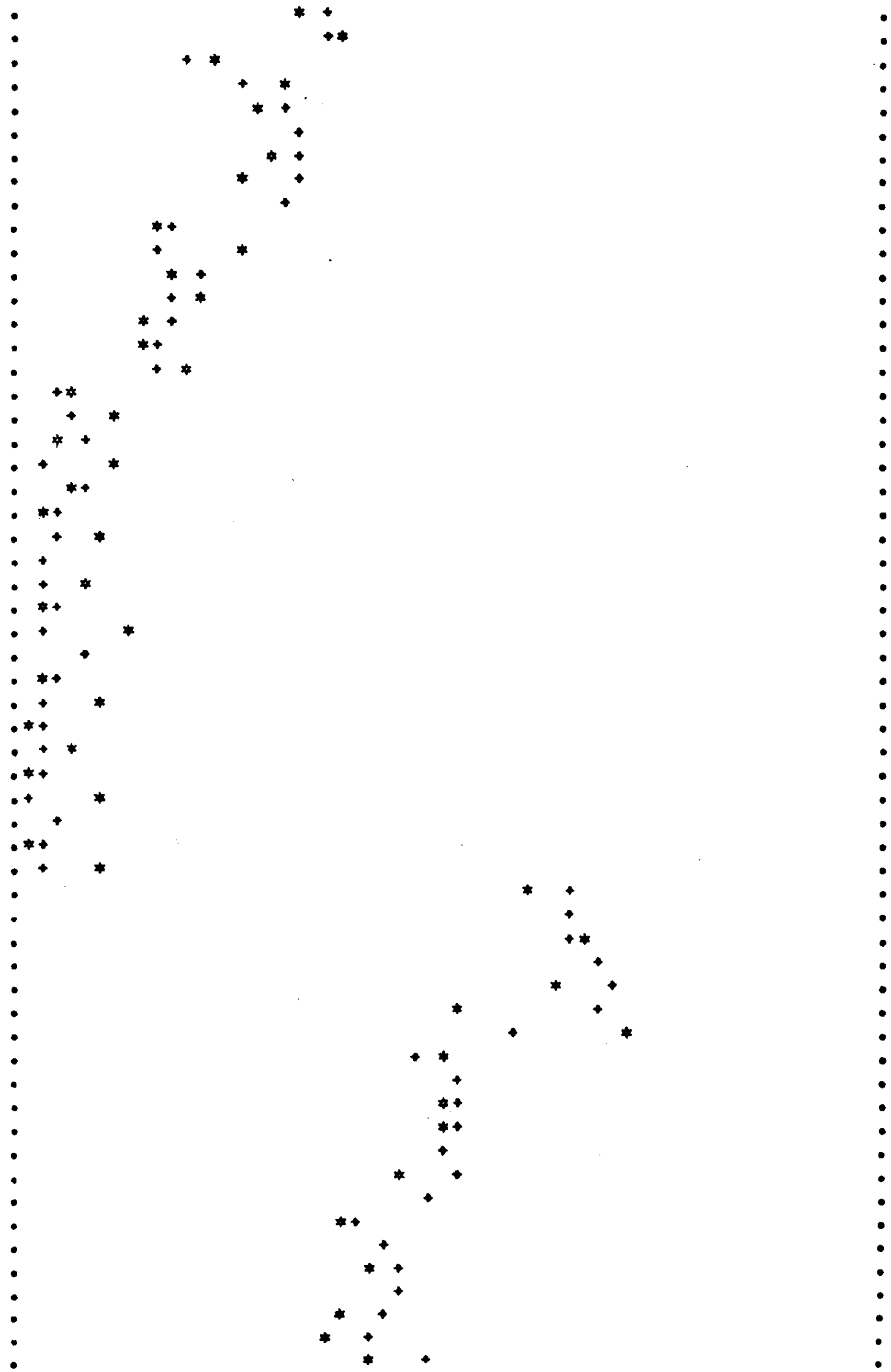
RANGE 44.79 TO 164.47

ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
114.298	122.027	-7.729	-6.762	1
126.734	119.831	6.903	5.447	2
124.783	126.222	-1.439	-1.153	3
126.182	126.268	-.086	-.068	4
124.560	127.435	-2.875	-2.308	5
123.475	128.222	-4.747	-3.845	6
131.910	126.310	5.600	4.245	7
145.703	150.103	-4.400	-3.020	8
159.962	143.271	16.691	10.434	9
164.467	153.043	11.424	6.946	10

162.631	158.656	3.975	2.444	11
160.000	157.329	2.671	1.669	12
156.850	158.744	-1.894	-1.207	13
163.822	153.537	10.285	6.278	14
83.268	89.529	-6.261	-7.519	15
95.698	89.714	5.984	6.253	16
94.330	95.534	-1.204	-1.276	17
95.847	94.747	1.100	1.147	18
90.000	97.251	-7.251	-8.057	19
87.622	91.907	-4.285	-4.890	20
101.100	94.895	6.205	6.137	21
107.367	115.106	-7.739	-7.208	22
121.167	113.794	7.373	6.085	23
121.054	120.013	1.041	.860	24
128.140	120.974	7.166	5.592	25
121.000	123.340	-2.340	-1.934	26
121.538	122.991	-1.453	-1.196	27
135.747	127.975	7.772	5.725	28
99.040	105.346	-6.306	-6.367	29
108.556	104.037	4.519	4.163	30
105.305	108.207	-2.902	-2.756	31
111.623	107.257	4.366	3.912	32
105.000	109.003	-4.003	-3.813	33
103.667	107.889	-4.222	-4.072	34
113.965	112.333	1.632	1.432	35
110.735	108.530	2.205	1.992	36
127.484	110.789	16.695	13.096	37
128.530	120.853	7.677	5.973	38
129.823	122.194	7.629	5.876	39
115.000	120.370	-5.370	-4.670	40
124.721	115.099	9.622	7.715	41
125.945	120.754	5.191	4.122	42
83.936	91.270	-7.334	-8.737	43
96.018	92.629	3.389	3.530	44
96.179	98.537	-2.358	-2.452	45
97.636	99.601	-1.965	-2.012	46
88.000	99.077	-11.077	-12.587	47
92.371	94.362	-1.991	-2.156	48
96.976	96.276	.700	.722	49
80.328	80.920	-.592	-.737	50
93.303	83.842	9.461	10.140	51
91.181	89.877	1.304	1.430	52
96.404	90.006	6.398	6.637	53
88.000	90.275	-2.275	-2.585	54
86.391	88.134	-1.743	-2.018	55
95.538	87.244	8.294	8.682	56
103.403	106.650	-3.247	-3.140	57
93.303	107.891	-14.588	-15.635	58
117.440	99.353	18.087	15.401	59
117.546	115.518	2.028	1.725	60
105.000	112.140	-7.140	-6.800	61
105.763	108.375	-2.612	-2.469	62
113.397	105.091	8.306	7.324	63
81.043	82.655	-1.612	-1.989	64
93.462	82.172	11.290	12.080	65
88.185	89.792	-1.607	-1.822	66
94.486	89.880	4.606	4.875	67
84.000	91.482	-7.482	-8.907	68



82.857	86.710	-3.853	-4.651	69
88.756	87.562	1.194	1.345	70
70.349	66.750	3.599	5.116	71
82.107	74.848	7.259	8.841	72
77.520	81.993	-4.473	-5.770	73
82.555	82.548	.007	.008	74
80.000	83.284	-3.284	-4.106	75
74.263	83.944	-9.681	-13.036	76
80.793	81.664	-.871	-1.077	77
62.249	65.916	-3.667	-5.890	78
74.422	63.749	10.673	14.342	79
65.184	69.729	-4.545	-6.973	80
68.995	65.045	3.950	5.725	81
62.000	66.003	-4.003	-6.456	82
61.445	63.908	-2.463	-4.008	83
67.015	63.954	3.061	4.567	84
50.822	49.239	1.583	3.114	85
57.708	50.153	7.555	13.092	86
49.013	52.431	-3.418	-6.974	87
56.509	47.610	8.899	15.748	88
50.000	52.632	-2.632	-5.264	89
47.370	49.662	-2.292	-4.838	90
54.115	48.995	5.120	9.462	91
46.060	46.182	-.122	-.265	92
53.335	47.466	5.869	11.004	93
46.853	49.511	-2.658	-5.672	94
58.703	46.811	11.892	20.258	95
52.000	52.690	-.690	-1.327	96
45.916	49.396	-3.480	-7.579	97
54.339	46.963	7.376	13.575	98
44.793	47.092	-2.299	-5.132	99
50.118	46.577	3.541	7.065	100
45.073	47.538	-2.465	-5.468	101
54.177	45.654	8.523	15.732	102
48.000	49.593	-1.593	-3.319	103
45.460	47.457	-1.997	-4.393	104
54.339	46.651	7.688	14.148	105
116.263	122.161	-5.898	-5.073	106
122.126	121.342	.784	.642	107
123.606	122.599	1.007	.814	108
126.508	126.249	.259	.205	109
120.000	128.716	-8.716	-7.264	110
106.509	126.108	-19.599	-18.401	111
129.441	114.415	15.026	11.608	112
103.963	99.360	4.603	4.427	113
105.021	105.877	-.856	-.815	114
103.504	104.796	-1.292	-1.249	115
104.275	104.845	-.570	-.547	116
104.000	103.816	.184	.177	117
96.659	104.918	-8.259	-8.544	118
102.526	102.366	.160	.156	119
89.542	90.498	-.956	-1.068	120
94.808	96.097	-1.289	-1.359	121
93.695	97.081	-3.386	-3.614	122
97.316	96.629	.687	.706	123
90.000	95.291	-5.291	-5.879	124
87.049	92.969	-5.920	-6.801	125
93.400	101.601	-8.201	-8.781	126



