EFFECTS OF THE DISTURBANCE PROCESS OF THE ECONOMETRIC MODEL AUSTRIA 1

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1. INTRODUCTION

In the analysis of dynamic properties of econometric models emphasis has been put so far mainly on the deterministic part of the model, whereas the influence of the stochastic disturbance process has been rather neglected. There is ample evidence, however, in the literature [1, 4, 8, 10, 11] that the neglecting of the stochastic process, which generates the errors of the equations, may considerably distort the solution of the model. Although the error terms, for instance, may be uncorrelated in the structural form of the model, the final form may reveal nearly periodical cycles generated by the stochastic components of the system. It is this finding that causes some authors to point to the importance of the economic implications for the theory of the business cycle [12].

In general there are two ways of studying the effects of the disturbance process of an econometric model. Firstly there is the possibility of simulating the error process and of repeatedly solving the system by adding the disturbance term which has been generated by suitable methods. Then the resulting different time paths of the model solution can be further analysed. Secondly there is the analytical approach using the theory of linear transformations of stationary processes [3, 13]. Following similar investigations by E.P.Howrey [10, 11] this technique is applied in this paper to the econometric model Austria 1 [5] which has proved to be stable [6, 14] and is assumed to have a stationary disturbance process. In comparison to the simulation approach the analytical technique greatly reduces the sampling variability but it still has to be assumed that the estimated values of the coefficients are "true".

2. THE FINAL FORM OF AN ECONOMETRIC MODEL

The standard linear econometric model

$$B_o y_t + B_1 y_{t-1} + \dots + B_n y_{t-n} + \\ + \Gamma_o z_t + \dots + \Gamma_m z_{t-m} = u_t \qquad (1)$$

is a system of stochastic difference equations where we denote by

- (y_t) the sequence of (r.1)-vectors of endogenous variables,
- (z_t) the sequence of (s.1)-vectors of (nonstochastic) exogenous variables, and
- (u_t) a r-dimensional wide-sense stationary disturbance process characterized by

$$Eu_t = 0 \qquad (2a)$$

In addition often is supported that

$$K_u(s) = Eu_{t+s}u_t' = \begin{cases} \Sigma & \text{for } s=0 , \\ 0 & \text{otherwise.} \end{cases} \qquad (2b)$$

B_i, i=1,...,n, and Γ_j, j=1,...,m, are (r.r) and (r.s) coefficient matrices, respectively. We assume the sequence of the exogenous variables to be bounded.

Provided B_o is nonsingular we get the reduced form of an econometric model by premultiplying the structural form (1)

$$y_t = \Pi_1 y_{t-1} + \dots + \Pi_n y_{t-n} + B_o^{-1}\Gamma_o z_t + \dots + B_o^{-1}\Gamma_m z_{t-m} + v_t \quad (3)$$

where $\Pi_i = -B_o^{-1}B_i$, $i=1,\dots,n$, and $v_t = B_o^{-1}u_t$.

With the two-sided z-transform we determine the steady state solution of (1). For this purpose we define the lag operator L by $Lx_t = x_{t-1}$ on a proper set of r-dimensional stochastic processes with bounded (noncentral) second moments. This set apparently includes also the nonstochastic sequences of exogenous variables. Then the structural form can be written as

$$(B_o + LB_1 + \dots + L^nB_n)y_t = (-\Gamma_o - \dots - L^m\Gamma_m)z_t + u_t . \quad (4)$$

If the determinant of the polynomial matrix $(B_o + B_1z + \dots + B_nz^n)$, with z being a complex variable, has only roots with moduli greater than one - i.e. the stability condition is fulfilled - then $(B_o + LB_1 + \dots + L^nB_n)^{-1}$ exists and has the following representation

$$(B_o + \dots + B_nz^n)^{-1} = \sum_{s=0}^{\infty} C_sL^s . \quad (5)$$

The convergence of the sum in (5) guarantees the convergence of the random variables in quadratic mean. The coefficient matrices C_s are determined by the inverse of the matrix polynomial $(B_o + B_1z + \dots + B_nz^n)$. With analogous assumptions we can get a representation for $(I - L\Pi_1 - \dots - L^n\Pi_n)^{-1}$.

With (5) we can write the solution of (1) in what is called the final form of the model:

$$y_t = (B_o + \dots + L^n B_n)^{-1}(-\Gamma_o - \dots - L^m \Gamma_m) z_t + \\ + (B_o + \dots + L^n B_n)^{-1} u_t \ . \quad (6)$$

We realize that this solution is composed of two additive components. The first term shows the effect of the exogenous variables and represents the expected value of the endogenous variables. The second term - let us denote it by w_t - comprises the influence of the error variables on the endogenous variables. Because of the stability assumption of the model (w_t) is a stationary process with mean zero and is derived from (u_t) by linear transformation with the transfer matrix

$$B(\lambda) = (B_o + B_1 e^{-i\lambda} + \dots + B_n e^{-in\lambda})^{-1} \ . \quad (7)$$

As the spectrum representation of u_t is

$$u_t = \int_{-\pi}^{\pi} e^{i\lambda t} dZ_u(\lambda) \quad (8)$$

(w_t) suffices the formula (cf. [13], chapter 1 and 8)

$$w_t = \int_{-\pi}^{\pi} e^{i\lambda t} B(\lambda) dZ_u(\lambda) \ . \quad (9)$$

Thus the spectrum matrix f_w of (w_t) is determined by the spectrum matrix f_u of the disturbance process (u_t) (cf. [13], p. 37)

$$f_w(\lambda) = (B_o + \dots + B_n e^{-i\lambda n})^{-1} f_u(\lambda) (B_o + \dots + B_n e^{-i\lambda n})^{-1*} \quad (10)$$

where * denotes the conjugate transpose operation. If (2b) is valid then (w_t) is a multidimensional autoregressive process.

Thus the transfermatrix $B(\lambda)$ characterizes the properties of the stochastic part of the endogenous variables. This becomes especially clear in the case of r=1. The transfer function in the polar form

$$B(\lambda) = |B(\lambda)| e^{i\Theta(\lambda)} \tag{11}$$

shows in the amplitude the increase or decrease in the cycles of the corresponding frequency bands of (u_t) and in the phase the temporal shift of the cyclical components (see (9)). There exists an analogous representation for the case r>1 (cf. [9], p.60):

$$B(\lambda) = D(\lambda)A(\lambda) \ . \tag{12}$$

$D(\lambda)$ is an isometric matrix and $A(\lambda)$ is a hermitian nonnegative matrix. A single element $b_{ij}(\lambda)$ of the matrix $B(\lambda)$ shows the influence of the j-th component of (u_t) on the i-th component of (w_t).

Yet it is also revealing to look at the spectrum matrix f_w itself: On its main-diagonal we find the auto spectra of the endogenous variables. They characterize the univariate structure of the stochastic process and from them we can take which cycles are generated by the error terms. The cross spectra are contained in the off-diagonal elements and specify the mutual correlation of the endogenous variables.

Mention should also be made that econometricians usually determine the time path of the endogenous variables from the reduced form by iterative substitution of the already known and realized past values of endogenous variables. This isthe customary procedure in forecasting. This means that we are looking for the solution $(y_{t+\tau})_{\tau=0,1,\dots}$ of (1) for given initial values $y_{t-1}, \dots, y_{t-n}$. But as these initial values already contain the effects of the past realizations of the error process the effect of future disturbances will not become too large for small τ as it would be in the case of the steady state solution. This can easily be seen if we compare the disturbance process of the steady state solution (4)

$$w_{t+\tau} = \sum_{s=0}^{\infty} C_s u_{t+\tau-s} \quad , \tag{13}$$

where we assume convergence in quadratic mean, with the initial value solution

$$w^*_{t+\tau} = \sum_{s=0}^{\tau} C_s u_{t+\tau-s} \quad . \tag{14}$$

Thus $\underset{\tau \to 0}{\mathrm{l.i.m.}}\, w^*_{t+\tau} = w_{t+\tau}$ and $\mathrm{var}(w^*_{t+\tau}) \leq \mathrm{var}(w_{t+\tau})$.

Furthermore it can be shown that forecasts based only on the deterministic part in the case of initial values are optimal in the sense of least squares in contrast to forecasts made with the final form (6).

In implementing the computations we can proceed in two ways. Either one can start from the spectra for (u_t) estimated for a finite number of frequency points and carry out the inversion of the matrix $(B_o + \dots + B_n e^{-in\lambda})$ at those frequencies or one postulates the validity of assumption (2b). Then there follows for the spectrum matrix of the residuals

$$\hat{f}_u = \frac{1}{2\pi} \hat{\Sigma} \tag{15}$$

which shows that only Σ has to be estimated. Although $\hat{f}_u$ is defined continuously on the intervall $[-\pi,\pi]$ the inversion of the transfer matrix will be implemented only for a finite number of frequencies. The latter approach has been used for the calculations underlying this paper.

3. EMPIRICAL RESULTS OF THE MODEL AUSTRIA 1

The above developed concept is now applied to the econometric model Austria 1. As this model is completely linear no modifications are necessary. A list of the equations and variables of this model is contained in Appendix 3 and 4, respectively. The model is based on yearly observations with lags up to two periods. The stability of the applied ordinary least squares version of the model is proved both by computation of the characteristic roots [6] (which are the inverses of the solutions of the equation $\det(B_o + \ldots + B_n z^n) = 0$) listed in Table 1 and the dynamic multipliers of the model [14].

Real Part	Imaginary Part	Modulus	Period
.026			
.333			
.200	±.237	.311	7.22
.500	±.377	.667	10.46
-.382	±.258	.461	2.47

Table 1 Characteristic Roots of the Econometric Model Austria 1

To reduce the amount of core storage required the original second order difference equation system was converted to a first-order system. Appendix 1 contains the auto spectra of all endogenous variables of the system. The cross spectra between real gross national product and all endogenous variables are shown in Appendix 2. Although the numerical results serve mainly descriptive purposes and can hardly be used to make judgements about the validity of the specifications of the model we yet observe in almost all endogenous variables cycles generated by the disturbance process. This phenomenon can be given an economic interpretation in view of the business cycle theory.

4. SUMMARY

This paper dealt with an analytical method for calculating the stochastic properties of the econometric model Austria 1. Using the spectral theory of stationary processes essentially the transformation of the disturbance process by the econometric model was shown. In the time domain these transformations are determined by the coefficients of the model whereas for the frequency domain analysis used in this approach the transfer matrix $B(\lambda)$ has been calculated. The effect of this transformation can also be studied by looking at the spectrum matrix of the transformed process. The discussions in this paper were restricted to the probability theoretical aspect of the problem whereas the statistical view was not taken into consideration. Although the employed econometric model with 29 equations and lags up to two periods is only of medium size it is

probably the largest model upon which this analysis has been applied so far. The reason for this are numerical difficulties which arise because of the large amount of storage capacity this procedure requires. Even with very large computer systems the use of peripherical storage devices for models of this size becomes necessary.

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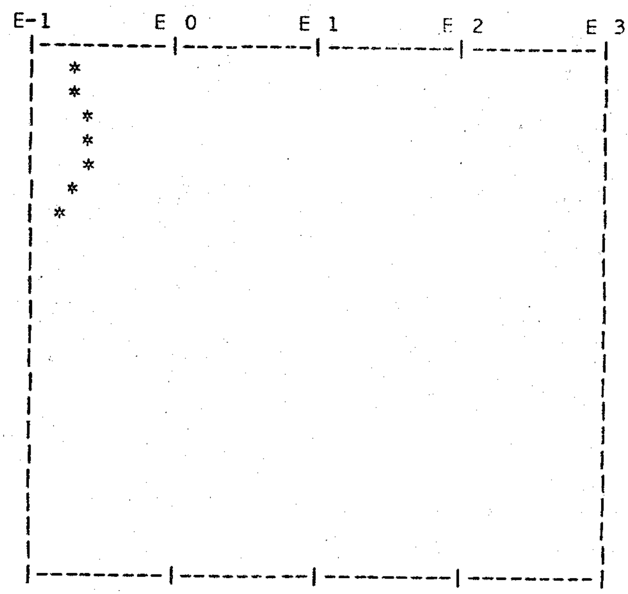
APPENDIX 1

AUTO SPECTRA OF THE
ENDOGENOUS VARIABLES

AUTO SPECTRA

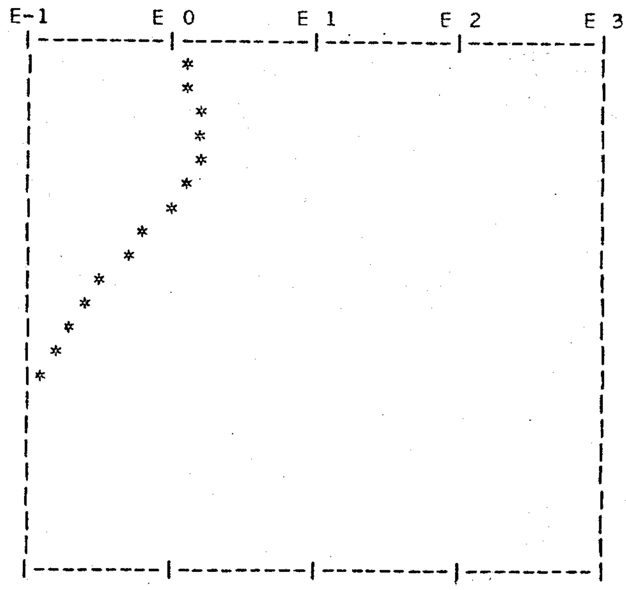
SERIES 1 ALO

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1731E 00	8.49	8.49
1	40.00	0.02	0.1810E 00	8.87	17.36
2	20.00	0.05	0.2031E 00	9.96	27.32
3	13.33	0.07	0.2279E 00	11.17	38.50
4	10.00	0.10	0.2235E 00	10.96	49.45
5	8.00	0.13	0.1802E 00	8.83	58.29
6	6.67	0.15	0.1320E 00	6.47	64.76
7	5.71	0.17	0.9819E-01	4.81	69.58
8	5.00	0.20	0.7709E-01	3.78	73.36
9	4.44	0.22	0.6398E-01	3.14	76.49
10	4.00	0.25	0.5555E-01	2.72	79.22
11	3.64	0.27	0.4988E-01	2.45	81.66
12	3.33	0.30	0.4591E-01	2.25	83.91
13	3.08	0.32	0.4305E-01	2.11	86.02
14	2.86	0.35	0.4106E-01	2.01	88.04
15	2.67	0.38	0.3993E-01	1.96	90.00
16	2.50	0.40	0.3967E-01	1.94	91.94
17	2.35	0.42	0.4012E-01	1.97	93.91
18	2.22	0.45	0.4090E-01	2.01	95.91
19	2.11	0.47	0.4156E-01	2.04	97.95
20	2.00	0.50	0.4181E-01	2.05	100.00



SERIES 2 BEP

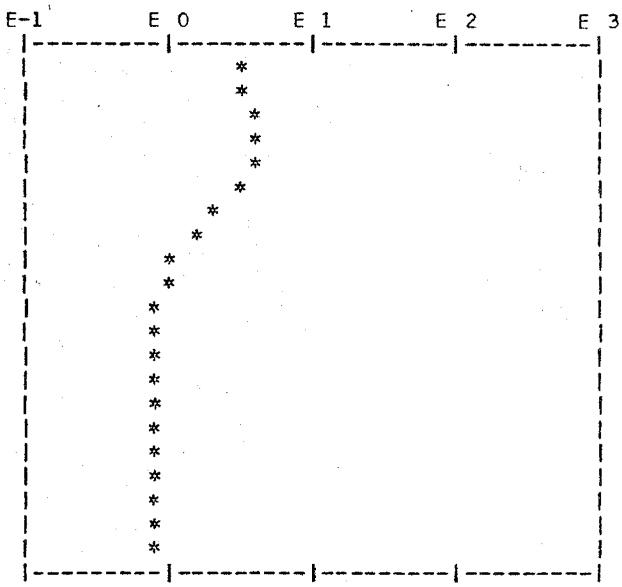
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1113E 01	9.87	9.87
1	40.00	0.02	0.1173E 01	10.40	20.27
2	20.00	0.05	0.1345E 01	11.92	32.18
3	13.33	0.07	0.1541E 01	13.66	45.85
4	10.00	0.10	0.1523E 01	13.50	59.35
5	8.00	0.13	0.1205E 01	10.68	70.02
6	6.67	0.15	0.8390E 00	7.44	77.46
7	5.71	0.17	0.5751E 00	5.10	82.56
8	5.00	0.20	0.4061E 00	3.60	86.16
9	4.44	0.22	0.2977E 00	2.64	88.79
10	4.00	0.25	0.2259E 00	2.00	90.80
11	3.64	0.27	0.1763E 00	1.56	92.36
12	3.33	0.30	0.1409E 00	1.25	93.61
13	3.08	0.32	0.1151E 00	1.02	94.63
14	2.86	0.35	0.9663E-01	0.86	95.49
15	2.67	0.38	0.8500E-01	0.75	96.24
16	2.50	0.40	0.8016E-01	0.71	96.95
17	2.35	0.42	0.8100E-01	0.72	97.67
18	2.22	0.45	0.8480E-01	0.75	98.42
19	2.11	0.47	0.8847E-01	0.78	99.20
20	2.00	0.50	0.8991E-01	0.80	100.00