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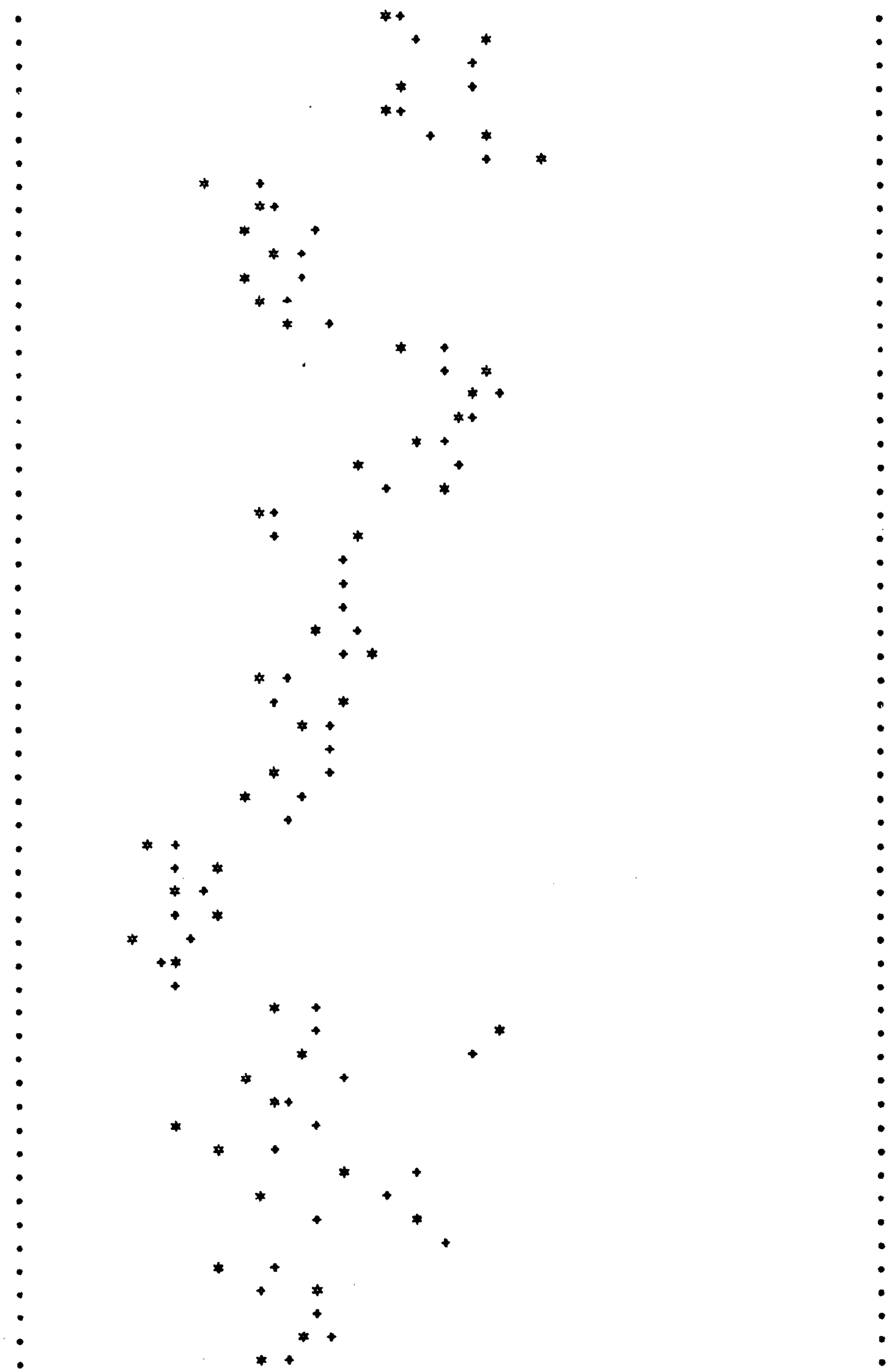
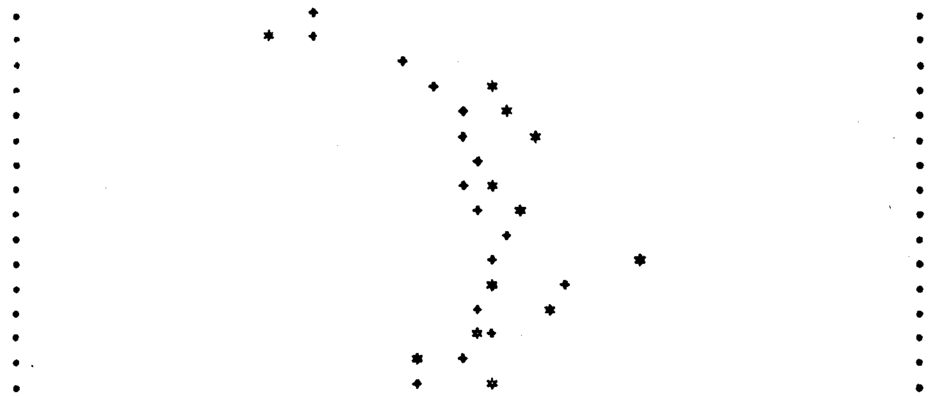
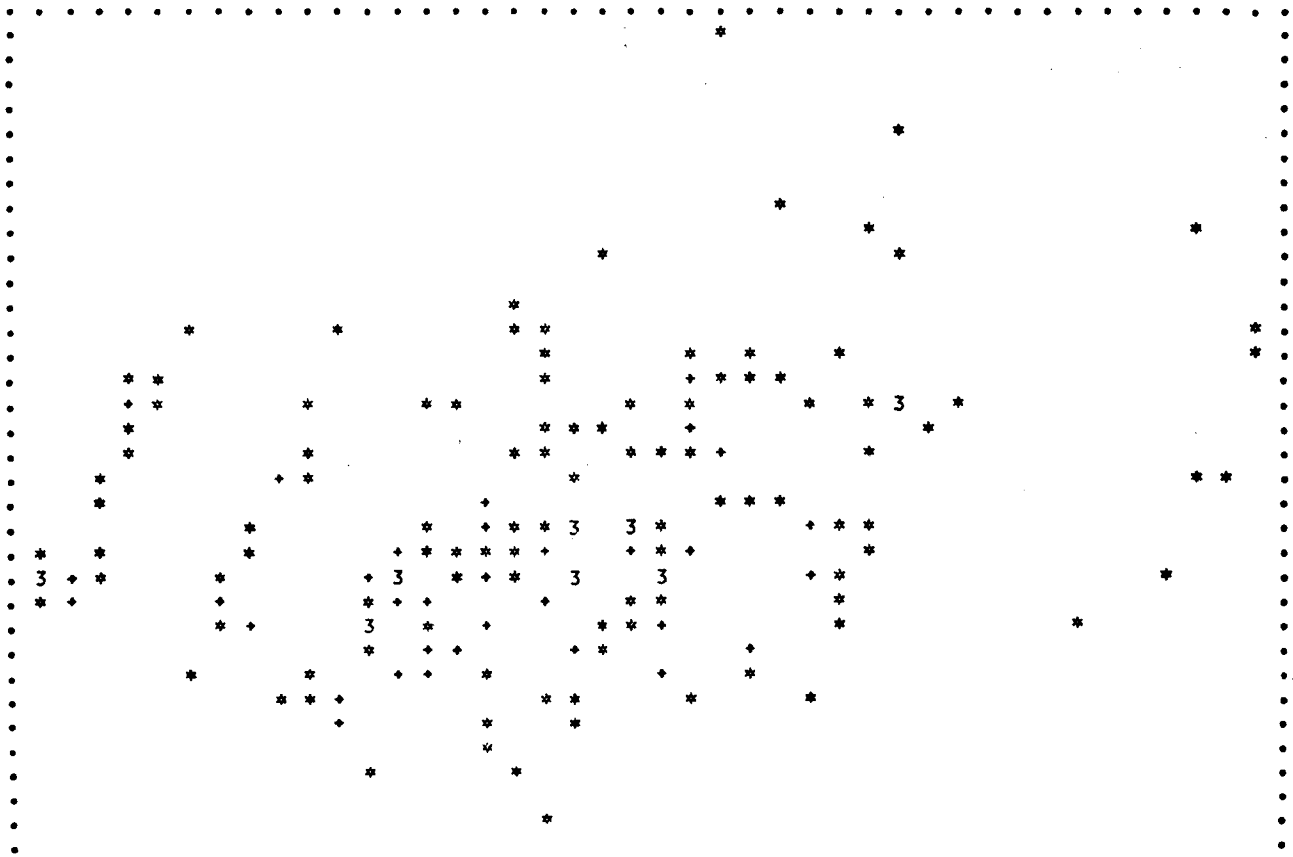
109.384	100.425	8.959	8.190	128	
107.863	108.468	-.605	-.561	129	
97.437	108.009	-10.572	-10.850	130	
96.000	98.238	-2.238	-2.331	131	
109.031	102.144	6.887	6.317	132	
118.786	110.041	8.745	7.362	133	
69.242	77.456	-8.214	-11.863	134	
77.815	79.693	-1.878	-2.413	135	
75.083	84.520	-9.437	-12.569	136	
80.223	83.895	-3.672	-4.577	137	
75.000	84.062	-9.062	-12.083	138	
77.093	82.125	-5.032	-6.527	139	
81.592	87.608	-6.016	-7.373	140	
97.895	103.751	-5.856	-5.982	141	
110.350	104.068	6.282	5.693	142	
106.770	110.909	-4.139	-3.876	143	
106.555	108.187	-1.632	-1.532	144	
100.000	104.579	-4.579	-4.579	145	
91.985	104.940	-12.955	-14.084	146	
103.518	95.634	7.884	7.616	147	
77.565	80.055	-2.490	-3.210	148	
92.287	79.771	12.516	13.562	149	
89.061	88.973	.088	.099	150	
90.073	90.409	-.336	-.373	151	
90.000	88.431	1.569	1.744	152	
84.367	90.796	-6.429	-7.620	153	
92.656	88.592	4.064	4.386	154	
76.744	80.549	-3.805	-4.958	155	
90.165	79.222	10.943	12.136	156	
83.617	87.508	-3.891	-4.653	157	
88.341	86.724	1.617	1.831	158	
80.000	87.248	-7.248	-9.060	159	
75.020	83.931	-8.911	-11.878	160	
80.551	82.148	-1.597	-1.983	161	
61.677	65.314	-3.637	-5.896	162	
71.562	64.248	7.314	10.220	163	
64.295	68.577	-4.282	-6.659	164	
70.727	65.482	5.245	7.416	165	
60.000	66.895	-6.895	-11.492	166	
64.535	63.323	1.212	1.878	167	
64.778	65.787	-1.009	-1.557	168	
78.421	85.438	-7.017	-8.948	169	
112.100	84.925	27.175	24.242	170	
83.678	106.682	-23.004	-27.491	171	
76.035	88.915	-12.880	-16.940	172	
80.000	82.023	-2.023	-2.528	173	
65.271	85.437	-20.166	-30.896	174	
71.262	79.488	-8.226	-11.543	175	
89.162	99.275	-10.113	-11.342	176	
76.770	94.968	-18.198	-23.704	177	
100.197	85.356	14.841	14.812	178	
103.776	102.678	1.098	1.056	179	
71.935	79.583	-7.648	-10.631	180	
84.665	77.149	7.516	8.878	181	
84.910	86.232	-1.322	-1.557	182	
83.417	87.660	-4.243	-5.086	183	
78.000	82.082	-4.082	-5.233	184	

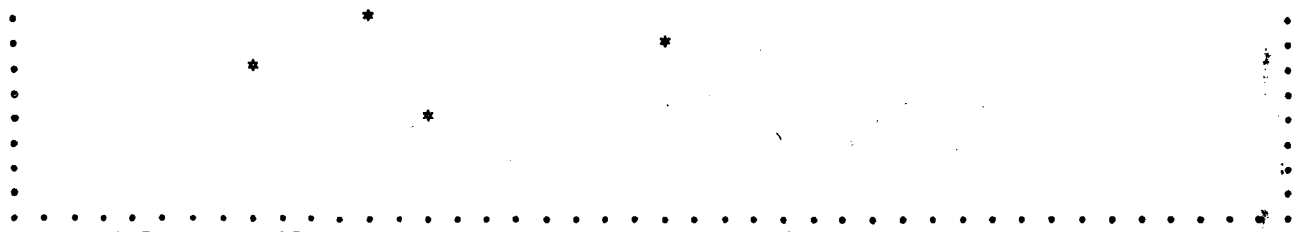


82.635	83.249	-.614	-.743	185	
77.204	82.737	-5.533	-7.167	186	
95.972	95.149	.823	.858	187	
107.638	98.658	8.980	8.343	188	
109.578	103.687	5.891	5.376	189	
113.091	104.594	8.497	7.513	190	
105.000	104.866	.134	.127	191	
107.406	103.128	4.278	3.983	192	
110.955	106.172	4.783	4.310	193	
110.062	110.359	-.297	-.270	194	
128.469	107.229	21.240	16.533	195	
108.195	117.365	-9.170	-8.476	196	
115.347	105.522	9.825	8.518	197	
105.000	107.640	-2.640	-2.514	198	
97.845	103.165	-5.320	-5.437	199	
107.895	97.850	10.045	9.310	200	



DURBIN-WATSON D STATISTIC= 2.25835
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -27.175 27.175
X-AXIS MCFPC RANGE 44.793 164.467
CODE OF SYMBOL *=1 +=2 $=OVER 4