AUTO SPECTRA

SERIES 3 CTPN

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.2894E 01	9.21	9.21
1	40.00	0.02	0.3003E 01	9.56	18.77
2	20.00	0.05	0.3293E 01	10.48	29.26
3	13.33	0.07	0.3550E 01	11.30	40.56
4	10.00	0.10	0.3305E 01	10.52	51.08
5	8.00	0.13	0.2524E 01	8.04	59.12
6	6.67	0.15	0.1770E 01	5.64	64.75
7	5.71	0.17	0.1282E 01	4.08	68.83
8	5.00	0.20	0.9992E 00	3.18	72.01
9	4.44	0.22	0.8374E 00	2.67	74.68
10	4.00	0.25	0.7453E 00	2.37	77.05
11	3.64	0.27	0.6958E 00	2.22	79.27
12	3.33	0.30	0.6747E 00	2.15	81.42
13	3.08	0.32	0.6742E 00	2.15	83.56
14	2.86	0.35	0.6889E 00	2.19	85.75
15	2.67	0.38	0.7122E 00	2.27	88.02
16	2.50	0.40	0.7356E 00	2.34	90.36
17	2.35	0.42	0.7516E 00	2.39	92.76
18	2.22	0.45	0.7581E 00	2.41	95.17
19	2.11	0.47	0.7588E 00	2.42	97.59
20	2.00	0.50	0.7583E 00	2.41	100.00



SERIES 4 IAPR

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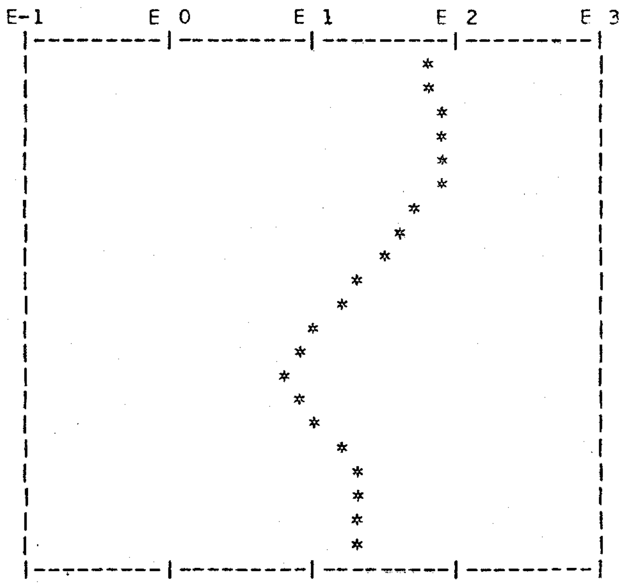
2	20.00	0.05	0.6419E 02	9.83	26.82
3	13.33	0.07	0.7368E 02	11.29	38.10
4	10.00	0.10	0.7541E 02	11.55	49.66
5	8.00	0.13	0.6397E 02	9.80	59.45
6	6.67	0.15	0.4842E 02	7.42	66.87
7	5.71	0.17	0.3550E 02	5.44	72.31
8	5.00	0.20	0.2578E 02	3.95	76.26
9	4.44	0.22	0.1845E 02	2.83	79.08
10	4.00	0.25	0.1294E 02	1.98	81.07
11	3.64	0.27	0.8996E 01	1.38	82.44
12	3.33	0.30	0.6611E 01	1.01	83.46
13	3.08	0.32	0.5879E 01	0.90	84.36
14	2.86	0.35	0.6873E 01	1.05	85.41
15	2.67	0.38	0.9401E 01	1.44	86.85
16	2.50	0.40	0.1277E 02	1.96	88.81
17	2.35	0.42	0.1595E 02	2.44	91.25
18	2.22	0.45	0.1817E 02	2.78	94.03
19	2.11	0.47	0.1931E 02	2.96	96.99
20	2.00	0.50	0.1964E 02	3.01	100.00



AUTO SPECTRA

SERIES 5 IBPR

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1	40.00	0.02	0.2988E 01	3.45	6.81
2	20.00	0.05	0.3212E 01	3.70	10.51
3	13.33	0.07	0.3562E 01	4.11	14.62
4	10.00	0.10	0.3895E 01	4.49	19.11
5	8.00	0.13	0.4026E 01	4.64	23.76
6	6.67	0.15	0.4001E 01	4.61	28.37
7	5.71	0.17	0.3945E 01	4.55	32.92
8	5.00	0.20	0.3910E 01	4.51	37.43
9	4.44	0.22	0.3906E 01	4.51	41.93
10	4.00	0.25	0.3935E 01	4.54	46.47
11	3.64	0.27	0.3998E 01	4.61	51.08
12	3.33	0.30	0.4099E 01	4.73	55.81
13	3.08	0.32	0.4244E 01	4.89	60.71
14	2.86	0.35	0.4433E 01	5.11	65.82
15	2.67	0.38	0.4647E 01	5.36	71.18
16	2.50	0.40	0.4844E 01	5.59	76.76
17	2.35	0.42	0.4981E 01	5.75	82.51
18	2.22	0.45	0.5045E 01	5.82	88.33
19	2.11	0.47	0.5060E 01	5.84	94.16
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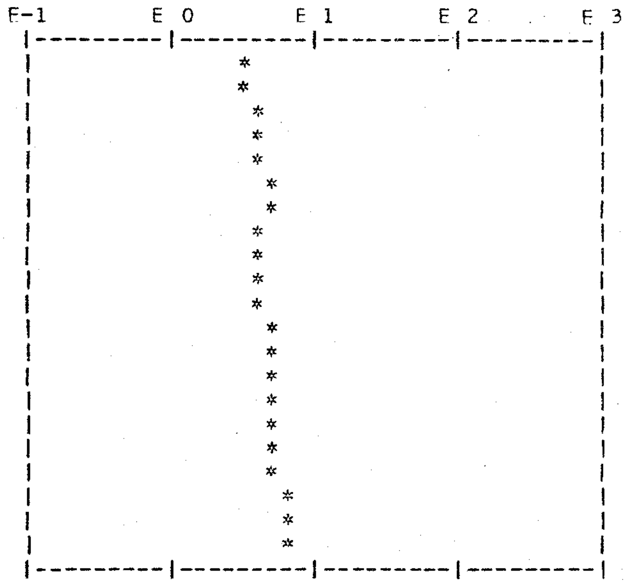

SERIES 6 ILDN

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2	20.00	0.05	0.6143E 00	2.73	7.59
3	13.33	0.07	0.6776E 00	3.01	10.59
4	10.00	0.10	0.6798E 00	3.02	13.61
5	8.00	0.13	0.6130E 00	2.72	16.33
6	6.67	0.15	0.5545E 00	2.46	18.79
7	5.71	0.17	0.5373E 00	2.38	21.18
8	5.00	0.20	0.5525E 00	2.45	23.63
9	4.44	0.22	0.5896E 00	2.62	26.25
10	4.00	0.25	0.6457E 00	2.87	29.11
11	3.64	0.27	0.7249E 00	3.22	32.33
12	3.33	0.30	0.8369E 00	3.71	36.05
13	3.08	0.32	0.9951E 00	4.42	40.46
14	2.86	0.35	0.1211E 01	5.37	45.84
15	2.67	0.38	0.1480E 01	6.57	52.41
16	2.50	0.40	0.1773E 01	7.87	60.28
17	2.35	0.42	0.2035E 01	9.03	69.31
18	2.22	0.45	0.2224E 01	9.87	79.18
19	2.11	0.47	0.2329E 01	10.34	89.52
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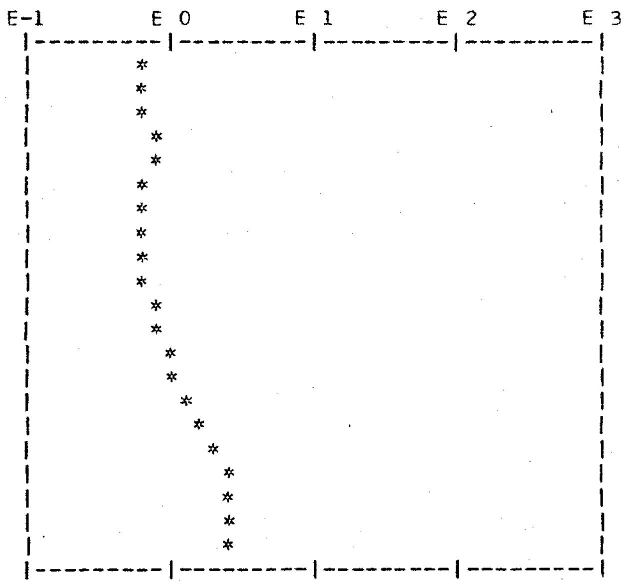

AUTO SPECTRA

SERIES 7 IMIN

I	T(I)	L(I)	POWER	%	SUM %
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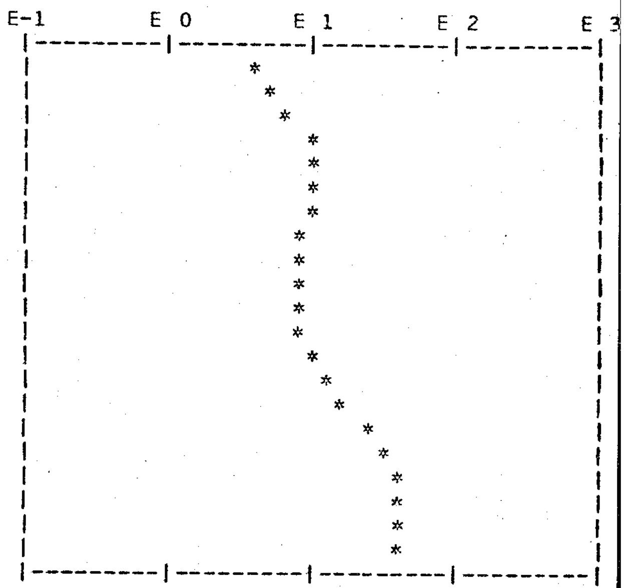
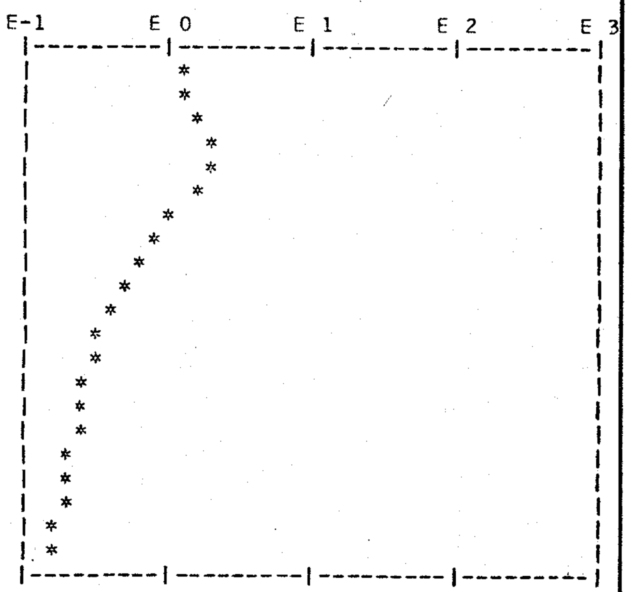
1	40.00	0.02	0.4261E 01	1.35	2.54
2	20.00	0.05	0.5792E 01	1.83	4.36
3	13.33	0.07	0.8144E 01	2.57	6.93
4	10.00	0.10	0.9891E 01	3.12	10.06
5	8.00	0.13	0.9666E 01	3.05	13.11
6	6.67	0.15	0.8450E 01	2.67	15.78
7	5.71	0.17	0.7403E 01	2.34	18.11
8	5.00	0.20	0.6790E 01	2.14	20.26
9	4.44	0.22	0.6592E 01	2.08	22.34
10	4.00	0.25	0.6833E 01	2.16	24.50
11	3.64	0.27	0.7631E 01	2.41	26.91
12	3.33	0.30	0.9207E 01	2.91	29.81
13	3.08	0.32	0.1186E 02	3.74	33.56
14	2.86	0.35	0.1583E 02	5.00	38.55
15	2.67	0.38	0.2109E 02	6.66	45.21
16	2.50	0.40	0.2698E 02	8.52	53.73
17	2.35	0.42	0.3239E 02	10.22	63.95
18	2.22	0.45	0.3634E 02	11.47	75.43
19	2.11	0.47	0.3857E 02	12.18	87.60
20	2.00	0.50	0.3927E 02	12.40	100.00



SERIES 8 LBPN

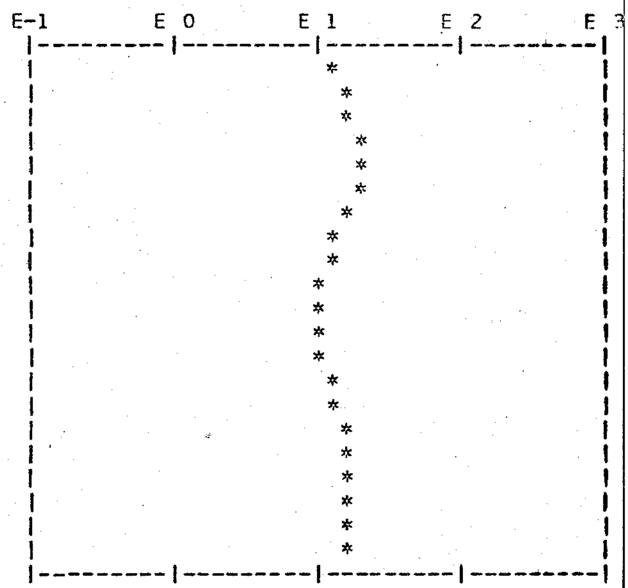
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1097E 01	8.18	8.18
1	40.00	0.02	0.1167E 01	8.70	16.89
2	20.00	0.05	0.1368E 01	10.21	27.10
3	13.33	0.07	0.1614E 01	12.04	39.14
4	10.00	0.10	0.1642E 01	12.25	51.39
5	8.00	0.13	0.1343E 01	10.02	61.41
6	6.67	0.15	0.9785E 00	7.30	68.71
7	5.71	0.17	0.7137E 00	5.32	74.04
8	5.00	0.20	0.5449E 00	4.07	78.10
9	4.44	0.22	0.4370E 00	3.26	81.36
10	4.00	0.25	0.3650E 00	2.72	84.09
11	3.64	0.27	0.3149E 00	2.35	86.44
12	3.33	0.30	0.2786E 00	2.08	88.51
13	3.08	0.32	0.2512E 00	1.87	90.39
14	2.86	0.35	0.2292E 00	1.71	92.10
15	2.67	0.38	0.2104E 00	1.57	93.67
16	2.50	0.40	0.1932E 00	1.44	95.11
17	2.35	0.42	0.1777E 00	1.33	96.43
18	2.22	0.45	0.1654E 00	1.23	97.67
19	2.11	0.47	0.1576E 00	1.18	98.84
20	2.00	0.50	0.1549E 00	1.16	100.00



AUTO SPECTRA

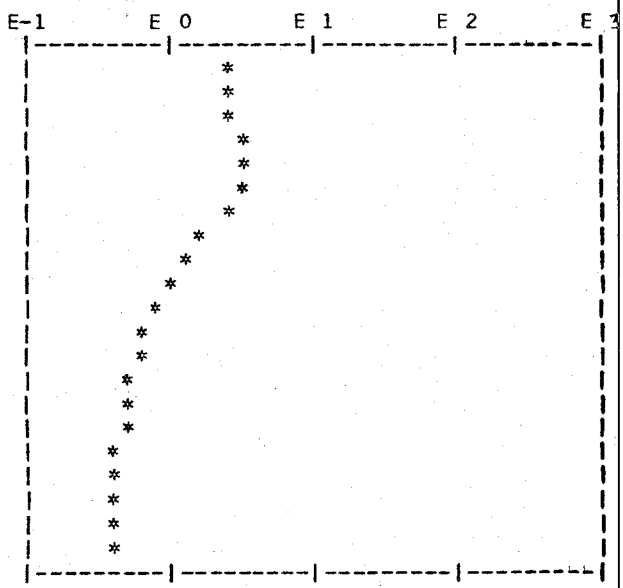
SERIES 9 NLPN

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1258E 02	4.57	4.57
1	40.00	0.02	0.1318E 02	4.79	9.35
2	20.00	0.05	0.1500E 02	5.45	14.80
3	13.33	0.07	0.1759E 02	6.39	21.19
4	10.00	0.10	0.1886E 02	6.85	28.04
5	8.00	0.13	0.1726E 02	6.27	34.30
6	6.67	0.15	0.1450E 02	5.27	39.57
7	5.71	0.17	0.1219E 02	4.43	44.00
8	5.00	0.20	0.1061E 02	3.85	47.85
9	4.44	0.22	0.9650E 01	3.50	51.35
10	4.00	0.25	0.9213E 01	3.35	54.70
11	3.64	0.27	0.9255E 01	3.36	58.06
12	3.33	0.30	0.9754E 01	3.54	61.60
13	3.08	0.32	0.1067E 02	3.87	65.48
14	2.86	0.35	0.1188E 02	4.31	69.79
15	2.67	0.38	0.1312E 02	4.76	74.55
16	2.50	0.40	0.1402E 02	5.09	79.64
17	2.35	0.42	0.1434E 02	5.21	84.85
18	2.22	0.45	0.1417E 02	5.15	90.00
19	2.11	0.47	0.1385E 02	5.03	95.03
20	2.00	0.50	0.1370E 02	4.97	100.00



SERIES 10 PIAX

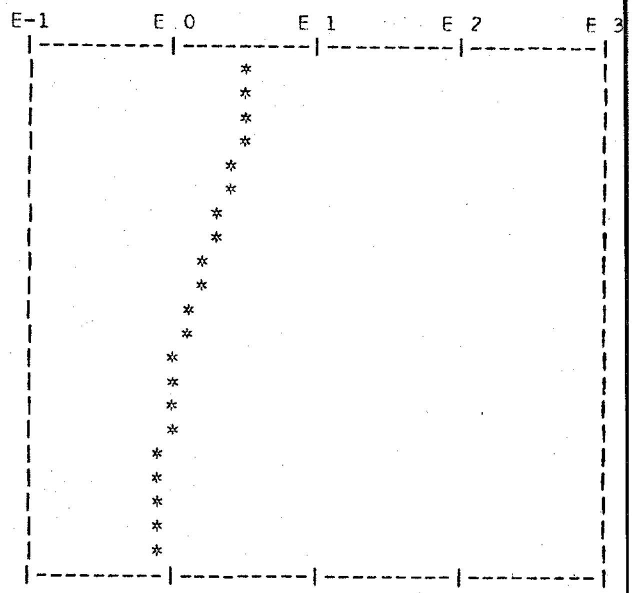
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.2023E 01	7.82	7.82
1	40.00	0.02	0.2138E 01	8.27	16.09
2	20.00	0.05	0.2478E 01	9.58	25.67
3	13.33	0.07	0.2922E 01	11.30	36.97
4	10.00	0.10	0.3052E 01	11.80	48.77
5	8.00	0.13	0.2626E 01	10.16	58.92
6	6.67	0.15	0.2025E 01	7.83	66.75
7	5.71	0.17	0.1538E 01	5.95	72.70
8	5.00	0.20	0.1189E 01	4.60	77.30
9	4.44	0.22	0.9399E 00	3.63	80.93
10	4.00	0.25	0.7587E 00	2.93	83.87
11	3.64	0.27	0.6274E 00	2.43	86.29
12	3.33	0.30	0.5343E 00	2.07	88.36
13	3.08	0.32	0.4704E 00	1.82	90.18
14	2.86	0.35	0.4278E 00	1.65	91.83
15	2.67	0.38	0.3986E 00	1.54	93.37
16	2.50	0.40	0.3757E 00	1.45	94.83
17	2.35	0.42	0.3552E 00	1.37	96.20
18	2.22	0.45	0.3374E 00	1.30	97.50
19	2.11	0.47	0.3251E 00	1.26	98.76
20	2.00	0.50	0.3207E 00	1.24	100.00



AUTO SPECTRA

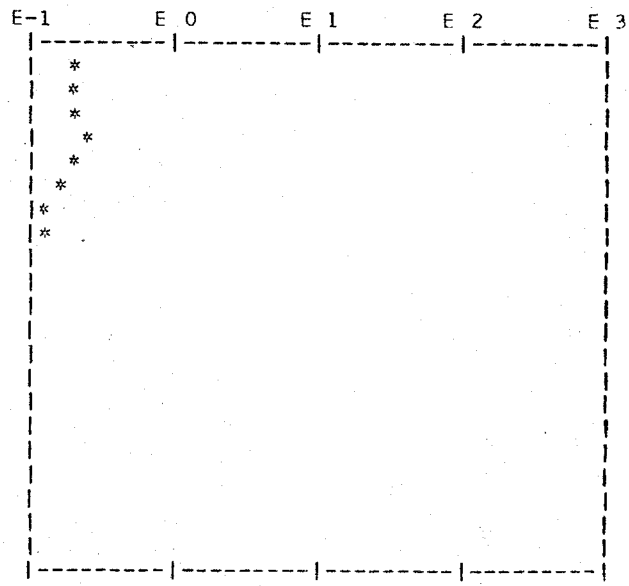
SERIES 11 PIBX

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.3139E 01	9.76	9.76
1	40.00	0.02	0.3086E 01	9.59	19.35
2	20.00	0.05	0.2936E 01	9.13	28.48
3	13.33	0.07	0.2713E 01	8.43	36.91
4	10.00	0.10	0.2439E 01	7.58	44.49
5	8.00	0.13	0.2148E 01	6.68	51.17
6	6.67	0.15	0.1883E 01	5.85	57.03
7	5.71	0.17	0.1656E 01	5.15	62.17
8	5.00	0.20	0.1467E 01	4.56	66.73
9	4.44	0.22	0.1310E 01	4.07	70.81
10	4.00	0.25	0.1181E 01	3.67	74.48
11	3.64	0.27	0.1075E 01	3.34	77.82
12	3.33	0.30	0.9874E 00	3.07	80.89
13	3.08	0.32	0.9147E 00	2.84	83.73
14	2.86	0.35	0.8540E 00	2.66	86.39
15	2.67	0.38	0.8032E 00	2.50	88.89
16	2.50	0.40	0.7614E 00	2.37	91.25
17	2.35	0.42	0.7287E 00	2.27	93.52
18	2.22	0.45	0.7055E 00	2.19	95.71
19	2.11	0.47	0.6919E 00	2.15	97.86
20	2.00	0.50	0.6874E 00	2.14	100.00



SERIES 12 PV2X

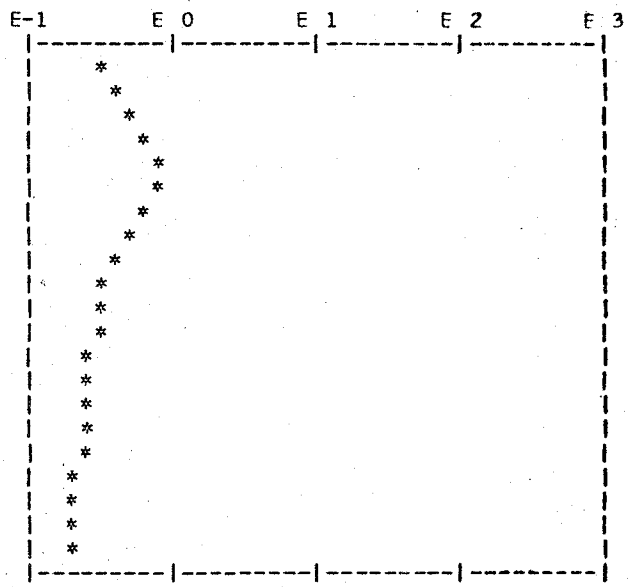
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1689E 00	7.36	7.36
1	40.00	0.02	0.1740E 00	7.58	14.94
2	20.00	0.05	0.1878E 00	8.18	23.12
3	13.33	0.07	0.2004E 00	8.73	31.85
4	10.00	0.10	0.1906E 00	8.30	40.16
5	8.00	0.13	0.1572E 00	6.85	47.01
6	6.67	0.15	0.1253E 00	5.46	52.47
7	5.71	0.17	0.1051E 00	4.58	57.05
8	5.00	0.20	0.9342E-01	4.07	61.12
9	4.44	0.22	0.8648E-01	3.77	64.89
10	4.00	0.25	0.8205E-01	3.57	68.46
11	3.64	0.27	0.7899E-01	3.44	71.90
12	3.33	0.30	0.7675E-01	3.34	75.25
13	3.08	0.32	0.7503E-01	3.27	78.52
14	2.86	0.35	0.7362E-01	3.21	81.72
15	2.67	0.38	0.7236E-01	3.15	84.88
16	2.50	0.40	0.7116E-01	3.10	87.98
17	2.35	0.42	0.7003E-01	3.05	91.03
18	2.22	0.45	0.6910E-01	3.01	94.04
19	2.11	0.47	0.6850E-01	2.98	97.02
20	2.00	0.50	0.6829E-01	2.98	100.00



AUTO SPECTRA

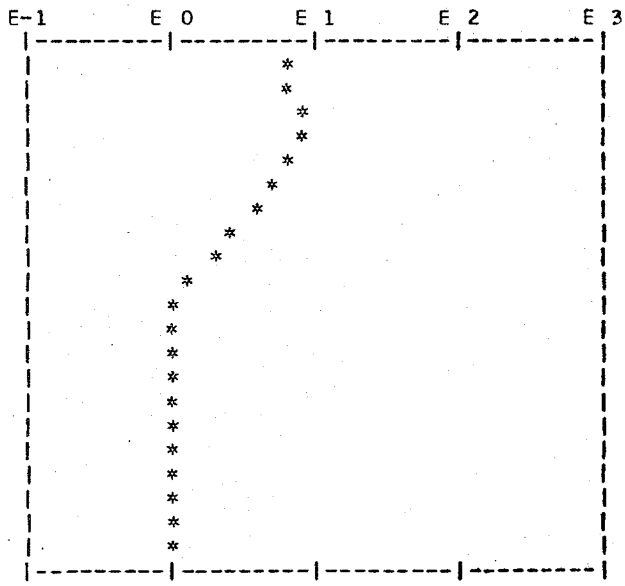
SERIES 13 PYMX

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.3089E 00	4.22	4.22
1	40.00	0.02	0.3434E 00	4.69	8.92
2	20.00	0.05	0.4537E 00	6.20	15.12
3	13.33	0.07	0.6281E 00	8.58	23.70
4	10.00	0.10	0.7522E 00	10.28	33.98
5	8.00	0.13	0.7064E 00	9.66	43.64
6	6.67	0.15	0.5715E 00	7.81	51.45
7	5.71	0.17	0.4504E 00	6.16	57.60
8	5.00	0.20	0.3667E 00	5.01	62.62
9	4.44	0.22	0.3132E 00	4.28	66.90
10	4.00	0.25	0.2796E 00	3.82	70.72
11	3.64	0.27	0.2583E 00	3.53	74.25
12	3.33	0.30	0.2443E 00	3.34	77.59
13	3.08	0.32	0.2342E 00	3.20	80.79
14	2.86	0.35	0.2256E 00	3.08	83.87
15	2.67	0.38	0.2168E 00	2.96	86.83
16	2.50	0.40	0.2074E 00	2.83	89.67
17	2.35	0.42	0.1979E 00	2.71	92.37
18	2.22	0.45	0.1900E 00	2.60	94.97
19	2.11	0.47	0.1849E 00	2.53	97.50
20	2.00	0.50	0.1832E 00	2.50	100.00



SERIES 14 YMBN

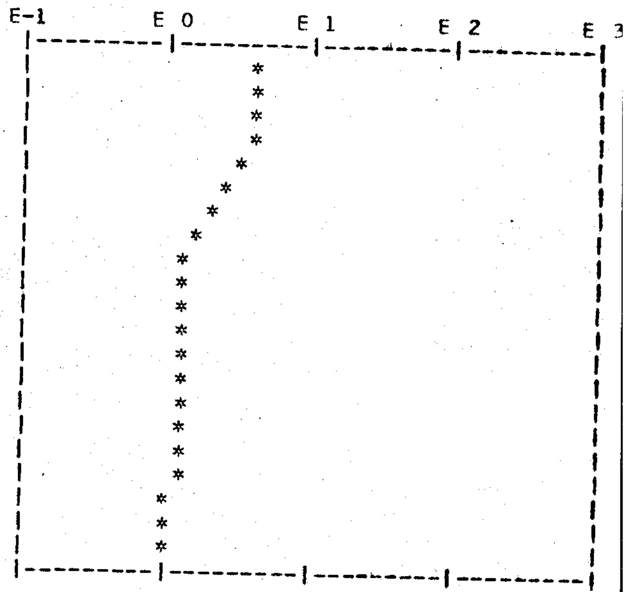
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.5814E 01	10.78	10.78
1	40.00	0.02	0.5986E 01	11.10	21.87
2	20.00	0.05	0.6431E 01	11.92	33.80
3	13.33	0.07	0.6757E 01	12.53	46.32
4	10.00	0.10	0.6155E 01	11.41	57.73
5	8.00	0.13	0.4625E 01	8.57	66.31
6	6.67	0.15	0.3171E 01	5.88	72.19
7	5.71	0.17	0.2196E 01	4.07	76.26
8	5.00	0.20	0.1590E 01	2.95	79.21
9	4.44	0.22	0.1214E 01	2.25	81.46
10	4.00	0.25	0.9859E 00	1.83	83.28
11	3.64	0.27	0.8605E 00	1.60	84.88
12	3.33	0.30	0.8121E 00	1.51	86.38
13	3.08	0.32	0.8221E 00	1.52	87.91
14	2.86	0.35	0.8704E 00	1.61	89.52
15	2.67	0.38	0.9305E 00	1.73	91.25
16	2.50	0.40	0.9720E 00	1.80	93.05
17	2.35	0.42	0.9762E 00	1.81	94.86
18	2.22	0.45	0.9499E 00	1.76	96.62
19	2.11	0.47	0.9184E 00	1.70	98.32
20	2.00	0.50	0.9050E 00	1.68	100.00