X-AXIS MCFPC

SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -27.175 27.175
X-AXIS PCMCF RANGE .351 10.540
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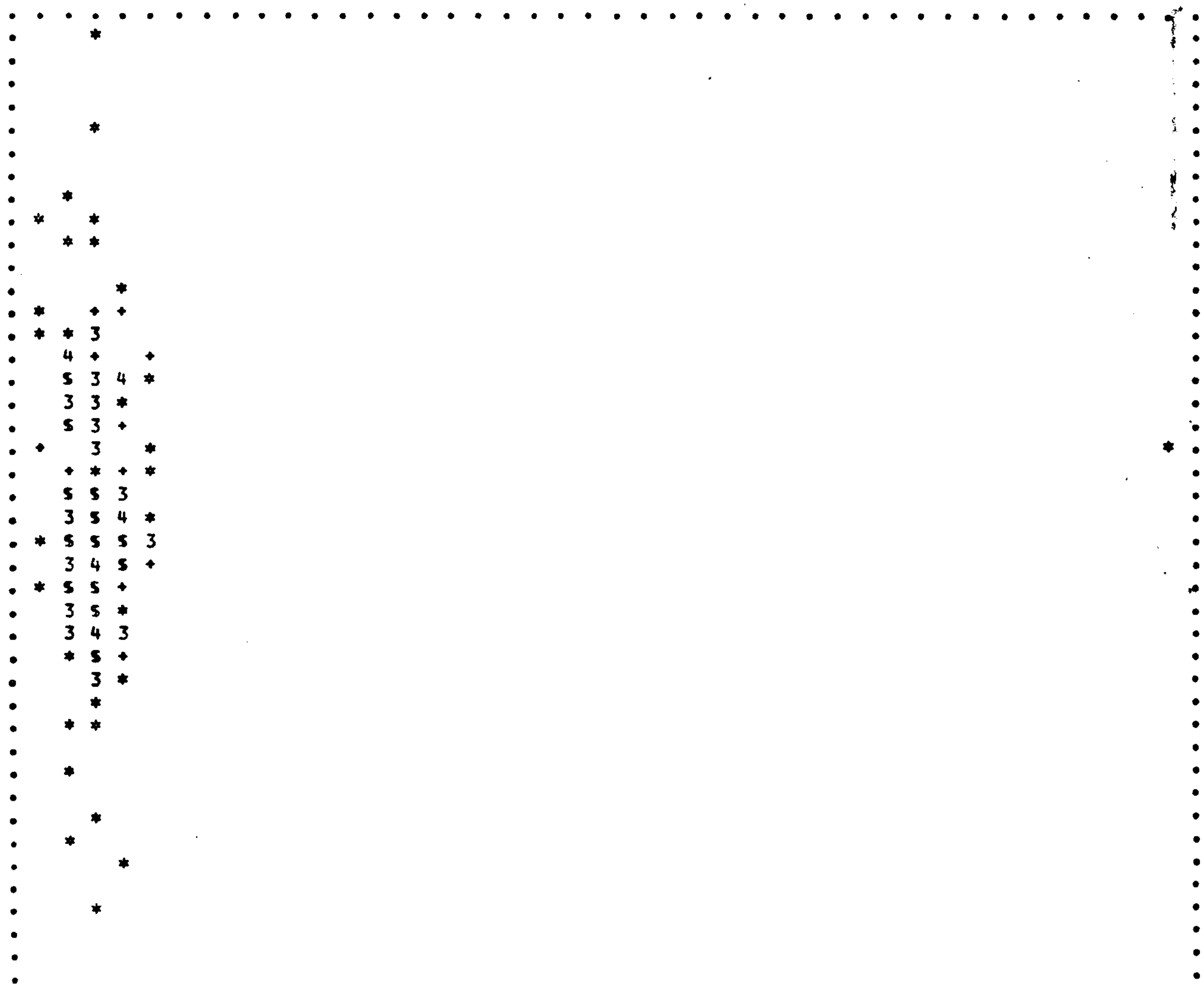

X-AXIS PCMCF

SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS RESD RANGE -27.175 27.175

X-AXIS DIPC RANGE 1270.000 3765.000

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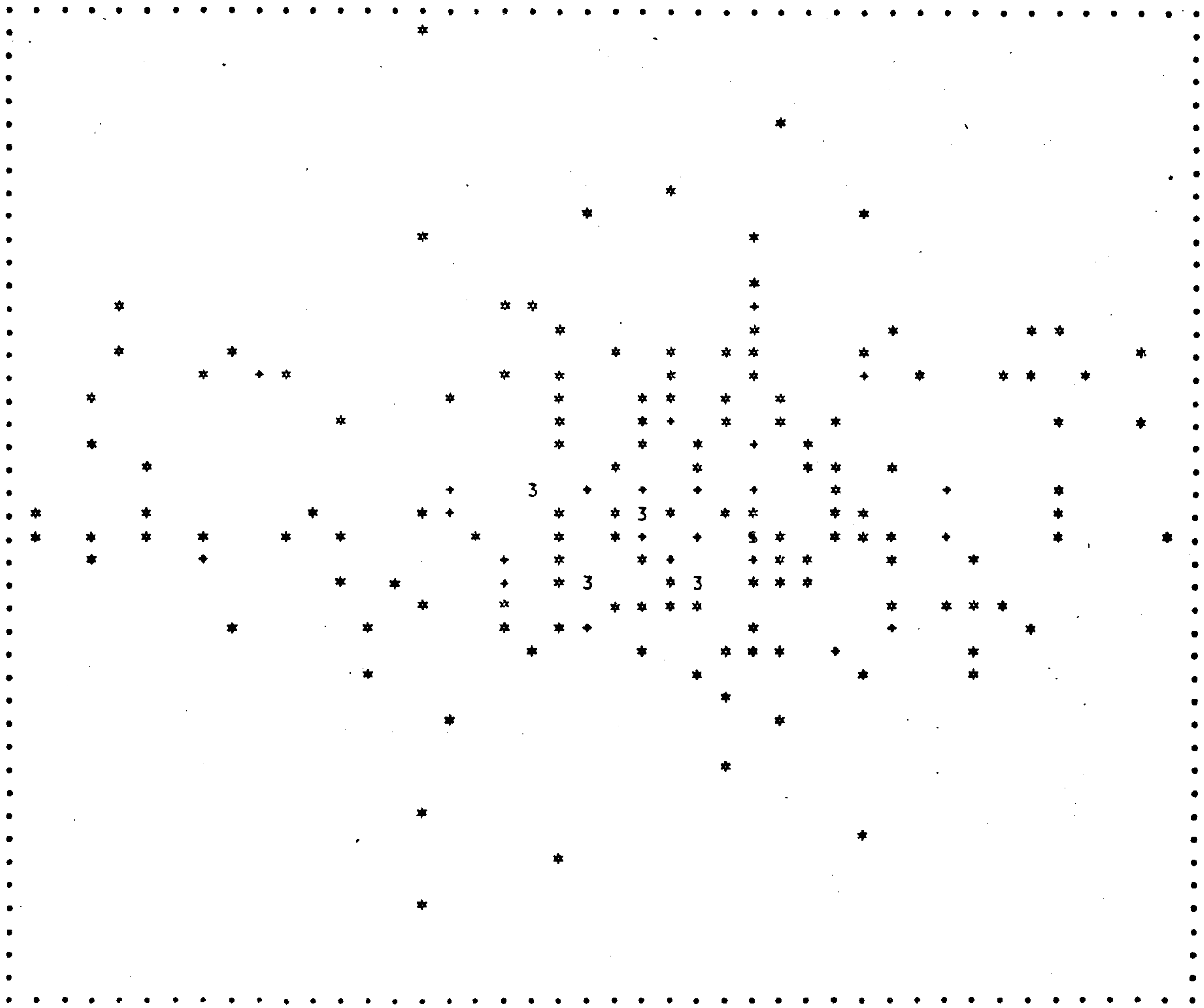


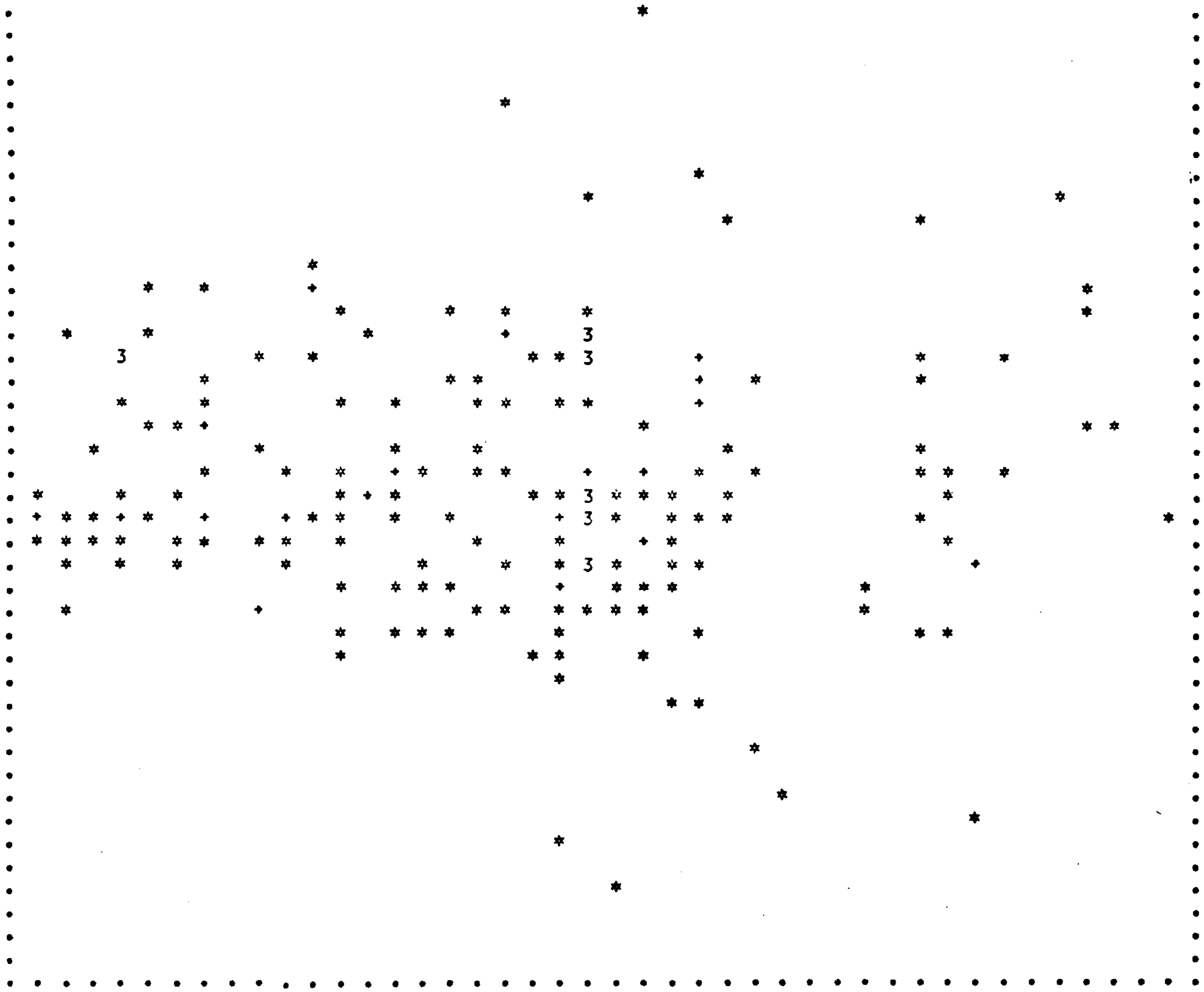
X-AXIS DIPC

SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS RESD RANGE -27.175 27.175