AUTO SPECTRA

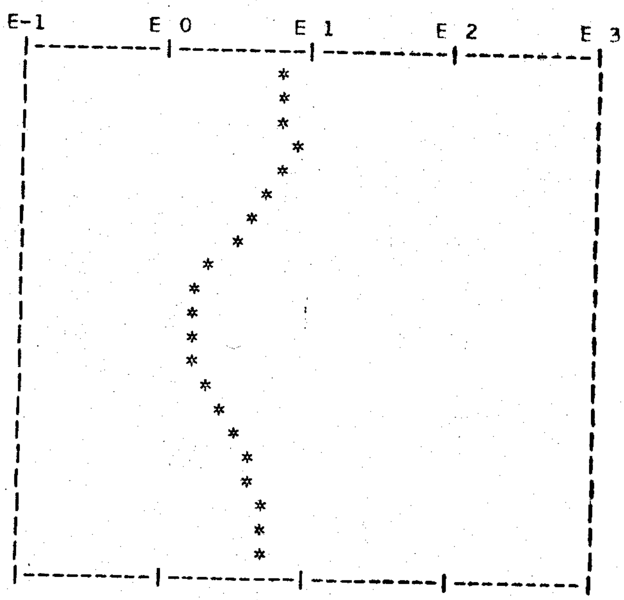
SERIES 15   YMBR

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.3719E 01	9.96	9.96
1	40.00	0.02	0.3766E 01	10.08	20.04
2	20.00	0.05	0.3848E 01	10.30	30.35
3	13.33	0.07	0.3737E 01	10.01	40.36
4	10.00	0.10	0.3148E 01	8.43	48.78
5	8.00	0.13	0.2315E 01	6.20	54.98
6	6.67	0.15	0.1711E 01	4.58	59.57
7	5.71	0.17	0.1379E 01	3.69	63.26
8	5.00	0.20	0.1200E 01	3.21	66.47
9	4.44	0.22	0.1101E 01	2.95	69.42
10	4.00	0.25	0.1052E 01	2.82	72.24
11	3.64	0.27	0.1041E 01	2.79	75.03
12	3.33	0.30	0.1061E 01	2.84	77.87
13	3.08	0.32	0.1102E 01	2.95	80.82
14	2.86	0.35	0.1145E 01	3.07	83.89
15	2.67	0.38	0.1164E 01	3.12	87.01
16	2.50	0.40	0.1134E 01	3.04	90.04
17	2.35	0.42	0.1053E 01	2.82	92.86
18	2.22	0.45	0.9522E 00	2.55	95.41
19	2.11	0.47	0.8717E 00	2.33	97.75
20	2.00	0.50	0.8416E 00	2.25	100.00



SERIES 16   UMSN

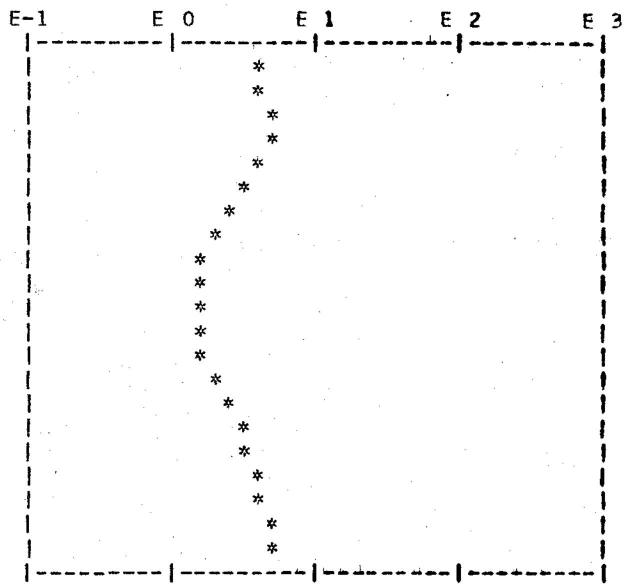
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.5159E 01	7.02	7.02
1	40.00	0.02	0.5360E 01	7.30	14.32
2	20.00	0.05	0.5914E 01	8.05	22.37
3	13.33	0.07	0.6474E 01	8.81	31.18
4	10.00	0.10	0.6195E 01	8.43	39.61
5	8.00	0.13	0.4893E 01	6.66	46.28
6	6.67	0.15	0.3519E 01	4.79	51.07
7	5.71	0.17	0.2555E 01	3.48	54.54
8	5.00	0.20	0.1949E 01	2.65	57.20
9	4.44	0.22	0.1582E 01	2.15	59.35
10	4.00	0.25	0.1385E 01	1.89	61.23
11	3.64	0.27	0.1328E 01	1.81	63.04
12	3.33	0.30	0.1411E 01	1.92	64.96
13	3.08	0.32	0.1644E 01	2.24	67.20
14	2.86	0.35	0.2038E 01	2.77	69.98
15	2.67	0.38	0.2571E 01	3.50	73.48
16	2.50	0.40	0.3163E 01	4.31	77.78
17	2.35	0.42	0.3689E 01	5.02	82.80
18	2.22	0.45	0.4058E 01	5.52	88.33
19	2.11	0.47	0.4258E 01	5.80	94.12
20	2.00	0.50	0.4318E 01	5.88	100.00



AUTO SPECTRA

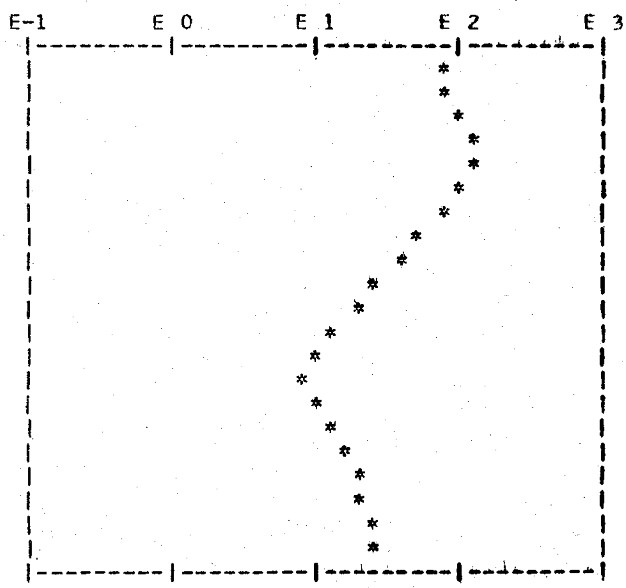
SERIES 17 UMSR

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.3663E 01	6.29	6.29
1	40.00	0.02	0.3754E 01	6.45	12.74
2	20.00	0.05	0.3982E 01	6.84	19.59
3	13.33	0.07	0.4119E 01	7.08	26.67
4	10.00	0.10	0.3745E 01	6.44	33.10
5	8.00	0.13	0.2924E 01	5.02	38.13
6	6.67	0.15	0.2199E 01	3.78	41.90
7	5.71	0.17	0.1745E 01	3.00	44.90
8	5.00	0.20	0.1484E 01	2.55	47.45
9	4.44	0.22	0.1345E 01	2.31	49.76
10	4.00	0.25	0.1295E 01	2.23	51.99
11	3.64	0.27	0.1332E 01	2.29	54.28
12	3.33	0.30	0.1466E 01	2.52	56.80
13	3.08	0.32	0.1718E 01	2.95	59.75
14	2.86	0.35	0.2099E 01	3.61	63.35
15	2.67	0.38	0.2589E 01	4.45	67.80
16	2.50	0.40	0.3117E 01	5.36	73.16
17	2.35	0.42	0.3575E 01	6.14	79.30
18	2.22	0.45	0.3888E 01	6.68	85.98
19	2.11	0.47	0.4054E 01	6.97	92.95
20	2.00	0.50	0.4103E 01	7.05	100.00



SERIES 18 IAPN

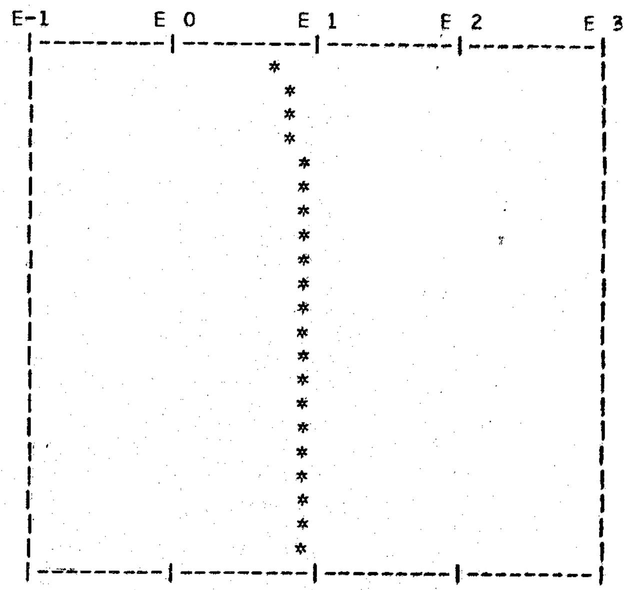
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.7511E 02	8.78	8.78
1	40.00	0.02	0.7865E 02	9.19	17.98
2	20.00	0.05	0.8896E 02	10.40	28.38
3	13.33	0.07	0.1018E 03	11.90	40.27
4	10.00	0.10	0.1032E 03	12.07	52.34
5	8.00	0.13	0.8627E 02	10.09	62.43
6	6.67	0.15	0.6410E 02	7.49	69.92
7	5.71	0.17	0.4610E 02	5.39	75.31
8	5.00	0.20	0.3289E 02	3.85	79.16
9	4.44	0.22	0.2321E 02	2.71	81.87
10	4.00	0.25	0.1614E 02	1.89	83.76
11	3.64	0.27	0.1122E 02	1.31	85.07
12	3.33	0.30	0.8286E 01	0.97	86.04
13	3.08	0.32	0.7305E 01	0.85	86.89
14	2.86	0.35	0.8248E 01	0.96	87.86
15	2.67	0.38	0.1082E 02	1.27	89.12
16	2.50	0.40	0.1424E 02	1.67	90.79
17	2.35	0.42	0.1743E 02	2.04	92.82
18	2.22	0.45	0.1962E 02	2.29	95.12
19	2.11	0.47	0.2072E 02	2.42	97.54
20	2.00	0.50	0.2104E 02	2.46	100.00



AUTO SPECTRA

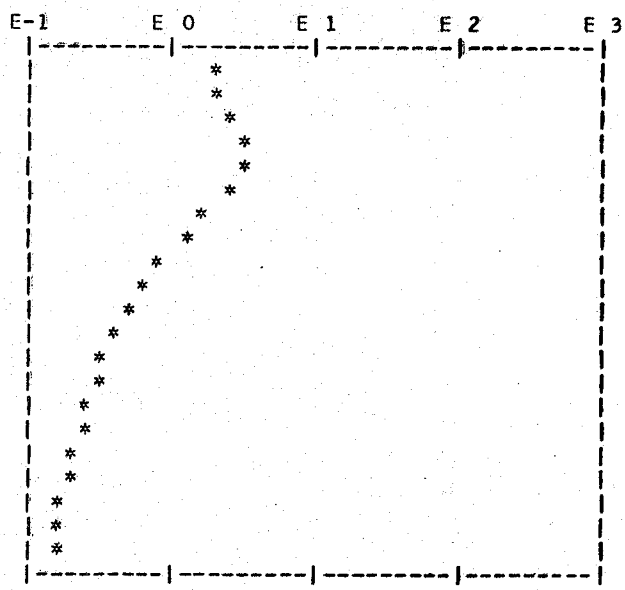
SERIES 19 IBPN

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.4913E 01	3.42	3.42
1	40.00	0.02	0.5062E 01	3.52	6.94
2	20.00	0.05	0.5495E 01	3.82	10.76
3	13.33	0.07	0.6121E 01	4.26	15.01
4	10.00	0.10	0.6647E 01	4.62	19.63
5	8.00	0.13	0.6810E 01	4.73	24.37
6	6.67	0.15	0.6766E 01	4.70	29.07
7	5.71	0.17	0.6716E 01	4.67	33.74
8	5.00	0.20	0.6713E 01	4.67	38.41
9	4.44	0.22	0.6755E 01	4.70	43.10
10	4.00	0.25	0.6832E 01	4.75	47.85
11	3.64	0.27	0.6939E 01	4.82	52.68
12	3.33	0.30	0.7074E 01	4.92	57.59
13	3.08	0.32	0.7236E 01	5.03	62.63
14	2.86	0.35	0.7418E 01	5.16	67.78
15	2.67	0.38	0.7593E 01	5.28	73.06
16	2.50	0.40	0.7724E 01	5.37	78.43
17	2.35	0.42	0.7782E 01	5.41	83.84
18	2.22	0.45	0.7774E 01	5.40	89.25
19	2.11	0.47	0.7742E 01	5.38	94.63
20	2.00	0.50	0.7726E 01	5.37	100.00



SERIES 20 LDTN

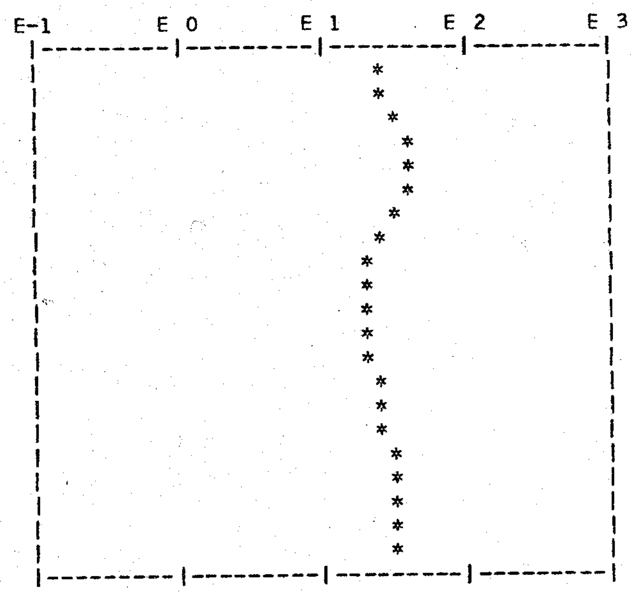
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1745E 01	8.83	8.83
1	40.00	0.02	0.1872E 01	9.48	18.31
2	20.00	0.05	0.2241E 01	11.34	29.65
3	13.33	0.07	0.2689E 01	13.61	43.26
4	10.00	0.10	0.2735E 01	13.84	57.10
5	8.00	0.13	0.2176F 01	11.01	68.11
6	6.67	0.15	0.1502E 01	7.60	75.71
7	5.71	0.17	0.1018E 01	5.15	80.87
8	5.00	0.20	0.7186E 00	3.64	84.50
9	4.44	0.22	0.5354E 00	2.71	87.21
10	4.00	0.25	0.4205E 00	2.13	89.34
11	3.64	0.27	0.3456E 00	1.75	91.09
12	3.33	0.30	0.2949E 00	1.49	92.58
13	3.08	0.32	0.2590E 00	1.31	93.89
14	2.86	0.35	0.2315E 00	1.17	95.06
15	2.67	0.38	0.2080E 00	1.05	96.12
16	2.50	0.40	0.1859E 00	0.94	97.06
17	2.35	0.42	0.1651E 00	0.84	97.89
18	2.22	0.45	0.1477E 00	0.75	98.64
19	2.11	0.47	0.1363E 00	0.69	99.33
20	2.00	0.50	0.1324E 00	0.67	100.00



AUTO SPECTRA

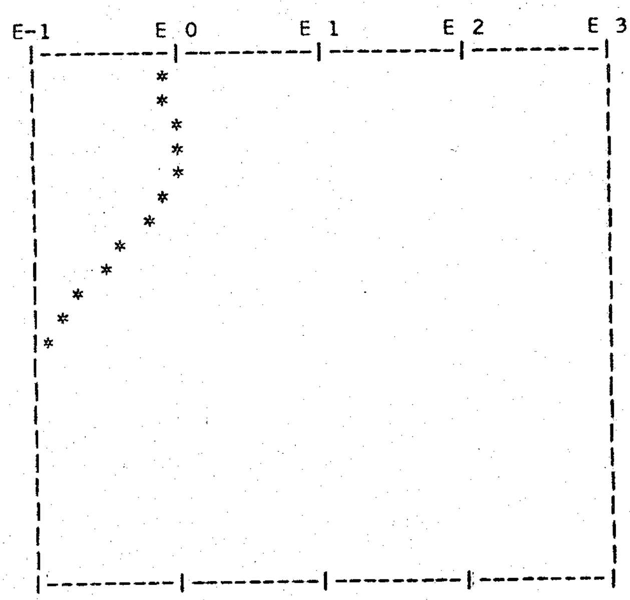
SERIES 21 NLDN

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.2354E 02	4.57	4.57
1	40.00	0.02	0.2466E 02	4.79	9.35
2	20.00	0.05	0.2808E 02	5.45	14.80
3	13.33	0.07	0.3292E 02	6.39	21.19
4	10.00	0.10	0.3530E 02	6.85	28.04
5	8.00	0.13	0.3230E 02	6.27	34.30
6	6.67	0.15	0.2714E 02	5.27	39.57
7	5.71	0.17	0.2281E 02	4.43	44.00
8	5.00	0.20	0.1986E 02	3.85	47.85
9	4.44	0.22	0.1806E 02	3.50	51.35
10	4.00	0.25	0.1724E 02	3.35	54.70
11	3.64	0.27	0.1732E 02	3.36	58.06
12	3.33	0.30	0.1825E 02	3.54	61.60
13	3.08	0.32	0.1997E 02	3.87	65.48
14	2.86	0.35	0.2223E 02	4.31	69.79
15	2.67	0.38	0.2455E 02	4.76	74.55
16	2.50	0.40	0.2624E 02	5.09	79.64
17	2.35	0.42	0.2684E 02	5.21	84.85
18	2.22	0.45	0.2652E 02	5.15	90.00
19	2.11	0.47	0.2592E 02	5.03	95.03
20	2.00	0.50	0.2564E 02	4.97	100.00



SERIES 22 BET

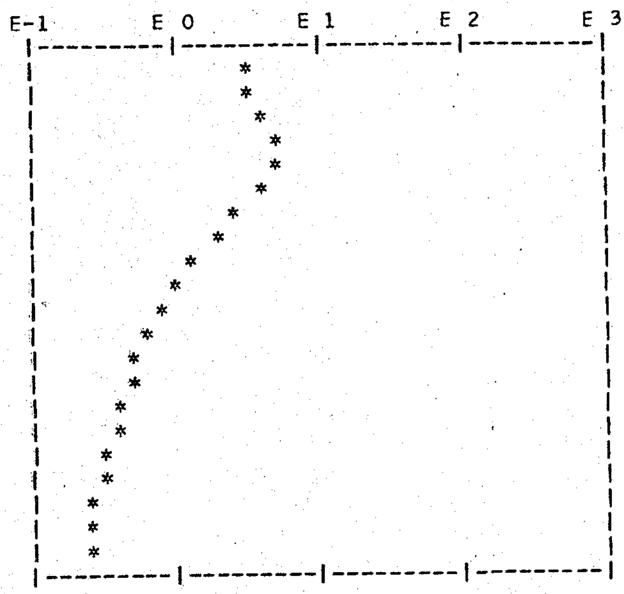
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.7071E 00	9.87	9.87
1	40.00	0.02	0.7452E 00	10.40	20.27
2	20.00	0.05	0.8541E 00	11.92	32.18
3	13.33	0.07	0.9791E 00	13.66	45.85
4	10.00	0.10	0.9675E 00	13.50	59.35
5	8.00	0.13	0.7652E 00	10.68	70.02
6	6.67	0.15	0.5329E 00	7.44	77.46
7	5.71	0.17	0.3653E 00	5.10	82.56
8	5.00	0.20	0.2579E 00	3.60	86.16
9	4.44	0.22	0.1891E 00	2.64	88.79
10	4.00	0.25	0.1435E 00	2.00	90.80
11	3.64	0.27	0.1120E 00	1.56	92.36
12	3.33	0.30	0.8953E-01	1.25	93.61
13	3.08	0.32	0.7311E-01	1.02	94.63
14	2.86	0.35	0.6138E-01	0.86	95.49
15	2.67	0.38	0.5400E-01	0.75	96.24
16	2.50	0.40	0.5092E-01	0.71	96.95
17	2.35	0.42	0.5145E-01	0.72	97.67
18	2.22	0.45	0.5387E-01	0.75	98.42
19	2.11	0.47	0.5619E-01	0.78	99.20
20	2.00	0.50	0.5711E-01	0.80	100.00



AUTO SPECTRA

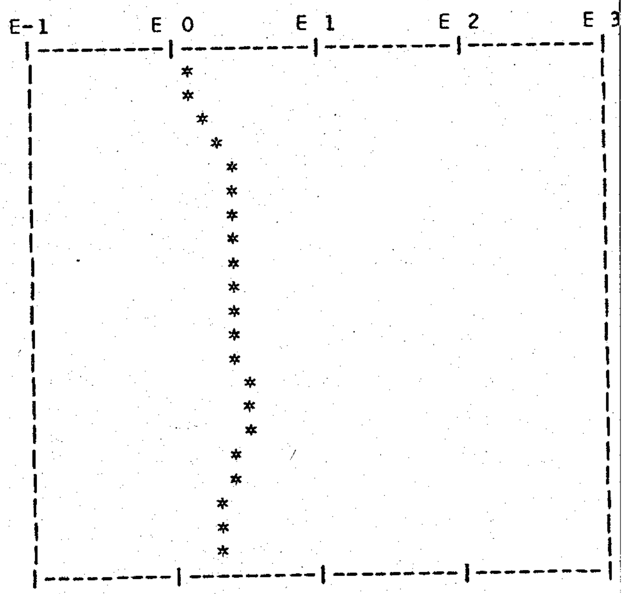
SERIES 23 LLPN

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.2853E 01	8.83	8.83
1	40.00	0.02	0.3062E 01	9.48	18.31
2	20.00	0.05	0.3664E 01	11.34	29.65
3	13.33	0.07	0.4397E 01	13.61	43.26
4	10.00	0.10	0.4473E 01	13.84	57.10
5	8.00	0.13	0.3559E 01	11.01	68.11
6	6.67	0.15	0.2456E 01	7.60	75.71
7	5.71	0.17	0.1665E 01	5.15	80.87
8	5.00	0.20	0.1175E 01	3.64	84.50
9	4.44	0.22	0.8756E 00	2.71	87.21
10	4.00	0.25	0.6876E 00	2.13	89.34
11	3.64	0.27	0.5652E 00	1.75	91.09
12	3.33	0.30	0.4823E 00	1.49	92.58
13	3.08	0.32	0.4235E 00	1.31	93.89
14	2.86	0.35	0.3786E 00	1.17	95.06
15	2.67	0.38	0.3402E 00	1.05	96.12
16	2.50	0.40	0.3040E 00	0.94	97.06
17	2.35	0.42	0.2699E 00	0.84	97.89
18	2.22	0.45	0.2416E 00	0.75	98.64
19	2.11	0.47	0.2230E 00	0.69	99.33
20	2.00	0.50	0.2165E 00	0.67	100.00



SERIES 24 LYF

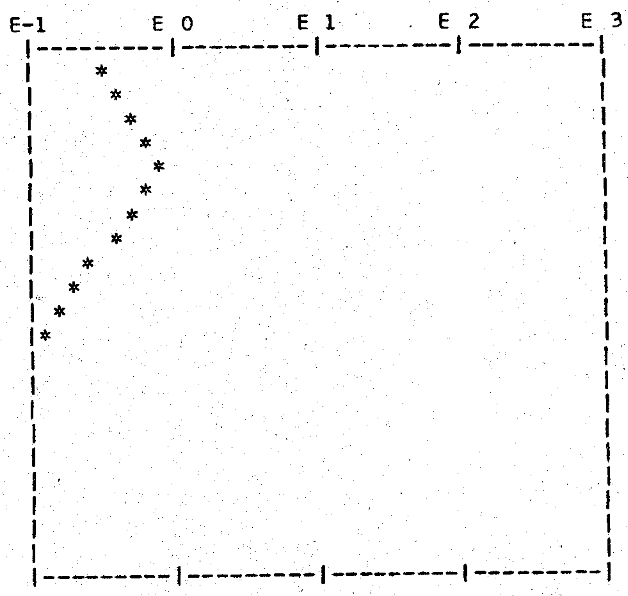
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1103E 01	2.50	2.50
1	40.00	0.02	0.1146E 01	2.59	5.09
2	20.00	0.05	0.1294E 01	2.93	8.02
3	13.33	0.07	0.1599E 01	3.62	11.63
4	10.00	0.10	0.2027E 01	4.59	16.22
5	8.00	0.13	0.2358E 01	5.34	21.56
6	6.67	0.15	0.2492F 01	5.64	27.19
7	5.71	0.17	0.2507E 01	5.67	32.87
8	5.00	0.20	0.2477E 01	5.60	38.47
9	4.44	0.22	0.2438E 01	5.52	43.99
10	4.00	0.25	0.2415E 01	5.47	49.45
11	3.64	0.27	0.2420F 01	5.48	54.93
12	3.33	0.30	0.2457E 01	5.56	60.49
13	3.08	0.32	0.2513E 01	5.69	66.18
14	2.86	0.35	0.2556E 01	5.78	71.96
15	2.67	0.38	0.2533E 01	5.73	77.69
16	2.50	0.40	0.2402E 01	5.44	83.13
17	2.35	0.42	0.2173E 01	4.92	88.05
18	2.22	0.45	0.1915E 01	4.33	92.38
19	2.11	0.47	0.1720E 01	3.89	96.27
20	2.00	0.50	0.1648E 01	3.73	100.00



AUTO SPECTRA

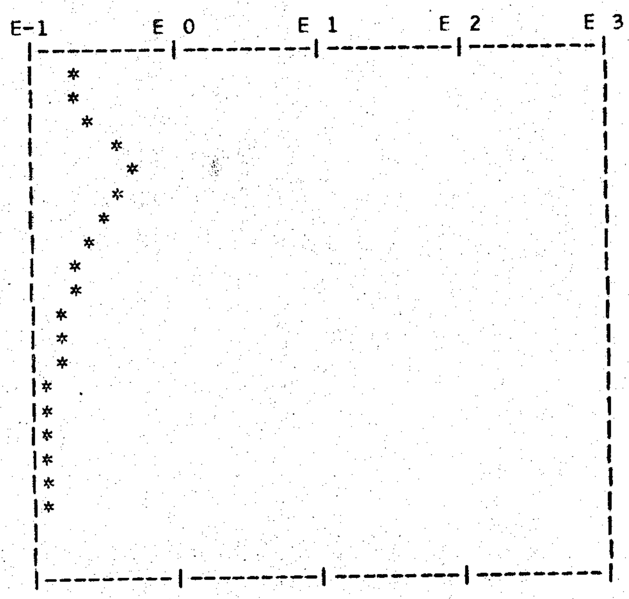
SERIES 25 PIYX

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.3089E 00	6.59	6.59
1	40.00	0.02	0.3413E 00	7.29	13.88
2	20.00	0.05	0.4426E 00	9.45	23.33
3	13.33	0.07	0.5938E 00	12.68	36.01
4	10.00	0.10	0.6804E 00	14.53	50.54
5	8.00	0.13	0.6030E 00	12.87	63.41
6	6.67	0.15	0.4537E 00	9.69	73.10
7	5.71	0.17	0.3274E 00	6.99	80.09
8	5.00	0.20	0.2400E 00	5.12	85.21
9	4.44	0.22	0.1811E 00	3.87	89.08
10	4.00	0.25	0.1398E 00	2.98	92.06
11	3.64	0.27	0.1089E 00	2.33	94.39
12	3.33	0.30	0.8439E-01	1.80	96.19
13	3.08	0.32	0.6392E-01	1.36	97.55
14	2.86	0.35	0.4649E-01	0.99	98.55
15	2.67	0.38	0.3176E-01	0.68	99.22
16	2.50	0.40	0.1980E-01	0.42	99.65
17	2.35	0.42	0.1079E-01	0.23	99.88
18	2.22	0.45	0.4650E-02	0.10	99.98
19	2.11	0.47	0.1138E-02	0.02	100.00
20	2.00	0.50	0.1145E-12	0.00	100.00



SERIES 26 PUMX

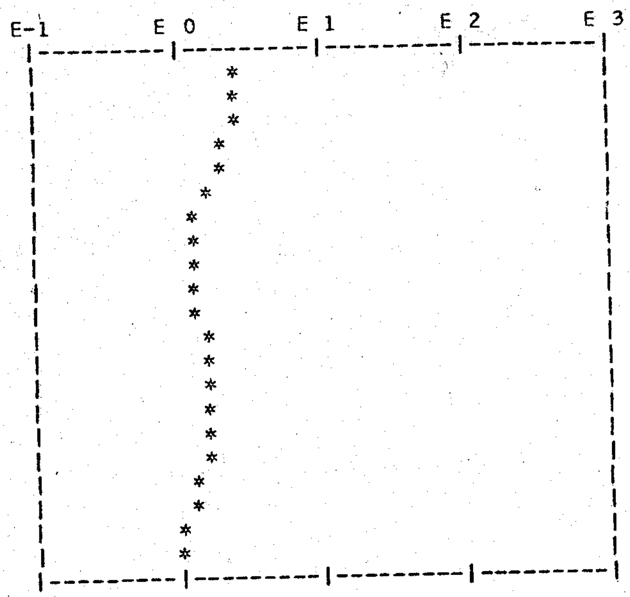
I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.1660E 00	4.22	4.22
1	40.00	0.02	0.1845E 00	4.69	8.92
2	20.00	0.05	0.2437E 00	6.20	15.12
3	13.33	0.07	0.3375E 00	8.58	23.70
4	10.00	0.10	0.4042E 00	10.28	33.98
5	8.00	0.13	0.3796E 00	9.66	43.64
6	6.67	0.15	0.3070E 00	7.81	51.45
7	5.71	0.17	0.2420E 00	6.16	57.60
8	5.00	0.20	0.1970E 00	5.01	62.62
9	4.44	0.22	0.1683E 00	4.28	66.90
10	4.00	0.25	0.1502E 00	3.82	70.72
11	3.64	0.27	0.1388E 00	3.53	74.25
12	3.33	0.30	0.1312E 00	3.34	77.59
13	3.08	0.32	0.1258E 00	3.20	80.79
14	2.86	0.35	0.1212E 00	3.08	83.87
15	2.67	0.38	0.1165E 00	2.96	86.83
16	2.50	0.40	0.1114E 00	2.83	89.67
17	2.35	0.42	0.1064E 00	2.71	92.37
18	2.22	0.45	0.1021E 00	2.60	94.97
19	2.11	0.47	0.9934E-01	2.53	97.50
20	2.00	0.50	0.9841E-01	2.50	100.00



AUTO SPECTRA

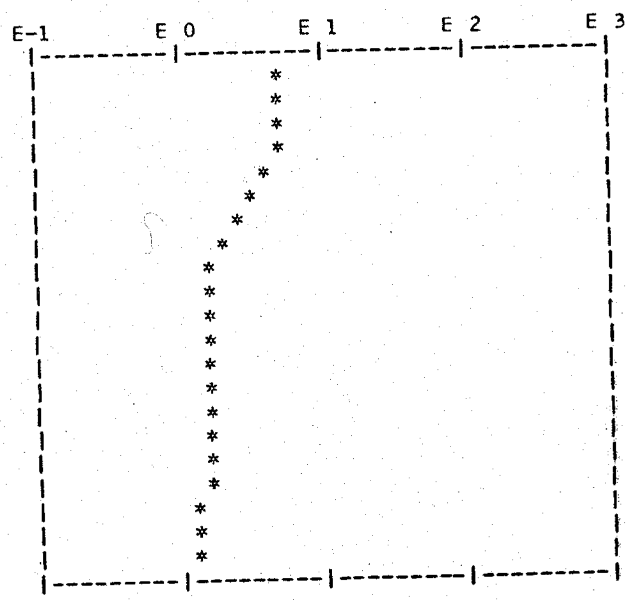
SERIES 27 YBFR

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.2256E 01	7.46	7.46
1	40.00	0.02	0.2239E 01	7.40	14.87
2	20.00	0.05	0.2158E 01	7.14	22.00
3	13.33	0.07	0.1942E 01	6.42	28.43
4	10.00	0.10	0.1605E 01	5.31	33.73
5	8.00	0.13	0.1349E 01	4.46	38.19
6	6.67	0.15	0.1255E 01	4.15	42.34
7	5.71	0.17	0.1235E 01	4.08	46.43
8	5.00	0.20	0.1230E 01	4.07	50.49
9	4.44	0.22	0.1230E 01	4.07	54.56
10	4.00	0.25	0.1242E 01	4.11	58.67
11	3.64	0.27	0.1275E 01	4.22	62.89
12	3.33	0.30	0.1330E 01	4.40	67.28
13	3.08	0.32	0.1397E 01	4.62	71.90
14	2.86	0.35	0.1453E 01	4.81	76.71
15	2.67	0.38	0.1462E 01	4.84	81.54
16	2.50	0.40	0.1393E 01	4.61	86.15
17	2.35	0.42	0.1250E 01	4.13	90.28
18	2.22	0.45	0.1082E 01	3.58	93.86
19	2.11	0.47	0.9522E 00	3.15	97.01
20	2.00	0.50	0.9044E 00	2.99	100.00