X-AXIS HDDYS RANGE 456.000 4467.000

CODE OF SYMBOL *=1 +=2 $=OVER 4



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     X-AXIS       HDDYS
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS    RESD  RANGE        -27.175         27.175
X-AXIS    MCFLG RANGE         44.793        164.467
CODE OF SYMBOL   *=1   +=2   $=OVER 4
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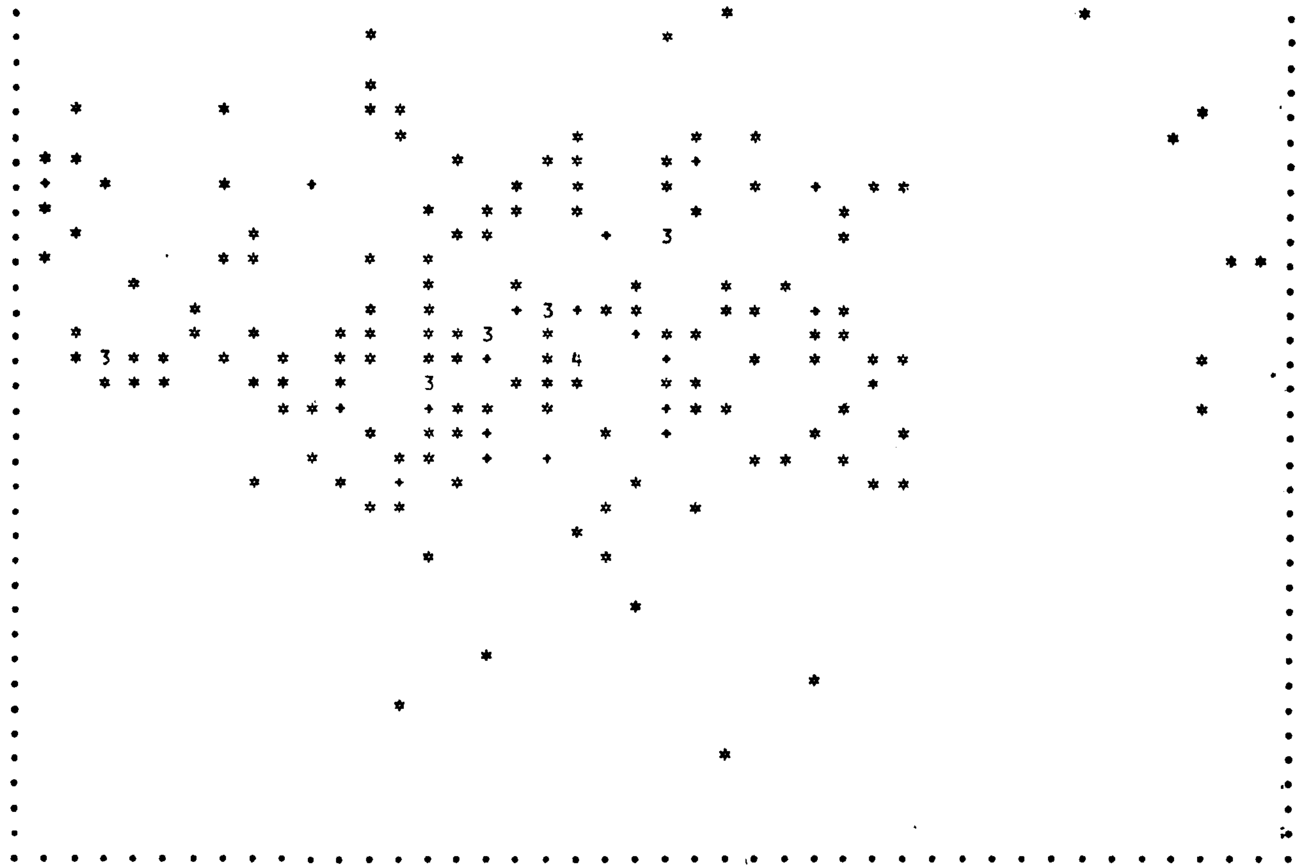


TOTAL CUMULATIVE TIME IN SECONDS--- 6.118

EQUATION NUMBER 2

200 10 NATURAL GAS DEMAND - TEXAS RESIDENTIAL

0 0 0 5 7 8 9 10 6 3 0 5 6 7 8 9 10

	1	2	3	4	5	6
1	26.294	-295.056	-301.033	-178.213	-37.017	-179.163
2	-295.056	12334.158	11849.652	7058.139	1569.967	7071.693
3	-301.033	11849.652	11427.619	6796.292	1508.086	6810.666
4	-178.213	7058.139	6796.292	4048.761	898.091	4055.590
5	-37.017	1569.967	1508.086	898.091	200.000	899.788
6	-179.163	7071.693	6810.666	4055.590	899.788	4064.275

ORDINARY LEAST SQUARES

VARIANCE-COVARIANCE MATRIX OF COEFFICIENTS

.000652		
-.000171	.001093	
.000114	.000037	.000346

.000407	-.000753	-.000461	.001782	
-.001217	-.005510	-.000803	.001457	.042572

DEPENDENT VARIABLE   LMCFC

A(LPCMC)= -.09804026 T= -3.839
(.02553862)

A(LDIPC)= .16735053 T= 5.061
(.03306747)

A(LHDDY)= .13911470 T= 7.483
(.01858961)

A(LMCFL)= .57734775 T= 13.675
(.04221831)

A(CONS)= -.47442020 T= -2.299
(.20632926)

VARIANCE= .00608402

STAND DEV= .07800013

R-SQUARED= .9252   (ADJUSTED FOR D. OF FREEDOM)

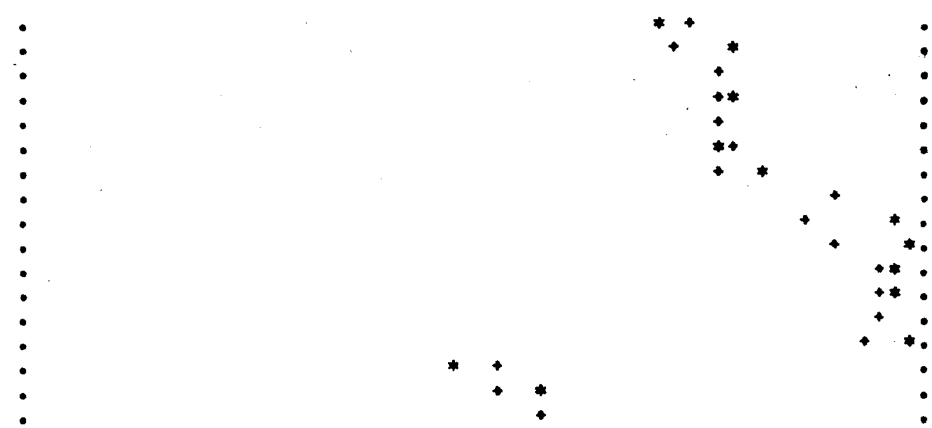
F-TEST(4,195)= 616.35

NATURAL GAS DEMAND - TEXAS RESIDENTIAL

2 LMCFC	LPCMC	LDIPC	LHDDY	LMCFL	CONS	R/SE	DW/F
OLS	-.0980	.1674	.1391	.5773	-.4744	.9252	2.1493
	-3.8389	5.0609	7.4835	13.6753	-2.2993	.0780	616.3463

ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
4.739	4.779	-.040	-.838	1
4.842	4.754	.088	1.819	2
4.827	4.807	.019	.398	3
4.838	4.816	.022	.446	4
4.825	4.822	.003	.052	5
4.816	4.831	-.015	-.319	6
4.882	4.825	.057	1.167	7
4.982	4.991	-.009	-.191	8
5.075	4.948	.127	2.497	9
5.103	5.003	.100	1.956	10
5.091	5.053	.038	.747	11
5.075	5.053	.022	.428	12
5.055	5.068	-.012	-.245	13
5.099	5.038	.060	1.186	14
4.422	4.479	-.057	-1.287	15
4.561	4.485	.076	1.670	16
4.547	4.547	-.000	-.007	17

RANGE 3.80 TO 5.10



4.563	4.544	.019	.412	18
4.500	4.564	-.064	-1.425	19
4.473	4.518	-.045	-.999	20
4.616	4.544	.072	1.560	21
4.676	4.752	-.076	-1.618	22
4.797	4.743	.054	1.124	23
4.796	4.786	.010	.204	24
4.853	4.797	.056	1.158	25
4.796	4.808	-.012	-.248	26
4.800	4.806	-.005	-.112	27
4.911	4.845	.066	1.335	28
4.596	4.663	-.068	-1.474	29
4.687	4.649	.039	.826	30
4.657	4.686	-.029	-.627	31
4.715	4.681	.034	.714	32
4.654	4.695	-.041	-.888	33
4.641	4.688	-.046	-.998	34
4.736	4.715	.021	.436	35
4.707	4.671	.036	.768	36
4.848	4.699	.149	3.072	37
4.856	4.773	.083	1.703	38
4.866	4.782	.084	1.729	39
4.745	4.766	-.021	-.441	40
4.826	4.744	.082	1.696	41
4.836	4.787	.049	1.010	42
4.430	4.517	-.087	-1.970	43
4.565	4.532	.033	.721	44
4.566	4.592	-.026	-.569	45
4.581	4.594	-.013	-.289	46
4.477	4.592	-.115	-2.559	47
4.526	4.553	-.027	-.595	48
4.574	4.573	.001	.026	49
4.386	4.399	-.013	-.299	50
4.536	4.441	.095	2.085	51
4.513	4.503	.010	.213	52
4.569	4.514	.054	1.187	53
4.477	4.505	-.027	-.608	54
4.459	4.495	-.036	-.803	55
4.560	4.491	.068	1.493	56
4.639	4.673	-.035	-.747	57
4.536	4.694	-.158	-3.485	58
4.766	4.625	.141	2.966	59
4.767	4.752	.014	.303	60
4.654	4.726	-.072	-1.545	61
4.661	4.705	-.043	-.931	62
4.731	4.679	.052	1.100	63
4.395	4.398	-.003	-.077	64
4.538	4.412	.125	2.757	65
4.479	4.479	.000	.001	66
4.548	4.497	.051	1.131	67
4.431	4.498	-.067	-1.509	68
4.417	4.458	-.041	-.936	69
4.486	4.474	.012	.276	70
4.253	4.096	.157	3.695	71
4.408	4.328	.080	1.805	72
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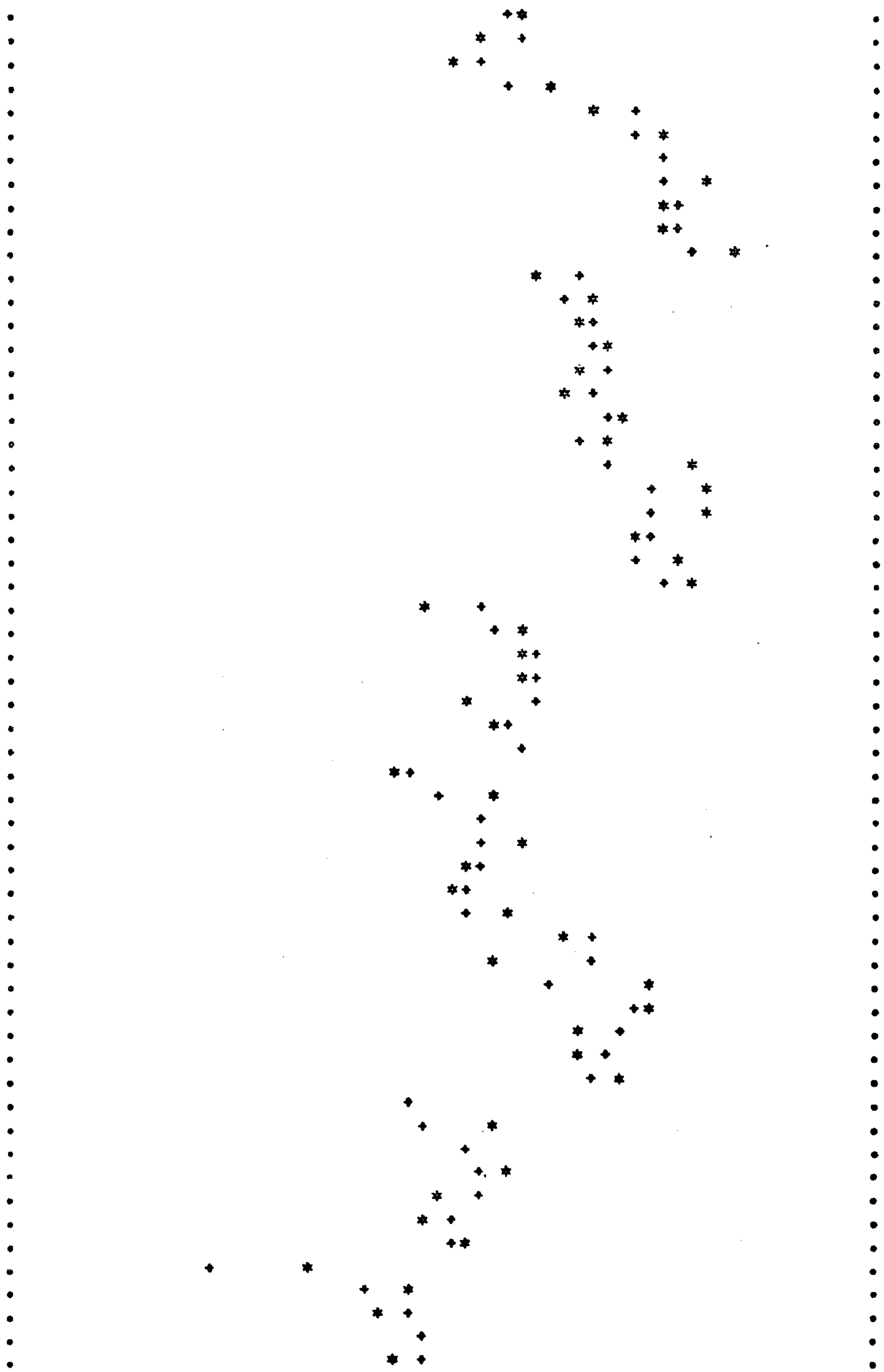
4.413	4.417	-.004	-.089	74
4.382	4.415	-.033	-.747	75