SERIES 28 YFBR

I	T(I)	L(I)	POWER	%	SUM %
0	999.99	0.0	0.4640E 01	9.96	9.96
1	40.00	0.02	0.4699E 01	10.08	20.04
2	20.00	0.05	0.4801E 01	10.30	30.35
3	13.33	0.07	0.4663E 01	10.01	40.36
4	10.00	0.10	0.3927E 01	8.43	48.78
5	8.00	0.13	0.2888E 01	6.20	54.98
6	6.67	0.15	0.2135E 01	4.58	59.57
7	5.71	0.17	0.1720E 01	3.69	63.26
8	5.00	0.20	0.1497E 01	3.21	66.47
9	4.44	0.22	0.1374E 01	2.95	69.42
10	4.00	0.25	0.1313E 01	2.82	72.24
11	3.64	0.27	0.1299E 01	2.79	75.03
12	3.33	0.30	0.1324E 01	2.84	77.87
13	3.08	0.32	0.1375E 01	2.95	80.82
14	2.86	0.35	0.1429E 01	3.07	83.89
15	2.67	0.38	0.1452E 01	3.12	87.01
16	2.50	0.40	0.1415E 01	3.04	90.04
17	2.35	0.42	0.1314E 01	2.82	92.86
18	2.22	0.45	0.1188E 01	2.55	95.41
19	2.11	0.47	0.1088E 01	2.33	97.75
20	2.00	0.50	0.1050E 01	2.25	100.00



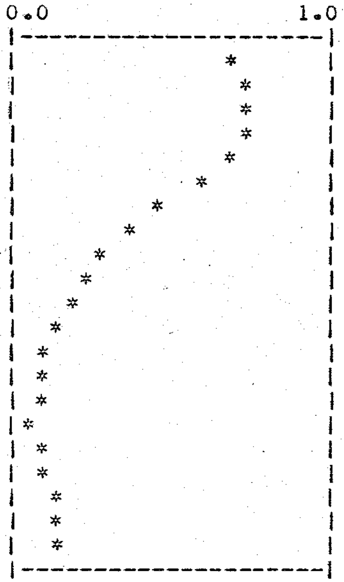
APPENDIX 2

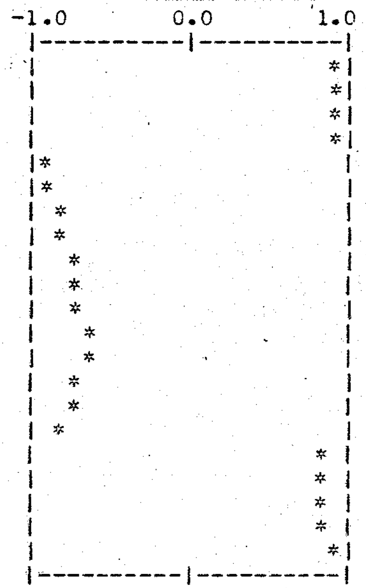
CROSS SPECTRA BETWEEN
REAL GROSS NATIONAL PRODUCT AND
ENDOGENOUS VARIABLES

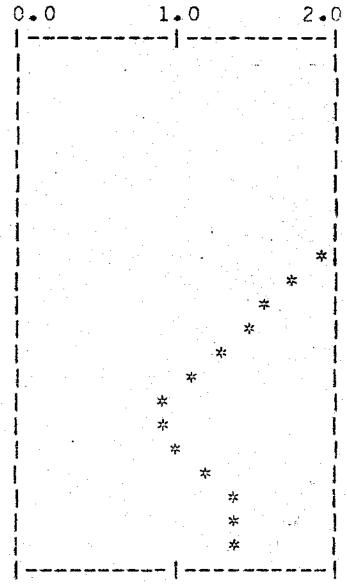
CROSS SP..TRA

SERIES 15 YMBR AND SERIES 1 ALO

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.724	1.000	3.944
1	40.00	0.02	0.728	0.990	3.893
2	20.00	0.05	0.736	0.985	3.734
3	13.33	0.07	0.733	0.989	3.468
4	10.00	0.10	0.691	-0.992	3.120
5	8.00	0.13	0.592	-0.957	2.757
6	6.67	0.15	0.461	-0.911	2.444
7	5.71	0.17	0.344	-0.862	2.197
8	5.00	0.20	0.256	-0.818	1.994
9	4.44	0.22	0.191	-0.783	1.813
10	4.00	0.25	0.143	-0.756	1.643
11	3.64	0.27	0.105	-0.738	1.479
12	3.33	0.30	0.074	-0.734	1.309
13	3.08	0.32	0.049	-0.751	1.121
14	2.86	0.35	0.031	-0.812	0.933
15	2.67	0.38	0.025	-0.934	0.851
16	2.50	0.40	0.034	0.947	0.982
17	2.35	0.42	0.055	0.901	1.202
18	2.22	0.45	0.079	0.909	1.360
19	2.11	0.47	0.097	0.947	1.430
20	2.00	0.50	0.104	1.000	1.446

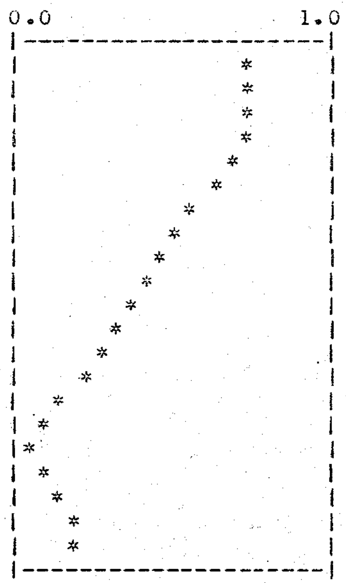


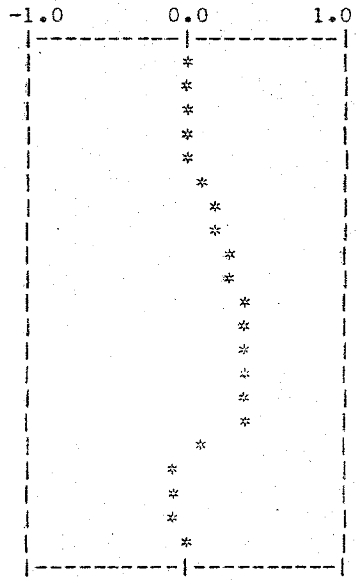


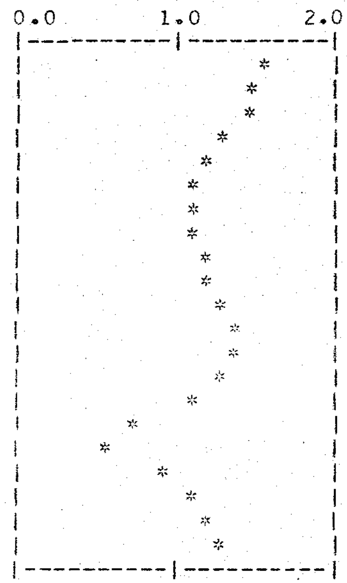


SERIES 15 YMBR AND SERIES 2 BEP

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.728	0.0	1.560
1	40.00	0.02	0.734	-0.005	1.534
2	20.00	0.05	0.746	-0.005	1.461
3	13.33	0.07	0.750	0.007	1.348
4	10.00	0.10	0.722	0.038	1.222
5	8.00	0.13	0.653	0.091	1.120
6	6.67	0.15	0.569	0.159	1.077
7	5.71	0.17	0.503	0.227	1.099
8	5.00	0.20	0.457	0.285	1.162
9	4.44	0.22	0.416	0.331	1.241
10	4.00	0.25	0.372	0.367	1.316
11	3.64	0.27	0.318	0.397	1.371
12	3.33	0.30	0.253	0.422	1.331
13	3.08	0.32	0.177	0.438	1.301
14	2.86	0.35	0.096	0.435	1.067
15	2.67	0.38	0.033	0.359	0.677
16	2.50	0.40	0.019	0.052	0.516
17	2.35	0.42	0.056	-0.111	0.856
18	2.22	0.45	0.113	-0.110	1.127
19	2.11	0.47	0.156	-0.063	1.240
20	2.00	0.50	0.171	-0.000	1.266



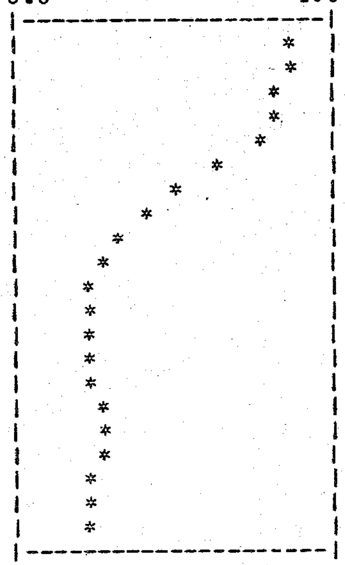


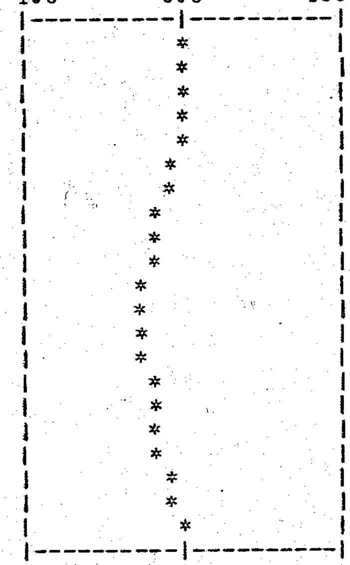


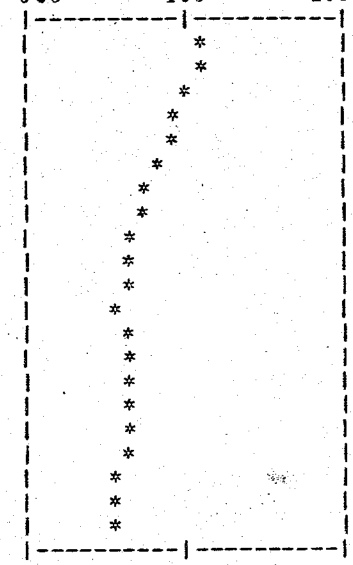
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 3 CTPN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.888	0.0	1.068
1	40.00	0.02	0.884	-0.010	1.053
2	20.00	0.05	0.871	-0.019	1.009
3	13.33	0.07	0.843	-0.028	0.942
4	10.00	0.10	0.783	-0.041	0.863
5	8.00	0.13	0.669	-0.066	0.783
6	6.67	0.15	0.524	-0.105	0.712
7	5.71	0.17	0.397	-0.154	0.654
8	5.00	0.20	0.310	-0.205	0.611
9	4.44	0.22	0.255	-0.247	0.580
10	4.00	0.25	0.221	-0.273	0.559
11	3.64	0.27	0.202	-0.282	0.550
12	3.33	0.30	0.195	-0.276	0.554
13	3.08	0.32	0.200	-0.260	0.571
14	2.86	0.35	0.213	-0.239	0.595
15	2.67	0.38	0.228	-0.217	0.611
16	2.50	0.40	0.237	-0.194	0.604
17	2.35	0.42	0.233	-0.164	0.571
18	2.22	0.45	0.217	-0.124	0.522
19	2.11	0.47	0.200	-0.069	0.479
20	2.00	0.50	0.192	-0.000	0.462

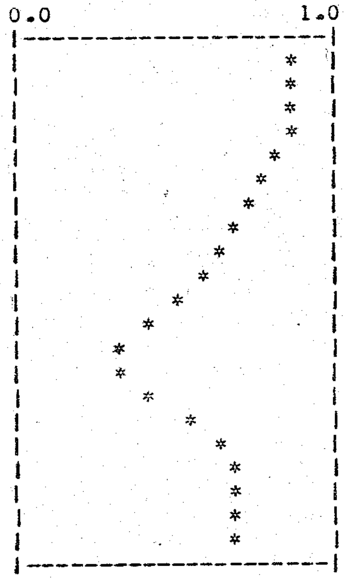


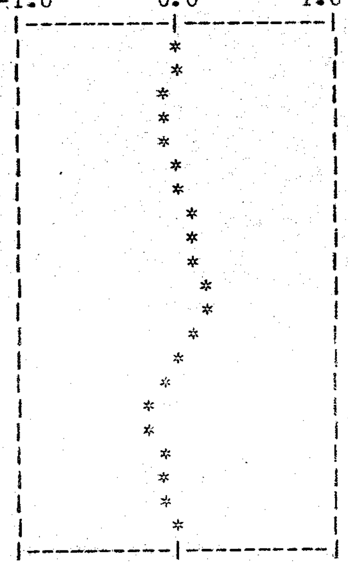


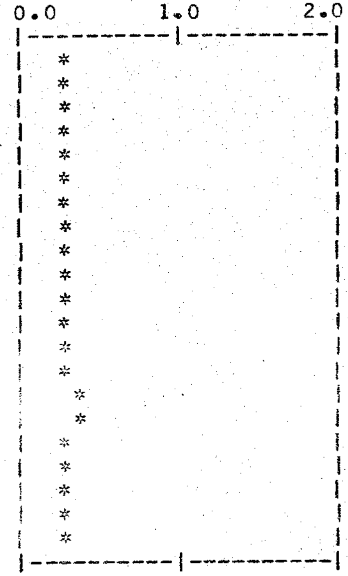


SERIES 15 YMBR AND SERIES 4 IAPR

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.892	0.0	0.247
1	40.00	0.02	0.893	-0.028	0.243
2	20.00	0.05	0.894	-0.052	0.232
3	13.33	0.07	0.889	-0.067	0.212
4	10.00	0.10	0.867	-0.065	0.190
5	8.00	0.13	0.819	-0.039	0.172
6	6.67	0.15	0.755	0.005	0.163
7	5.71	0.17	0.696	0.055	0.164
8	5.00	0.20	0.642	0.102	0.173
9	4.44	0.22	0.586	0.142	0.187
10	4.00	0.25	0.513	0.169	0.204
11	3.64	0.27	0.414	0.169	0.219
12	3.33	0.30	0.306	0.109	0.222
13	3.08	0.32	0.279	-0.030	0.229
14	2.86	0.35	0.392	-0.146	0.255
15	2.67	0.38	0.538	-0.184	0.258
16	2.50	0.40	0.636	-0.178	0.238
17	2.35	0.42	0.684	-0.150	0.213
18	2.22	0.45	0.702	-0.108	0.192
19	2.11	0.47	0.704	-0.057	0.178
20	2.00	0.50	0.703	-0.000	0.174







CROSS SPECTRA

SERIES 15 YMBR AND SERIES 5 IBPR

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.171	0.0	0.467
1	40.00	0.02	0.182	-0.026	0.479
2	20.00	0.05	0.214	-0.043	0.506
3	13.33	0.07	0.256	-0.049	0.518
4	10.00	0.10	0.274	-0.044	0.471
5	8.00	0.13	0.239	-0.028	0.371
6	6.67	0.15	0.171	0.002	0.271
7	5.71	0.17	0.109	0.053	0.195
8	5.00	0.20	0.068	0.132	0.144
9	4.44	0.22	0.048	0.245	0.117
10	4.00	0.25	0.046	0.373	0.111
11	3.64	0.27	0.058	0.483	0.123
12	3.33	0.30	0.082	0.566	0.146
13	3.08	0.32	0.117	0.629	0.174
14	2.86	0.35	0.160	0.683	0.203
15	2.67	0.38	0.204	0.733	0.226
16	2.50	0.40	0.243	0.782	0.239
17	2.35	0.42	0.270	0.832	0.239
18	2.22	0.45	0.285	0.886	0.232
19	2.11	0.47	0.291	0.942	0.224
20	2.00	0.50	0.292	1.000	0.221