4.308	4.427	-.119	-2.765	76
4.392	4.407	-.015	-.343	77
4.131	4.197	-.066	-1.605	78
4.310	4.194	.115	2.680	79
4.177	4.248	-.070	-1.686	80
4.234	4.204	.030	.702	81
4.127	4.183	-.056	-1.365	82
4.118	4.182	-.064	-1.559	83
4.205	4.195	.010	.246	84
3.928	3.905	.023	.594	85
4.055	3.945	.110	2.720	86
3.892	3.939	-.047	-1.201	87
4.034	3.876	.158	3.925	88
3.912	3.944	-.032	-.820	89
3.858	3.916	-.058	-1.514	90
3.991	3.925	.066	1.645	91
3.830	3.855	-.025	-.645	92
3.977	3.899	.078	1.960	93
3.847	3.913	-.066	-1.707	94
4.072	3.883	.189	4.652	95
3.951	3.938	.014	.343	96
3.827	3.910	-.083	-2.168	97
3.995	3.890	.105	2.633	98
3.802	3.869	-.067	-1.755	99
3.914	3.881	.034	.865	100
3.808	3.882	-.074	-1.947	101
3.992	3.860	.132	3.300	102
3.871	3.891	-.020	-.506	103
3.817	3.888	-.071	-1.864	104
3.995	3.884	.111	2.778	105
4.756	4.789	-.033	-.687	106
4.805	4.766	.039	.810	107
4.817	4.780	.037	.764	108
4.840	4.820	.020	.419	109
4.787	4.837	-.050	-1.037	110
4.668	4.819	-.151	-3.233	111
4.863	4.737	.126	2.600	112
4.644	4.588	.056	1.204	113
4.654	4.641	.013	.285	114
4.640	4.634	.005	.115	115
4.647	4.639	.008	.174	116
4.644	4.632	.012	.267	117
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4.630	4.619	.011	.233	119
4.495	4.496	-.002	-.034	120
4.552	4.543	.009	.192	121
4.540	4.558	-.018	-.392	122
4.578	4.559	.019	.408	123
4.500	4.553	-.053	-1.171	124
4.466	4.534	-.067	-1.506	125
4.537	4.594	-.057	-1.262	126
4.560	4.587	-.027	-.592	127
4.695	4.611	.084	1.792	128
4.681	4.682	-.001	-.014	129
4.579	4.671	-.092	-2.009	130
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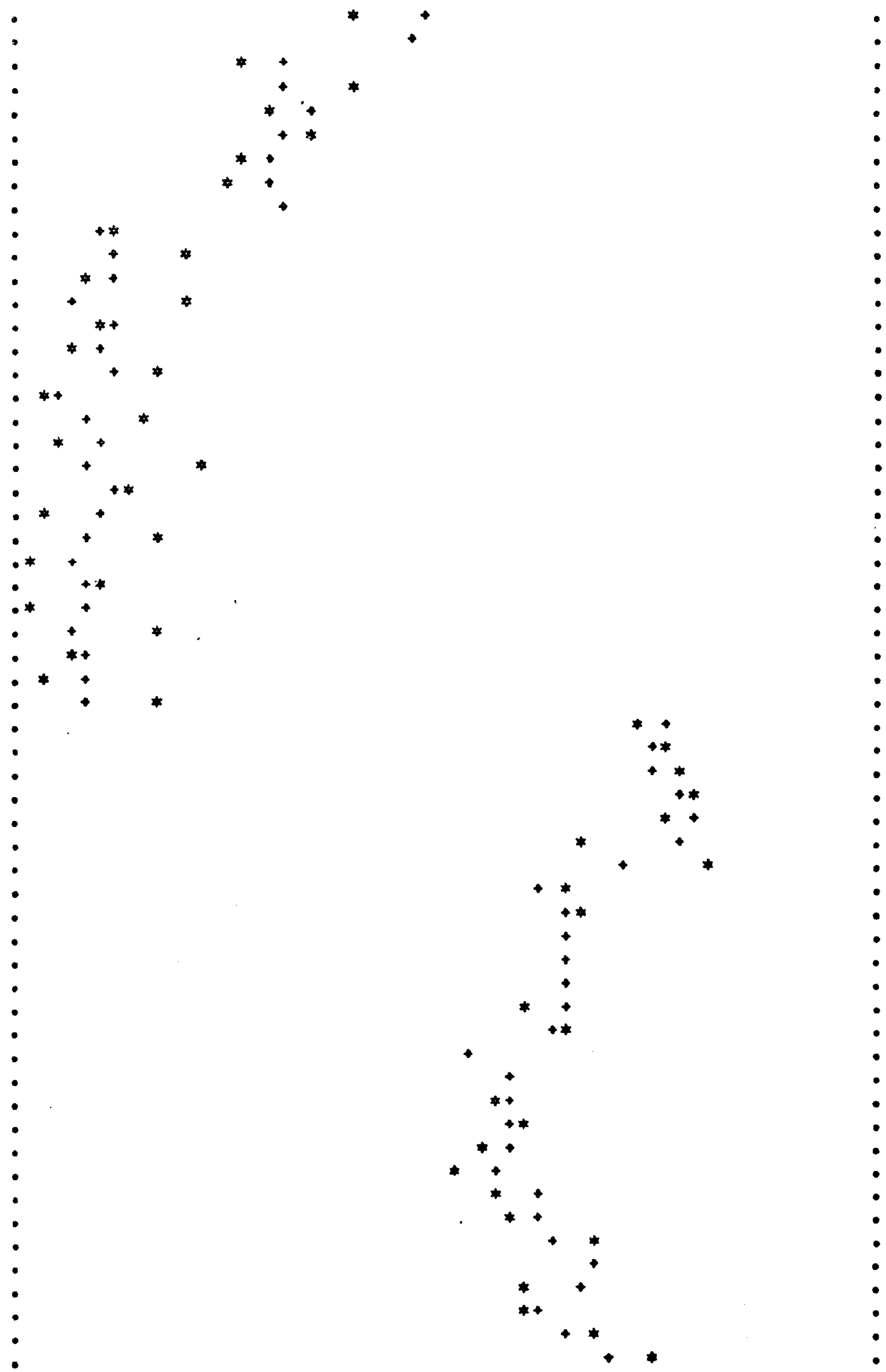
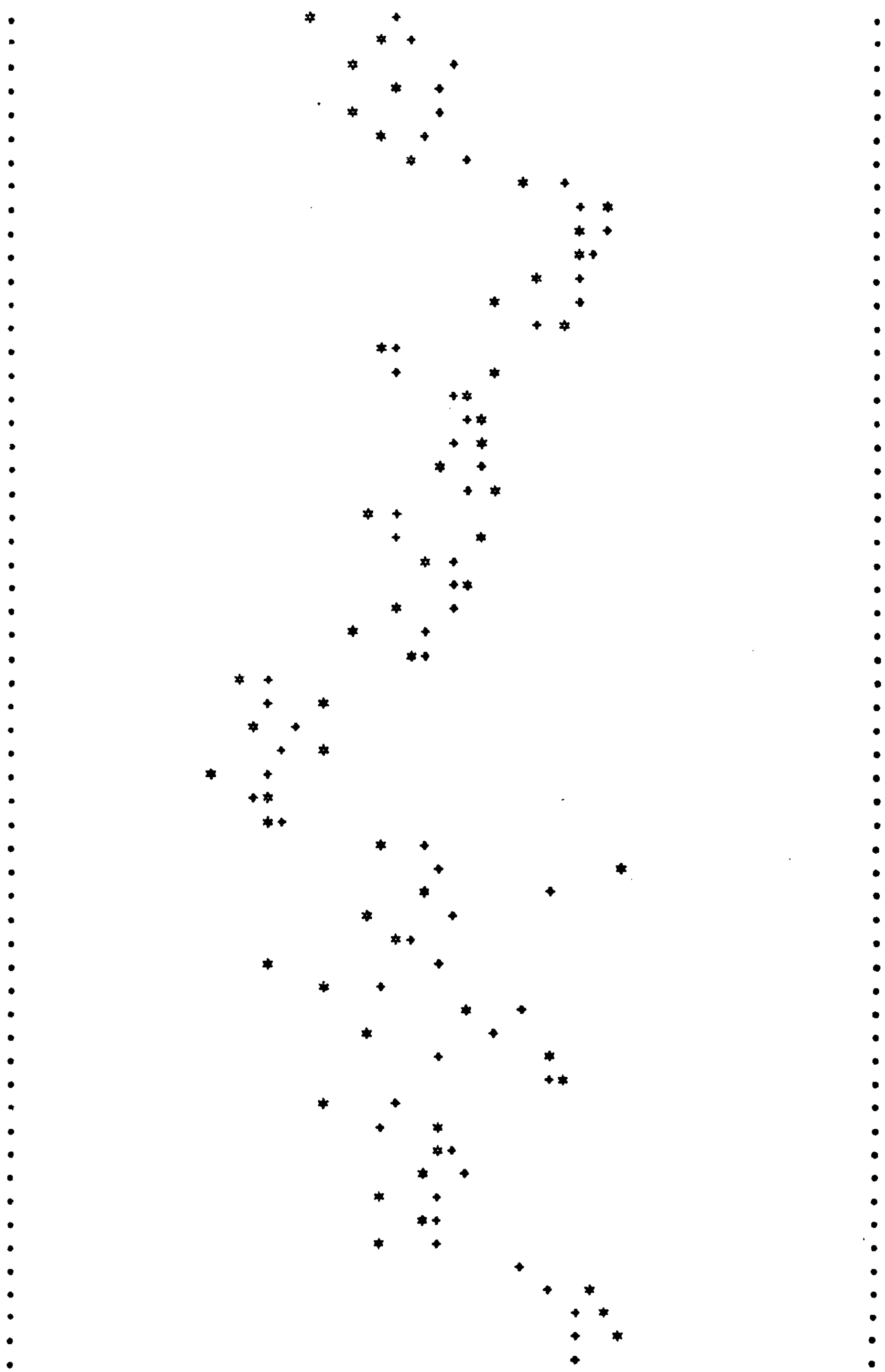
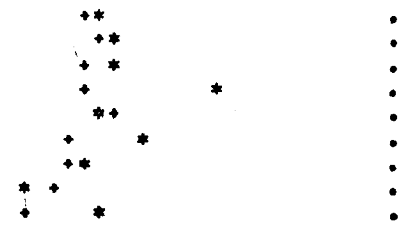
4.692	4.643	.049	1.044	132
4.777	4.709	.068	1.422	133



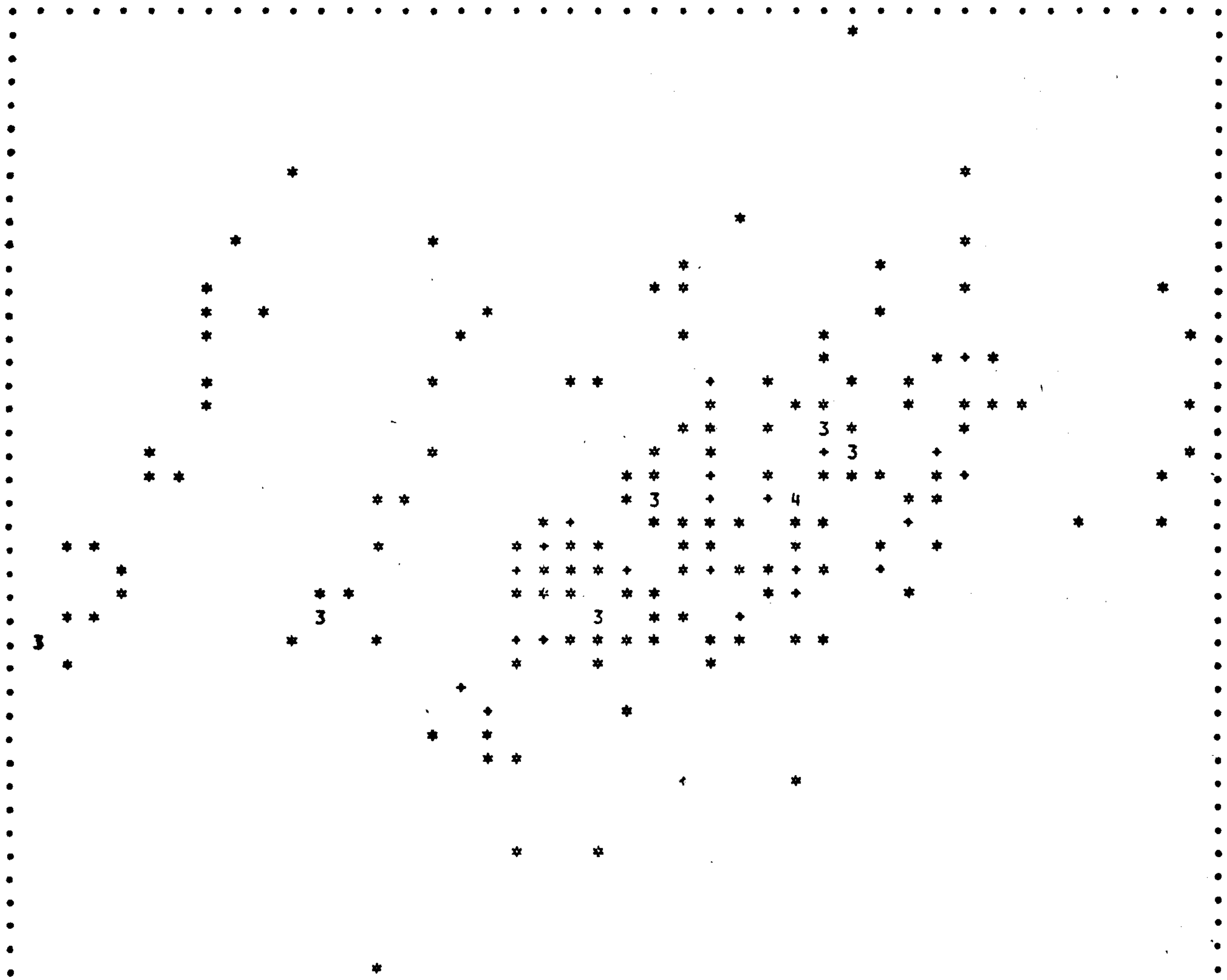
4.238	4.366	-.128	-3.020	134
4.354	4.392	-.037	-.859	135
4.319	4.455	-.136	-3.153	136
4.385	4.436	-.052	-1.175	137
4.317	4.443	-.125	-2.905	138
4.345	4.422	-.077	-1.779	139
4.402	4.480	-.078	-1.773	140
4.584	4.641	-.057	-1.254	141
4.704	4.652	.052	1.096	142
4.671	4.707	-.037	-.784	143
4.669	4.689	-.021	-.444	144
4.605	4.659	-.054	-1.177	145
4.522	4.673	-.151	-3.343	146
4.640	4.590	.050	1.083	147
4.351	4.369	-.018	-.405	148
4.525	4.384	.141	3.107	149
4.489	4.470	.019	.422	150
4.501	4.495	.005	.115	151
4.500	4.466	.034	.750	152
4.435	4.497	-.062	-1.397	153
4.529	4.484	.045	.995	154
4.340	4.374	-.033	-.768	155
4.502	4.379	.122	2.714	156
4.426	4.455	-.029	-.657	157
4.481	4.462	.019	.420	158
4.382	4.455	-.073	-1.662	159
4.318	4.425	-.108	-2.492	160
4.389	4.409	-.020	-.467	161
4.122	4.174	-.052	-1.270	162
4.271	4.171	.100	2.332	163
4.163	4.215	-.051	-1.227	164
4.259	4.191	.068	1.590	165
4.094	4.167	-.072	-1.769	166
4.167	4.159	.008	.197	167
4.171	4.193	-.022	-.518	168
4.362	4.429	-.067	-1.540	169
4.719	4.446	.273	5.791	170
4.427	4.624	-.197	-4.457	171
4.331	4.471	-.140	-3.230	172
4.382	4.403	-.021	-.472	173
4.179	4.442	-.263	-6.298	174
4.266	4.362	-.096	-2.247	175
4.490	4.566	-.075	-1.680	176
4.341	4.531	-.190	-4.385	177
4.607	4.443	.164	3.567	178
4.642	4.618	.024	.527	179
4.276	4.382	-.107	-2.493	180
4.439	4.361	.078	1.756	181
4.442	4.466	-.024	-.550	182
4.424	4.481	-.057	-1.281	183
4.357	4.433	-.077	-1.756	184
4.414	4.447	-.032	-.733	185
4.346	4.437	-.091	-2.086	186
4.564	4.569	-.005	-.113	187
4.679	4.615	.064	1.367	188
4.697	4.653	.044	.928	189
4.728	4.660	.068	1.446	190
4.654	4.655	-.001	-.029	191



4.677	4.652	.025	.530	192
4.709	4.680	.029	.609	193
4.701	4.664	.037	.791	194
4.856	4.657	.199	4.102	195
4.684	4.711	-.027	-.576	196
4.748	4.637	.111	2.333	197
4.654	4.642	.012	.258	198
4.583	4.621	-.037	-.811	199
4.681	4.578	.103	2.202	200



DURBIN-WATSON D STATISTIC= 2.14932
SCATTER DIAGRAM WITH VARYING SCALE
Y-AXIS RESD RANGE -.273 .273
X-AXIS LMCFC RANGE 3.802 5.103
CODE OF SYMBOL *=1 +=2 $=OVER 4

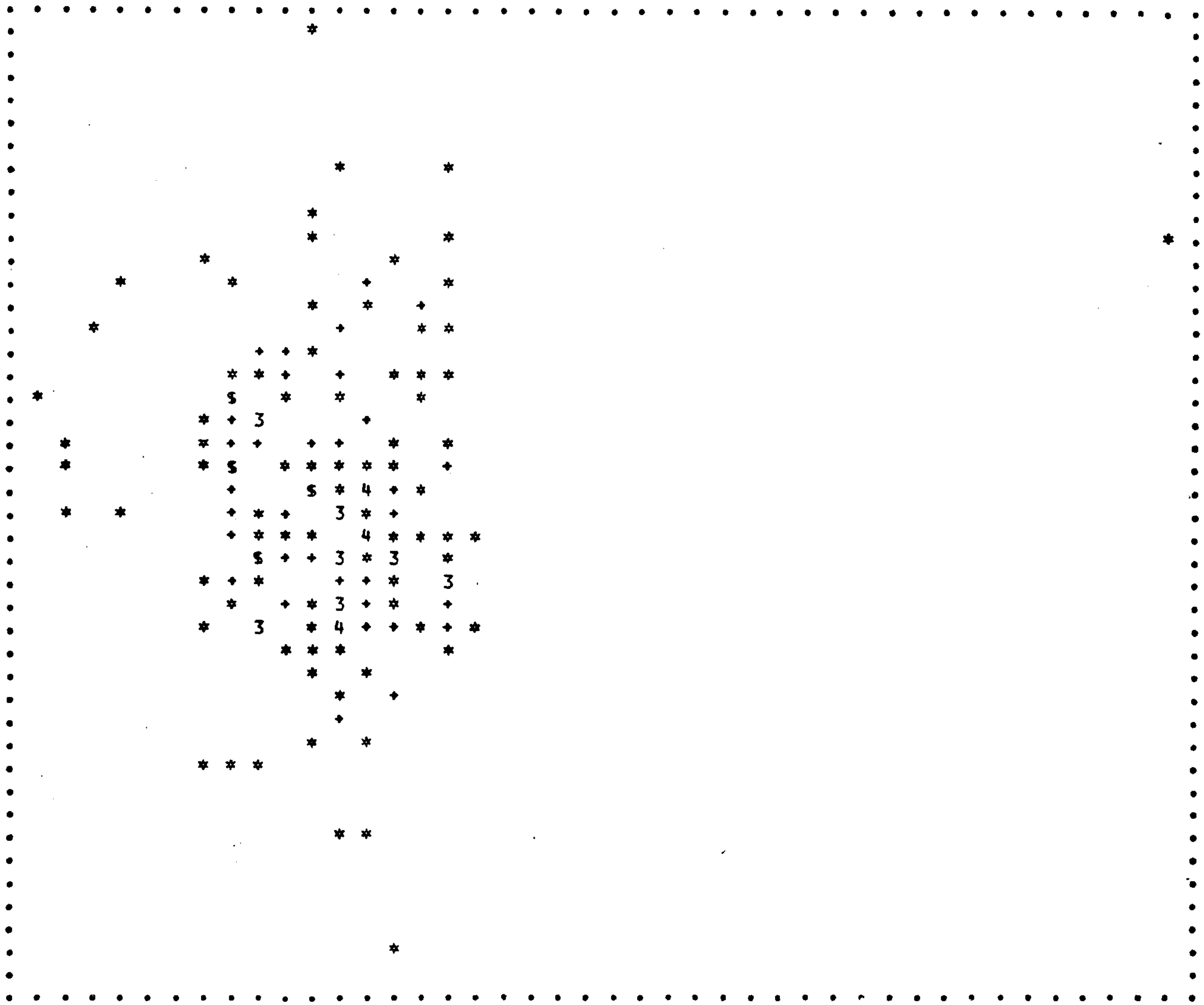


X-AXIS LMCFC

SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS	RESD	RANGE	-.273	.273
X-AXIS	LPCMC	RANGE	-1.047	2.355