SERIES 15 YMBR AND SERIES 6 ILDN

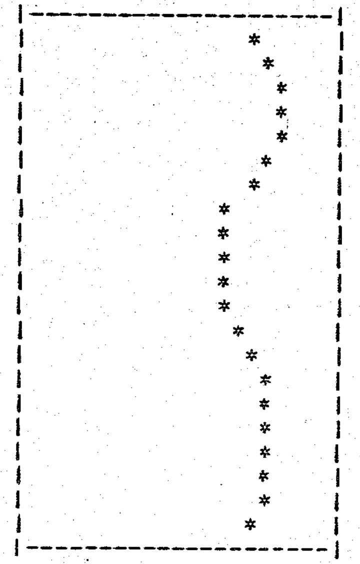
I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.870	0.0	2.454
1	40.00	0.02	0.873	-0.053	2.429
2	20.00	0.05	0.882	-0.104	2.351
3	13.33	0.07	0.888	-0.150	2.214
4	10.00	0.10	0.882	-0.187	2.021
5	8.00	0.13	0.859	-0.214	1.801
6	6.67	0.15	0.832	-0.230	1.602
7	5.71	0.17	0.813	-0.237	1.444
8	5.00	0.20	0.804	-0.239	1.322
9	4.44	0.22	0.803	-0.236	1.225
10	4.00	0.25	0.807	-0.231	1.147
11	3.64	0.27	0.817	-0.225	1.083
12	3.33	0.30	0.831	-0.220	1.027
13	3.08	0.32	0.847	-0.214	0.969
14	2.86	0.35	0.863	-0.207	0.904
15	2.67	0.38	0.876	-0.196	0.830
16	2.50	0.40	0.883	-0.178	0.751
17	2.35	0.42	0.883	-0.150	0.676
18	2.22	0.45	0.878	-0.110	0.613
19	2.11	0.47	0.872	-0.059	0.571
20	2.00	0.50	0.869	-0.000	0.557

CROSS SPECTRA

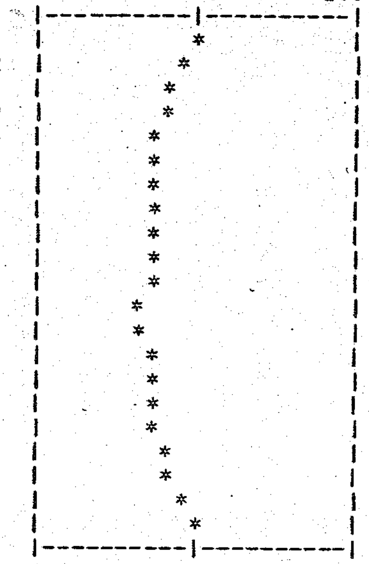
SERIES 15 YMBR AND SERIES 7 IMIN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.770	0.0	0.872
1	40.00	0.02	0.791	-0.102	0.836
2	20.00	0.05	0.833	-0.180	0.744
3	13.33	0.07	0.859	-0.229	0.628
4	10.00	0.10	0.851	-0.256	0.520
5	8.00	0.13	0.803	-0.273	0.439
6	6.67	0.15	0.733	-0.288	0.385
7	5.71	0.17	0.673	-0.305	0.354
8	5.00	0.20	0.637	-0.322	0.336
9	4.44	0.22	0.628	-0.338	0.324
10	4.00	0.25	0.642	-0.350	0.314
11	3.64	0.27	0.672	-0.356	0.303
12	3.33	0.30	0.712	-0.355	0.286
13	3.08	0.32	0.752	-0.346	0.264
14	2.86	0.35	0.784	-0.328	0.238
15	2.67	0.38	0.805	-0.300	0.211
16	2.50	0.40	0.813	-0.263	0.185
17	2.35	0.42	0.809	-0.214	0.162
18	2.22	0.45	0.795	-0.154	0.144
19	2.11	0.47	0.781	-0.081	0.133
20	2.00	0.50	0.774	-0.000	0.129

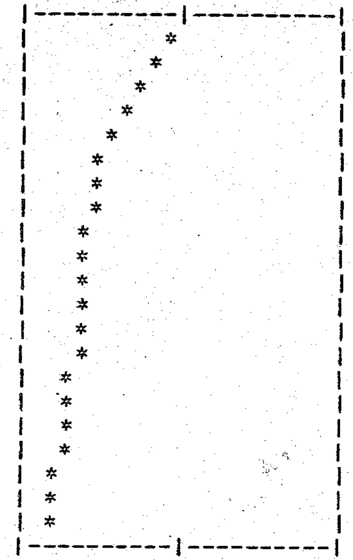
COHERENCE 0.0 1.0



PHASE -1.0 0.0 1.0



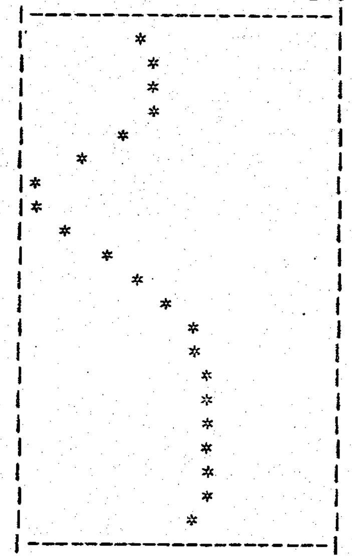
GAIN 0.0 1.0 2.0



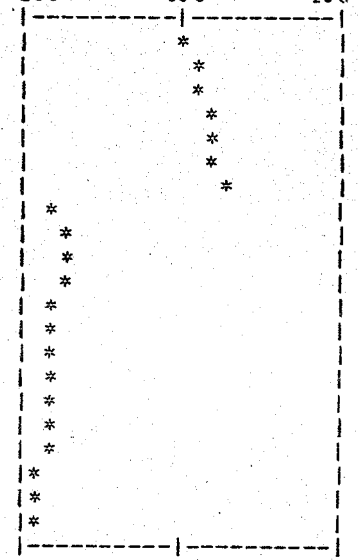
SERIES 15 YMBR AND SERIES 8 LBPN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.375	0.0	1.127
1	40.00	0.02	0.381	0.062	1.109
2	20.00	0.05	0.394	0.120	1.052
3	13.33	0.07	0.386	0.167	0.945
4	10.00	0.10	0.308	0.203	0.768
5	8.00	0.13	0.152	0.233	0.511
6	6.67	0.15	0.022	0.301	0.195
7	5.71	0.17	0.015	-0.913	0.169
8	5.00	0.20	0.108	-0.843	0.488
9	4.44	0.22	0.238	-0.838	0.774
10	4.00	0.25	0.360	-0.842	1.019
11	3.64	0.27	0.457	-0.851	1.230
12	3.33	0.30	0.526	-0.861	1.416
13	3.08	0.32	0.570	-0.875	1.582
14	2.86	0.35	0.595	-0.891	1.724
15	2.67	0.38	0.605	-0.909	1.829
16	2.50	0.40	0.603	-0.929	1.882
17	2.35	0.42	0.595	-0.949	1.878
18	2.22	0.45	0.585	-0.969	1.835
19	2.11	0.47	0.577	-0.985	1.787
20	2.00	0.50	0.575	-1.000	1.767

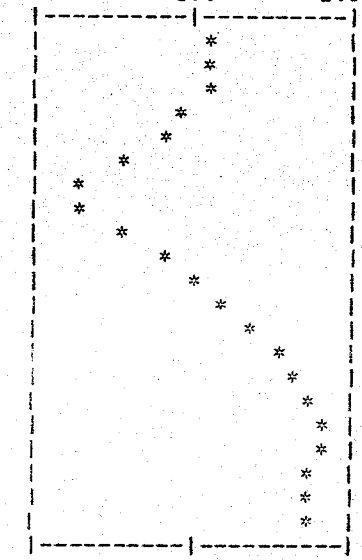
COHERENCE 0.0 1.0



PHASE -1.0 0.0 1.0



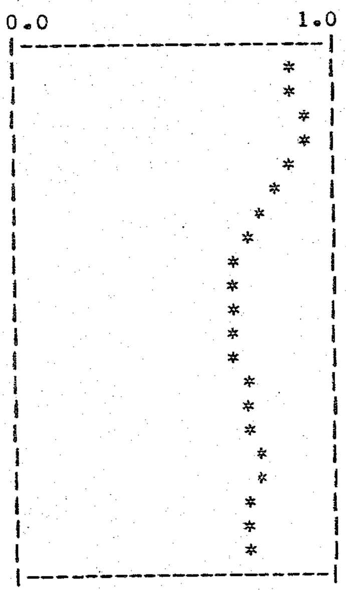
GAIN 0.0 1.0 2.0

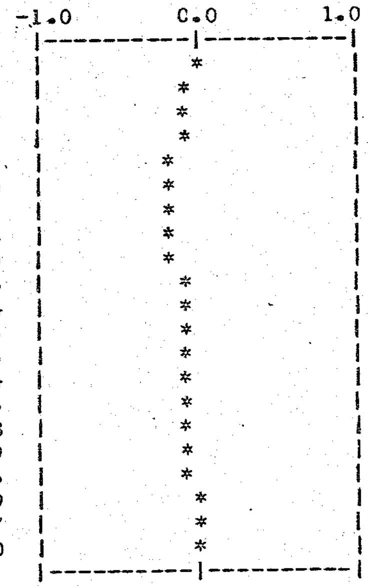


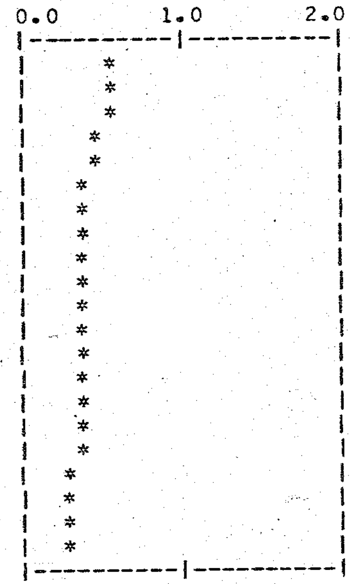
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 9 NLPN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.919	0.0	0.521
1	40.00	0.02	0.922	-0.053	0.513
2	20.00	0.05	0.927	-0.104	0.488
3	13.33	0.07	0.926	-0.148	0.444
4	10.00	0.10	0.909	-0.179	0.390
5	8.00	0.13	0.866	-0.190	0.341
6	6.67	0.15	0.805	-0.186	0.308
7	5.71	0.17	0.747	-0.173	0.291
8	5.00	0.20	0.705	-0.160	0.282
9	4.44	0.22	0.682	-0.146	0.279
10	4.00	0.25	0.676	-0.134	0.278
11	3.64	0.27	0.684	-0.123	0.278
12	3.33	0.30	0.704	-0.113	0.277
13	3.08	0.32	0.729	-0.104	0.274
14	2.86	0.35	0.753	-0.096	0.269
15	2.67	0.38	0.771	-0.088	0.262
16	2.50	0.40	0.779	-0.079	0.251
17	2.35	0.42	0.777	-0.066	0.239
18	2.22	0.45	0.767	-0.049	0.227
19	2.11	0.47	0.755	-0.027	0.218
20	2.00	0.50	0.750	-0.000	0.215

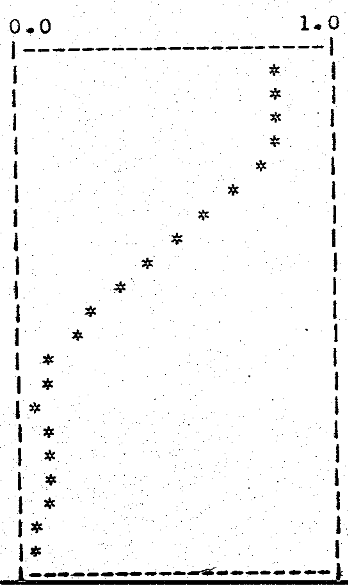


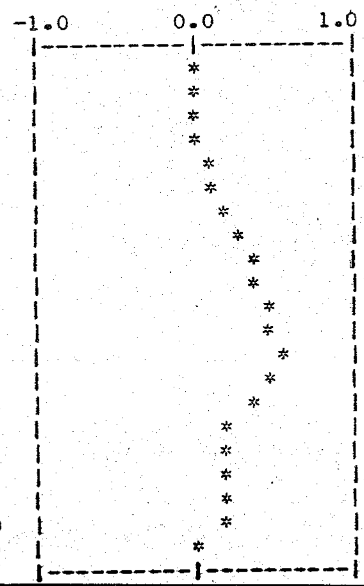


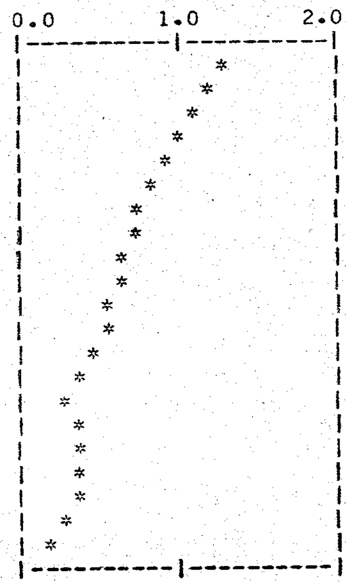


SERIES 15 YMBR AND SERIES 10 PIAX

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.855	0.0	1.254
1	40.00	0.02	0.854	0.012	1.227
2	20.00	0.05	0.851	0.026	1.149
3	13.33	0.07	0.837	0.047	1.034
4	10.00	0.10	0.794	0.081	0.905
5	8.00	0.13	0.708	0.134	0.790
6	6.67	0.15	0.594	0.204	0.708
7	5.71	0.17	0.483	0.283	0.658
8	5.00	0.20	0.386	0.360	0.624
9	4.44	0.22	0.295	0.431	0.588
10	4.00	0.25	0.208	0.493	0.537
11	3.64	0.27	0.129	0.540	0.462
12	3.33	0.30	0.067	0.556	0.364
13	3.08	0.32	0.030	0.504	0.264
14	2.86	0.35	0.019	0.354	0.228
15	2.67	0.38	0.027	0.240	0.278
16	2.50	0.40	0.036	0.211	0.328
17	2.35	0.42	0.036	0.215	0.325
18	2.22	0.45	0.025	0.216	0.268
19	2.11	0.47	0.013	0.170	0.187
20	2.00	0.50	0.008	0.000	0.142







CROSS SPECTRA

SERIES 15 YMBR AND SERIES 11 PIBX

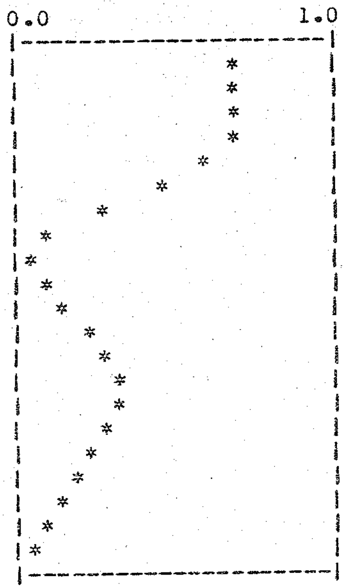
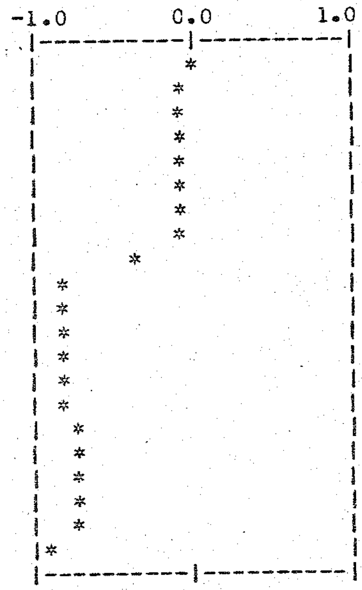
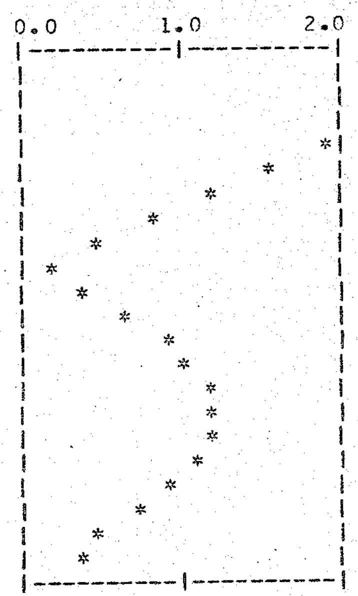
I	T(I)	L(I)	COHERENCE (0.0 – 1.0)	PHASE (-1.0 – 0.0 – 1.0)	GAIN (0.0 – 1.0 – 2.0)
0	999.99	0.0	0.037	0.0	0.210
1	40.00	0.02	0.038	0.011	0.217
2	20.00	0.05	0.042	0.014	0.234
3	13.33	0.07	0.044	0.010	0.246
4	10.00	0.10	0.038	0.010	0.223
5	8.00	0.13	0.026	0.038	0.168
6	6.67	0.15	0.016	0.110	0.122
7	5.71	0.17	0.012	0.212	0.102
8	5.00	0.20	0.012	0.305	0.101
9	4.44	0.22	0.014	0.370	0.110
10	4.00	0.25	0.017	0.410	0.125
11	3.64	0.27	0.021	0.433	0.142
12	3.33	0.30	0.024	0.444	0.161
13	3.08	0.32	0.026	0.449	0.177
14	2.86	0.35	0.026	0.449	0.186
15	2.67	0.38	0.023	0.445	0.182
16	2.50	0.40	0.017	0.435	0.161
17	2.35	0.42	0.011	0.415	0.125
18	2.22	0.45	0.005	0.373	0.085
19	2.11	0.47	0.002	0.272	0.050
20	2.00	0.50	0.001	0.000	0.033