CODE OF SYMBOL *=1 +=2 $=OVER 4

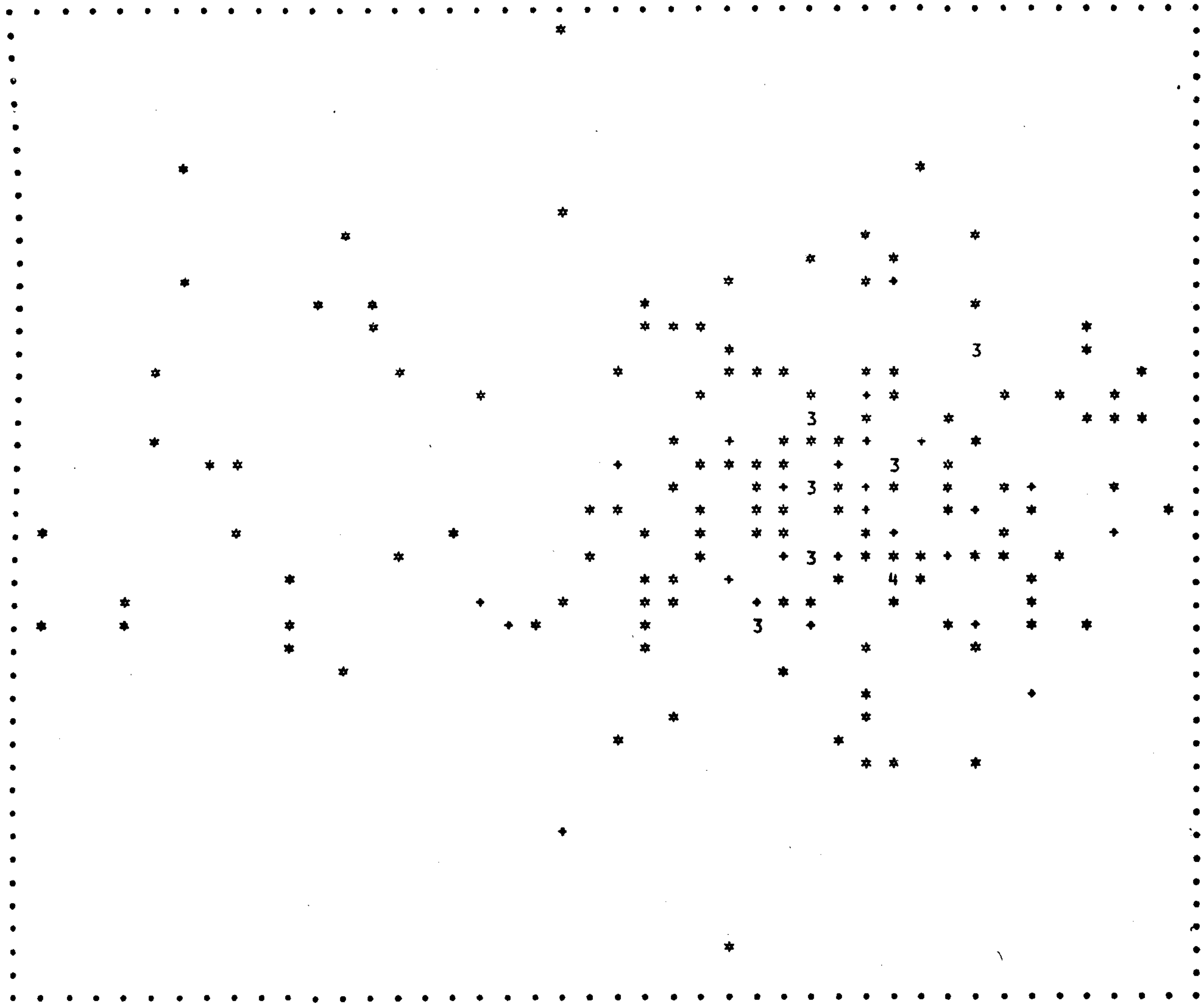


X-AXIS LPCMC

SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS	RESD	RANGE	-.273	.273
X-AXIS	LDIPC	RANGE	7.147	8.234

CODE OF SYMBOL *=1 +=2 $=OVER 4



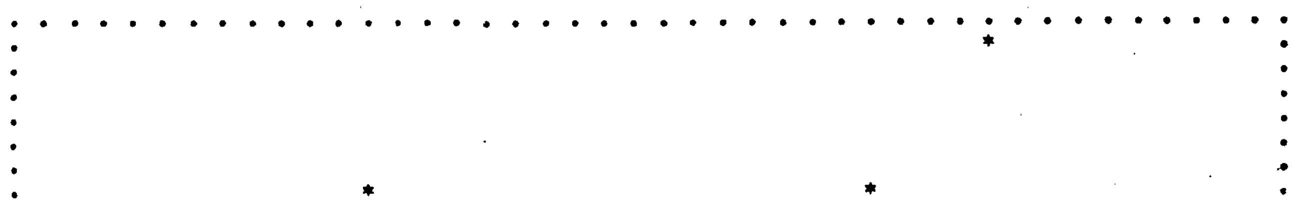
X-AXIS LDIPC

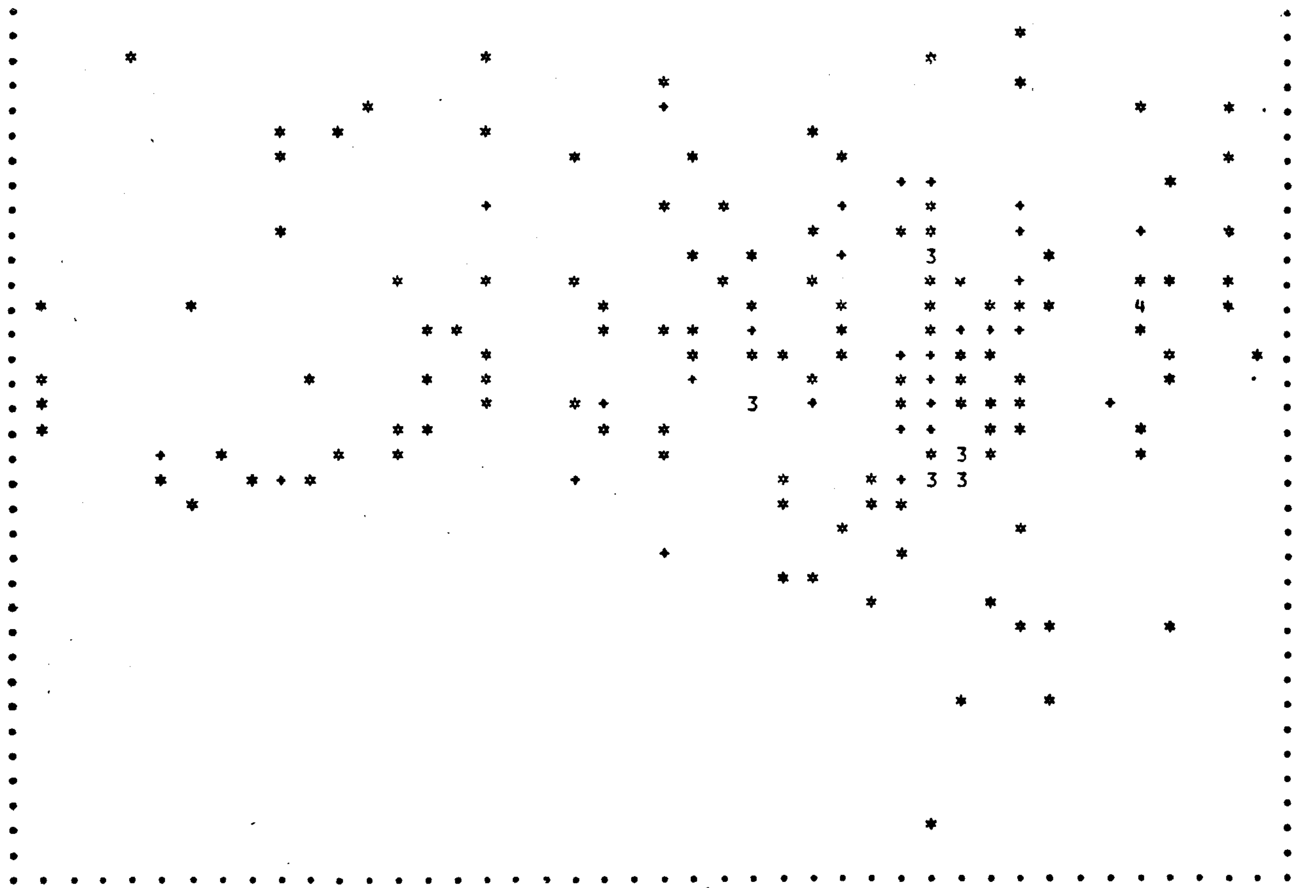
SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS RESD RANGE -.273 .273

X-AXIS LHDDY RANGE 6.122 8.404

CODE OF SYMBOL *=1 +=2 $=OVER 4





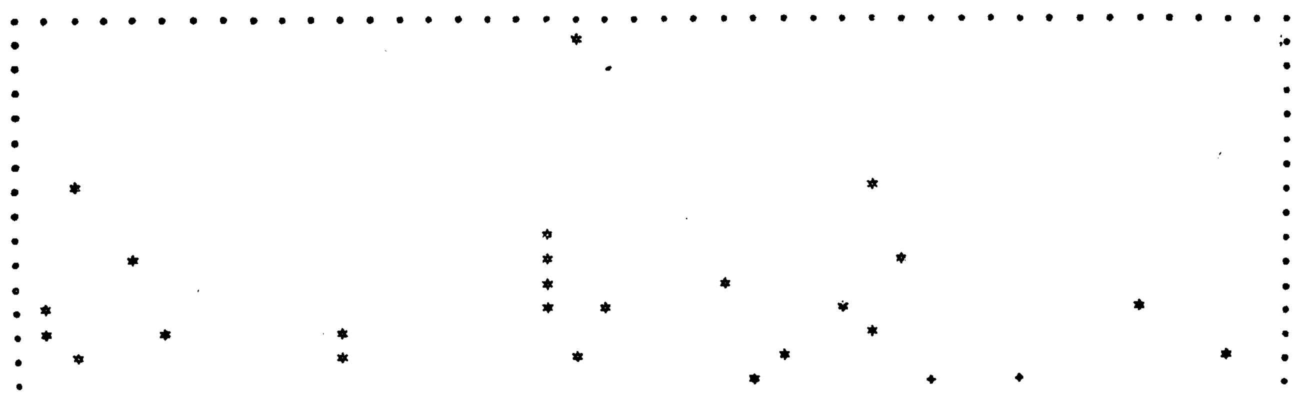
X-AXIS   LHDDY

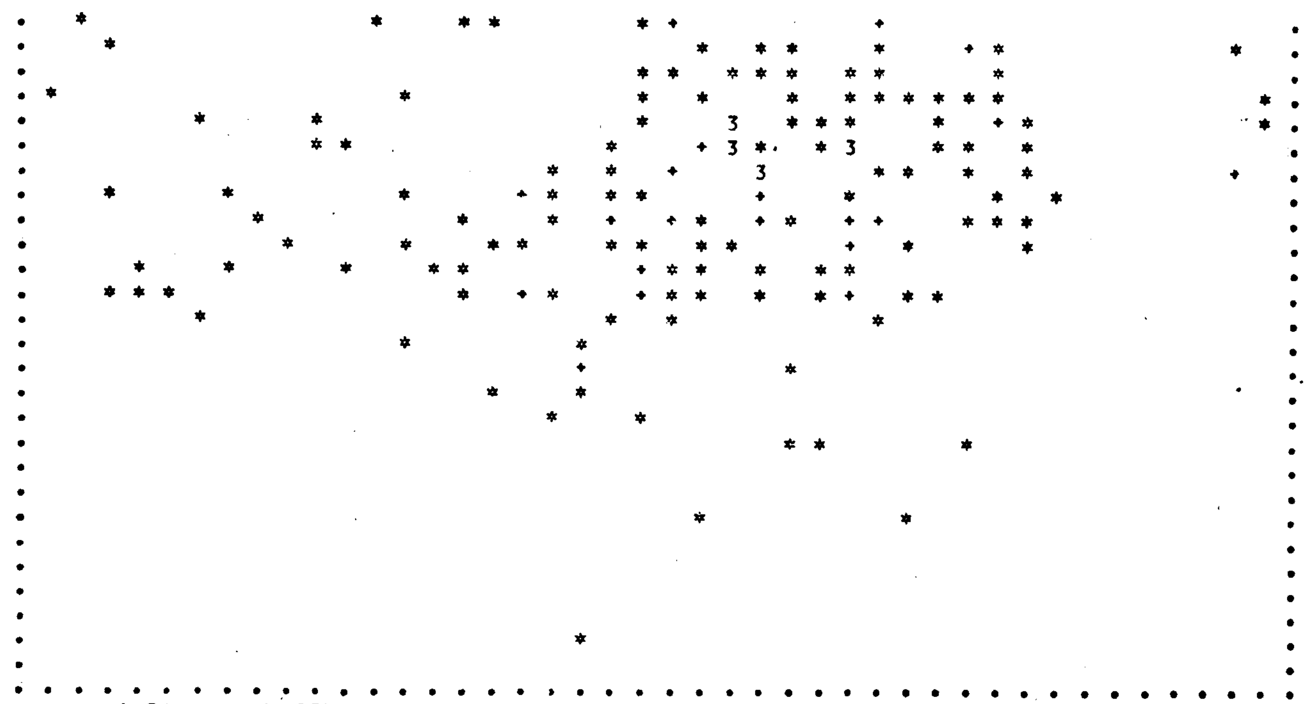
SCATTER DIAGRAM WITH VARYING SCALE

Y-AXIS   RESD RANGE   -.273   .273

X-AXIS   LMCFL RANGE   3.802   5.103

CODE OF SYMBOL   *=1   +=2 $=OVER 4





X-AXIS LMCFL

TOTAL CUMULATIVE TIME IN SECONDS--- 9.287
EQUATION NUMBER 3
200 10 NATURAL GAS DEMAND - TEXAS RESIDENTIAL
0 0 0 4 2 3 4 1 3 0 3 2 3 4

	1	2	3	4	5
1	262.005	462744.030	339246.960	178.972	15629.422
2	462744.030	************	************	525241.000	50561653.371
3	339246.960	************	************	424463.000	43548439.711
4	178.972	525241.000	424463.000	200.000	18690.491
5	15629.422	50561653.371	43548439.711	18690.491	1873025.090

ORDINARY LEAST SQUARES

VARIANCE-COVARIANCE MATRIX OF COEFFICIENTS

1.434321			
.000004	.000003		
.000338	-.000000	.000001	
-2.011722	-.005853	-.001082	20.129524

DEPENDENT VARIABLE MCFPC

A(PCMCF)= -1.91513915 T= -1.599
(1.19763126)

APPENDIX C

This Appendix contains a listing of the program which generates forecasts of residential electricity and natural gas demand and the highway use of gasoline by year up to any year desired by the user. The program requires as input: (1) the yearly rates of growth of income and population (in decimals) (2) the real price of the commodity (in 1967 dollars) (3) the year of the price change, and (4) the last year for which a forecast is desired.

Illustrative output from the mdoel is given in this Appendix for each commodity analyzed:

(1) A continuation of present prices, along with a 1.9% yearly growth in real per-capita income and a 1.2% population growth;

(2) A 50% increase in price occuring January 1, 1977, along with the same growth rates in income and population

(3) A continuation of present prices along with a 3.8% yearly income growth and a 1.2% yearly population growth.

Residential Electricity Demand

Price: 2¢ per KWH in 1967 dollars

Real Income growth: 1.9%/yr

Population growth: 1.2%/yr

YEAR	DEMAND (BILLION KWH)
1974	36.04
1975	38.09
1976	40.17
1977	42.28
1978	44.43
1979	46.61
1980	48.84
1981	51.12
1982	53.45
1983	55.84
1984	58.29
1985	60.82
1986	63.41
1987	66.09
1988	68.95
1989	71.70
1990	74.64
1991	77.68
1992	80.83
1993	84.09
1994	87.46
1995	90.95
1996	94.57
1997	98.32
1998	102.21
1999	106.25
2000	110.44

Price 3¢ per KWH in 1967 dollars

Real Income growth: 1.9%/yr

Population growth: 1.2%/yr

YEAR	DEMAND (BILLION KWH)
1974	36.04
1975	38.05
1976	40.08
1977	41.32
1978	42.65
1979	44.06
1980	45.54
1981	47.11
1982	48.76
1983	50.49
1984	52.31
1985	54.21
1986	56.20
1987	58.27
1988	60.44
1989	62.70
1990	65.06
1991	67.51
1992	70.07
1993	72.74
1994	75.51
1995	78.40
1996	81.40
1997	84.53
1998	87.78
1999	91.16
2000	94.67

Price: 2¢ per KWH in 1967 dollars

Real Income growth: 3.8%/yr

Population growth: 1.2%/yr

YEAR	DEMAND (BILLION KWH)
1974	66.04
1975	38.22
1976	40.56
1977	43.07
1978	45.76
1979	48.64
1980	51.71
1981	55.00
1982	58.52
1983	62.27
1984	66.28
1985	70.56
1986	75.13
1987	80.01
1988	85.21
1989	90.77
1990	96.69
1991	103.01
1992	109.75
1993	116.93
1994	124.60
1995	132.77
1996	141.48
1997	150.77
1998	160.68
1999	171.24
2000	182.50

Residential Natural Gas Demand

Price: $0.81 per 1000 cubic feet in 1967 dollars

Real Income growth: 1.9%/yr

Population growth: 1.2%/yr

YEAR	CONSUMPTION (MILLION MCF)
1973	217.038
1974	226.273
1975	232.934
1976	238.917
1977	244.274
1978	249.517
1979	254.672
1980	259.817
1981	264.996
1982	270.238
1983	275.560
1984	280.973
1985	286.493
1986	292.097
1987	297.817
1988	303.649
1989	309.593
1990	315.653
1991	321.831
1992	328.130
1993	334.552
1994	341.100
1995	347.776
1996	354.588
1997	361.522
1998	368.597
1999	375.811
2000	383.167

Price: $1.21 per 1000 cubic feet in 1967 dollars

Real Income growth: 1.9%/yr

Population growth: 1.2%/yr

YEAR	CONSUMPTION (MILLION MCF)
1973	217.038
1974	226.273
1975	232.934
1976	238.817
1977	234.853
1978	234.508
1979	236.236
1980	239.191
1981	242.896
1982	247.077
1983	251.576
1984	256.302
1985	261.202
1986	266.245
1987	271.416
1988	276.704
1989	282.106
1990	287.619
1991	293.243
1992	298.990
1993	304.829
1994	310.794
1995	316.876
1996	323.078
1997	329.401
1998	335.848
1999	342.421
2000	349.122

Price: $0.81 per 1000 cubic feet in 1967 dollars

Real Income growth: 3.8%/yr

Population growth: 1.2%/yr

YEAR	CONSUMPTION (MILLION MCF)
1973	217.038
1974	226.973
1975	234.798
1976	242.155
1977	249.304
1978	256.404
1979	263.552
1980	270.809
1981	278.210
1982	285.782
1983	293.541
1984	301.499
1985	309.666
1986	318.051
1987	326.660
1988	335.501
1989	344.580
1990	353.904
1991	363.481
1992	373.316
1993	383.417
1994	393.792
1995	404.447
1996	415.391
1997	426.631
1998	438.175
1999	450.031
2000	462.208

Highway Gasoline Demand

Price: 34.4¢ per gallon in 1967 dollars

Real Income growth: 1.9%/yr

Population growth: 1.2%/yr

YEAR	CONSUMPTION (MILLION GALS.)
1974	6941.600
1975	6816.208
1976	6750.911
1977	6728.105
1978	6734.410
1979	6770.183
1980	6829.052
1981	6907.597
1982	7003.111
1983	7113.443
1984	7236.867
1985	7371.997
1986	7517.714
1987	7673.118
1988	7837.484
1989	8010.228
1990	8190.886
1991	8379.094
1992	8574.566
1993	8777.085
1994	8986.495
1995	9202.683
1996	9425.583
1997	9655.160
1998	9891.413
1999	10134.364
2000	10384.060

Price: 50¢ per gallon in 1967 dollars

Real Income growth: 1.9%/yr

Population growth: 1.2%/yr

YEAR	CONSUMPTION (MILLION GALS.)
1974	6941.600
1975	6816.208
1976	6750.911
1977	6054.094
1978	5556.334
1979	5198.031
1980	4940.389
1981	4757.349
1982	4630.911
1983	4548.328
1984	4500.371
1985	4480.226
1986	4482.773
1987	4504.105
1988	4541.203
1989	4591.706
1990	4653.750
1991	4725.852
1992	4806.828
1993	4895.721
1994	4991.766
1995	5094.342
1996	5202.951
1997	5317.191
1998	5436.743
1999	5561.354
2000	5690.828

Price: 36.4¢ per gallon in 1967 dollars

Real Income growth: 3.8%/yr

Population growth: 1.2%/yr

YEAR	CONSUMPTION (MILLION GALS.)
1974	6941.600
1975	7186.938
1976	7436.707
1977	7682.550
1978	7925.770
1979	8167.531
1980	8408.872
1981	8650.715
1982	8893.877
1983	9139.087
1984	9386.991
1985	9638.170
1986	9893.140
1987	10152.371
1988	10416.286
1989	10685.274
1990	10959.693
1991	11239.873
1992	11526.126
1993	11818.746
1994	12118.010
1995	12424.188
1996	12737.540
1997	13058.317
1998	13386.769
1999	13723.139
2000	14067.671

```
337ENERGY*TEXDEMAND(1).FORECAST
      DIMENSION C(30),LYR(30),CPC(30)
    5 WRITE(6,25)
   25 FORMAT(' ','FORECAST OF:1-ELECTRICITY,2-NAT.GAS,3-GASOLINE')
      READ(5,30)ITYPE
   30 FORMAT(I1)
      WRITE(6,15)
C GY-YEARLY % GROWTH IN REAL INCOME GP-YEARLY % GROWTH IN POPULATION
C P-PRICE FORECAST  NP-YEAR OF PRICE CHANGE
   15 FORMAT(' ','INPUT VALUES FOR REAL INCOME & POPULATION GROWTH,& PRI
     1CE(IN CENTS FOR          ELEC AND GASOLINE,IN DOLLARS FOR NG)')
      READ(5,20)GY,GP,P
   20 FORMAT()
      WRITE(6,21)
   21 FORMAT(' ','INPUT YEAR OF PRICE CHANGE & LAST YEAR FOR FORECAST')
      READ(5,40)NP,IYR
   40 FORMAT(I4)
      CYD=2965.0
      YD=LOG(CYD)
      CPOP=12.0
      KYR=1974
      LYR(1)=KYR
      IF(ITYPE.EQ.1)GO TO 60
      IF(ITYPE.EQ.2)GO TO 80
C GASOLINE DEMAND FORECASTING
      PR=LOG(34.36)
      CPC(1)=LOG(577.65)
      C(1)=6941.6
      MN=IYR-KYR+1
      DO 45 L=2,MN
      KYR=KYR+1
      IF(KYR.GE.NP)PR=LOG(P)
      CYD=CYD*(1.+GY)
      YD=LOG(CYD)
      CPOP=CPOP*(1.+GP)
      CPC(L)=1.1235-0.2806*PR+0.1175*YD+0.8268*CPC(L-1)
      C(L)=EXP(CPC(L))*CPOP
      LYR(L)=KYR
   45 CONTINUE
      WRITE(6,46)
   46 FORMAT('1',/,' YEAR',7X,'CONSUMPTION',/,10X,'(MILLION GALS.)')
      WRITE(6,55)(LYR(J),C(J),J=1,MN)
   55 FORMAT('1',I4,5X,F12.3)
      GO TO 199
C ELECTRICITY DEMAND FORECASTING
   60 PR=LOG(2.05)
      DD=2681.9
      CPC(1)=LOG(10.65)
      C(1)=EXP(CPC(1))*CPOP*0.282
      ME=IYR-KYR+1
      DO 65 K=2,ME
      KYR=KYR+1
      IF(KYR.GE.NP)PR=LOG(P)
      CYD=CYD*(1.+GY)
      YD=LOG(CYD)
      CPOP=CPOP*(1.+GP)
      CDD=LOG(DD)
      CPC(K)=-2.0104-0.0515*PR+0.1823*YD+0.1189*CDD+0.869*CPC(K-1)
```

```
      C(K)=EXP(CPC(K))*CPOP*0.282
      LYR(K)=KYR
   65 CONTINUE
      WRITE(6,70)
   70 FORMAT('1',/,' YEAR',10X,'DEMAND',/,11X,'(BILLION KWH)')
      WRITE(6,75)(LYR(I),C(I),I=1,ME)
   75 FORMAT('1',I4,5X,F9.2)
      GO TO 199
C NATURAL GAS DEMAND FORECASTING
   80 PR=LOG(0.81)
      KYR=1973
      LYR(1)=KYR
      C(1)=217.03772
      CPC(1)=LOG(95.945)
      HDD=LOG(2122.315)
      CPOP=11.848
      MG=IYR-KYR+1
      DO 85 JG=2,MG
      KYR=KYR+1
      IF(KYR.GE.NP)PR=LOG(P)
      CYD=CYD*(1.+GY)
      YD=LOG(CYD)
      CPOP=CPOP*(1.+GP)
      CPC(JG)=-0.4744-0.098*PR+0.1674*YD+0.1391*HDD+0.5773*CPC(JG-1)
      C(JG)=EXP(CPC(JG))*CPOP*0.192
      LYR(JG)=KYR
   85 CONTINUE
      WRITE(6,90)
   90 FORMAT('1',/,' YEAR',8X,'CONSUMPTION',/,12X,'(MILLION MCF)')
      WRITE(6,55)(LYR(N),C(N),N=1,MG)
  199 WRITE(6,95)
   95 FORMAT('1','DO YOU WISH ANY MORE FORECASTS?')
      READ(5,96)ANS
   96 FORMAT(A1)
      IF(ANS.EQ.'Y')GO TO 5
      STOP
      END
```