SERIES 15 YMBR AND SERIES 12 PV2X

I	T(I)	L(I)	COHERENCE (0.0 – 1.0)	PHASE (-1.0 – 0.0 – 1.0)	GAIN (0.0 – 1.0 – 2.0)
0	999.99	0.0	0.376	0.0	2.879
1	40.00	0.02	0.375	0.028	2.847
2	20.00	0.05	0.366	0.056	2.738
3	13.33	0.07	0.333	0.080	2.491
4	10.00	0.10	0.238	0.083	1.982
5	8.00	0.13	0.098	0.021	1.199
6	6.67	0.15	0.030	-0.286	0.636
7	5.71	0.17	0.078	-0.597	1.014
8	5.00	0.20	0.170	-0.688	1.480
9	4.44	0.22	0.245	-0.732	1.766
10	4.00	0.25	0.286	-0.763	1.917
11	3.64	0.27	0.300	-0.789	1.989
12	3.33	0.30	0.296	-0.812	2.023
13	3.08	0.32	0.282	-0.834	2.037
14	2.86	0.35	0.266	-0.857	2.033
15	2.67	0.38	0.249	-0.880	2.001
16	2.50	0.40	0.234	-0.905	1.930
17	2.35	0.42	0.222	-0.930	1.826
18	2.22	0.45	0.214	-0.955	1.716
19	2.11	0.47	0.210	-0.978	1.633
20	2.00	0.50	0.208	-1.000	1.603

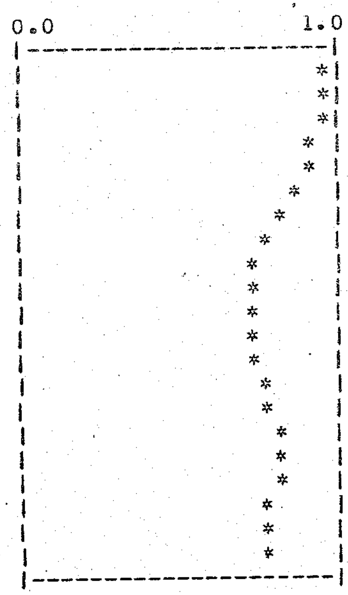
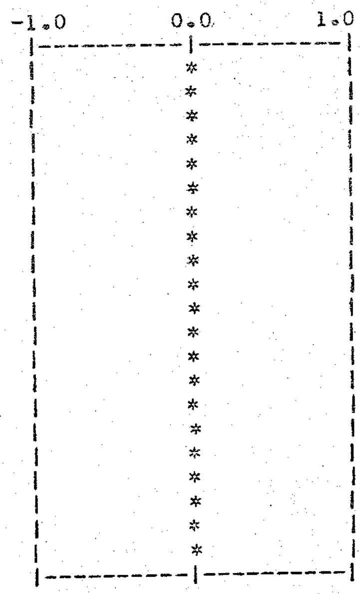
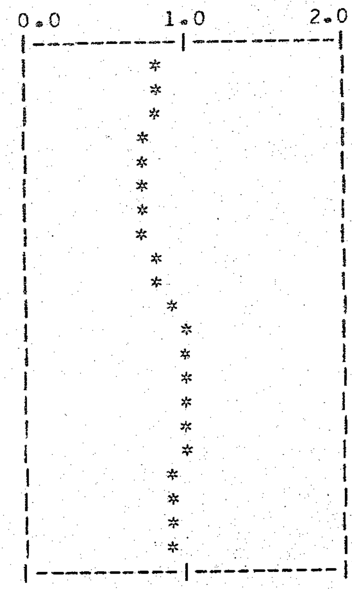
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 13 PYMX

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.694	0.0	2.891
1	40.00	0.02	0.703	-0.057	2.777
2	20.00	0.05	0.715	-0.098	2.462
3	13.33	0.07	0.698	-0.116	2.039
4	10.00	0.10	0.617	-0.118	1.607
5	8.00	0.13	0.445	-0.111	1.208
6	6.67	0.15	0.228	-0.109	0.826
7	5.71	0.17	0.065	-0.135	0.446
8	5.00	0.20	0.005	-0.422	0.130
9	4.44	0.22	0.032	-0.898	0.337
10	4.00	0.25	0.106	-0.937	0.631
11	3.64	0.27	0.187	-0.935	0.869
12	3.33	0.30	0.251	-0.919	1.044
13	3.08	0.32	0.286	-0.895	1.160
14	2.86	0.35	0.291	-0.865	1.216
15	2.67	0.38	0.269	-0.832	1.202
16	2.50	0.40	0.223	-0.798	1.104
17	2.35	0.42	0.161	-0.771	0.924
18	2.22	0.45	0.094	-0.763	0.688
19	2.11	0.47	0.043	-0.812	0.450
20	2.00	0.50	0.023	-1.000	0.327

SERIES 15 YMBR AND SERIES 14 YMBN

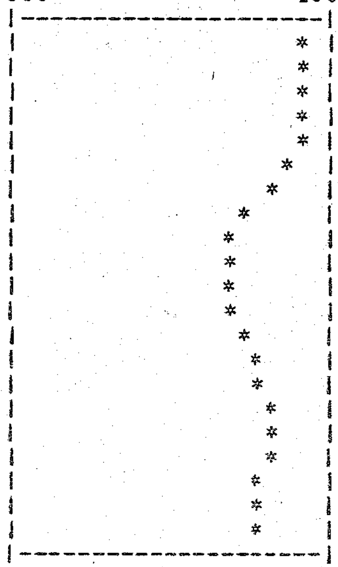




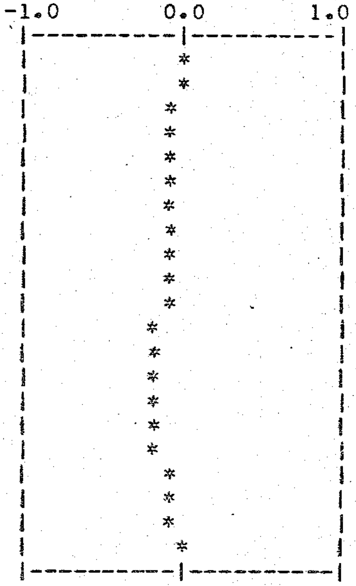
I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.984	0.0	0.793
1	40.00	0.02	0.983	-0.011	0.786
2	20.00	0.05	0.980	-0.022	0.766
3	13.33	0.07	0.972	-0.029	0.733
4	10.00	0.10	0.953	-0.032	0.698
5	8.00	0.13	0.915	-0.030	0.677
6	6.67	0.15	0.861	-0.023	0.682
7	5.71	0.17	0.808	-0.017	0.712
8	5.00	0.20	0.771	-0.012	0.763
9	4.44	0.22	0.750	-0.011	0.825
10	4.00	0.25	0.746	-0.012	0.893
11	3.64	0.27	0.756	-0.018	0.957
12	3.33	0.30	0.775	-0.025	1.006
13	3.08	0.32	0.797	-0.033	1.033
14	2.86	0.35	0.816	-0.040	1.036
15	2.67	0.38	0.830	-0.044	1.019
16	2.50	0.40	0.834	-0.045	0.986
17	2.35	0.42	0.830	-0.042	0.946
18	2.22	0.45	0.819	-0.033	0.906
19	2.11	0.47	0.807	-0.018	0.875
20	2.00	0.50	0.802	-0.000	0.864

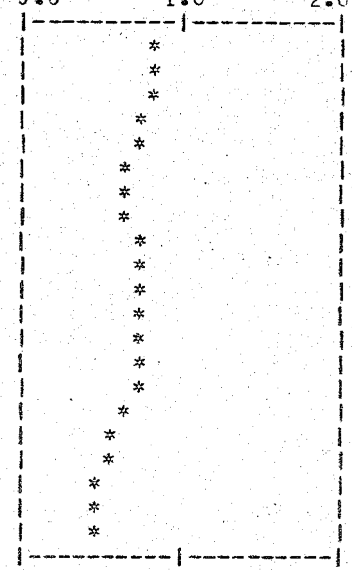
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 16 UMSN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.974	0.0	0.838
1	40.00	0.02	0.973	-0.027	0.827
2	20.00	0.05	0.970	-0.052	0.795
3	13.33	0.07	0.961	-0.073	0.745
4	10.00	0.10	0.939	-0.087	0.691
5	8.00	0.13	0.892	-0.094	0.650
6	6.67	0.15	0.826	-0.099	0.634
7	5.71	0.17	0.762	-0.105	0.641
8	5.00	0.20	0.716	-0.115	0.664
9	4.44	0.22	0.692	-0.129	0.694
10	4.00	0.25	0.691	-0.146	0.725
11	3.64	0.27	0.710	-0.164	0.746
12	3.33	0.30	0.742	-0.180	0.747
13	3.08	0.32	0.778	-0.192	0.722
14	2.86	0.35	0.808	-0.195	0.674
15	2.67	0.38	0.829	-0.190	0.612
16	2.50	0.40	0.837	-0.175	0.548
17	2.35	0.42	0.834	-0.148	0.488
18	2.22	0.45	0.824	-0.109	0.440
19	2.11	0.47	0.812	-0.058	0.408
20	2.00	0.50	0.806	-0.000	0.396

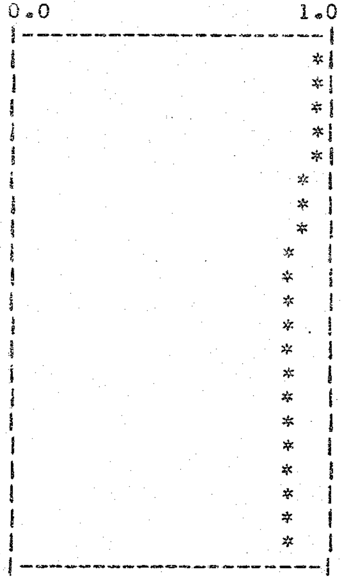


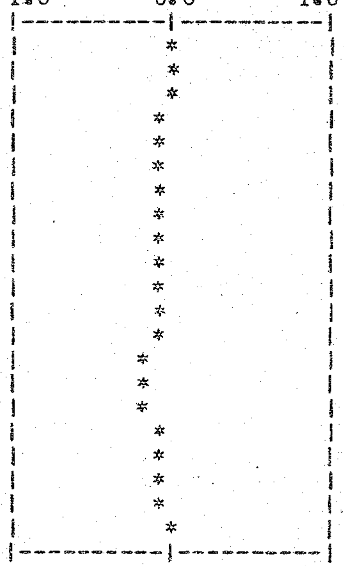


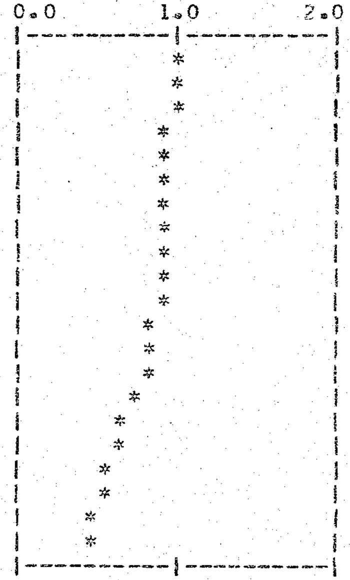


SERIES 15 YMBR AND SERIES 17 UMSR

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.988	0.0	1.002
1	40.00	0.02	0.988	-0.021	0.996
2	20.00	0.05	0.988	-0.042	0.977
3	13.33	0.07	0.985	-0.062	0.946
4	10.00	0.10	0.979	-0.078	0.907
5	8.00	0.13	0.965	-0.090	0.874
6	6.67	0.15	0.944	-0.097	0.857
7	5.71	0.17	0.925	-0.102	0.855
8	5.00	0.20	0.912	-0.108	0.859
9	4.44	0.22	0.905	-0.114	0.861
10	4.00	0.25	0.902	-0.123	0.856
11	3.64	0.27	0.904	-0.133	0.841
12	3.33	0.30	0.909	-0.144	0.811
13	3.08	0.32	0.914	-0.153	0.766
14	2.86	0.35	0.919	-0.158	0.708
15	2.67	0.38	0.921	-0.157	0.643
16	2.50	0.40	0.920	-0.147	0.578
17	2.35	0.42	0.914	-0.127	0.519
18	2.22	0.45	0.905	-0.094	0.471
19	2.11	0.47	0.897	-0.051	0.439
20	2.00	0.50	0.893	-0.000	0.428







CROSS SPECTRA

SERIES 15 YMBR AND SERIES 18 IAPN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.910	0.0	0.212
1	40.00	0.02	0.910	-0.021	0.209
2	20.00	0.05	0.909	-0.040	0.198
3	13.33	0.07	0.901	-0.049	0.182
4	10.00	0.10	0.876	-0.042	0.163
5	8.00	0.13	0.824	-0.013	0.149
6	6.67	0.15	0.757	0.034	0.142
7	5.71	0.17	0.692	0.087	0.144
8	5.00	0.20	0.633	0.136	0.152
9	4.44	0.22	0.569	0.178	0.164
10	4.00	0.25	0.488	0.207	0.178
11	3.64	0.27	0.378	0.209	0.187
12	3.33	0.30	0.259	0.150	0.182
13	3.08	0.32	0.222	-0.001	0.183
14	2.86	0.35	0.327	-0.129	0.213
15	2.67	0.38	0.479	-0.170	0.227
16	2.50	0.40	0.587	-0.166	0.216
17	2.35	0.42	0.645	-0.140	0.197
18	2.22	0.45	0.668	-0.101	0.180
19	2.11	0.47	0.674	-0.053	0.168
20	2.00	0.50	0.674	-0.000	0.164

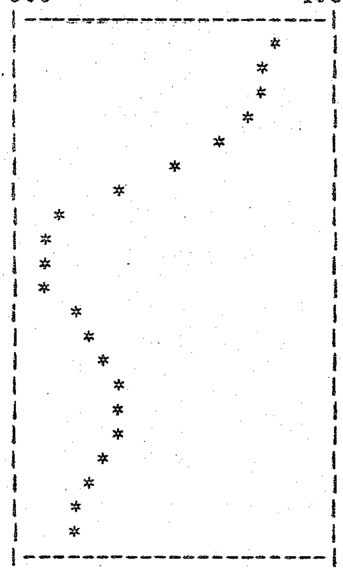
SERIES 15 YMBR AND SERIES 19 IBPN

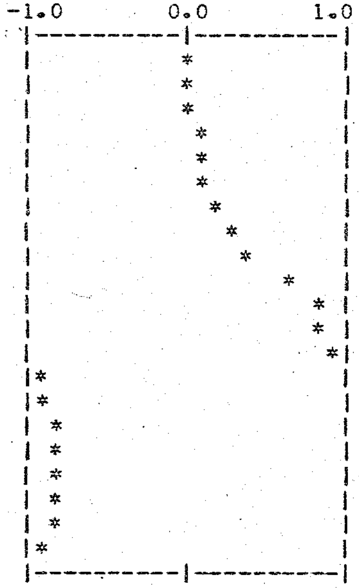
I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.223	0.0	0.411
1	40.00	0.02	0.231	-0.014	0.414
2	20.00	0.05	0.252	-0.026	0.420
3	13.33	0.07	0.274	-0.034	0.409
4	10.00	0.10	0.269	-0.032	0.357
5	8.00	0.13	0.217	-0.015	0.271
6	6.67	0.15	0.146	0.021	0.192
7	5.71	0.17	0.091	0.080	0.137
8	5.00	0.20	0.060	0.167	0.103
9	4.44	0.22	0.047	0.275	0.088
10	4.00	0.25	0.048	0.382	0.086
11	3.64	0.27	0.057	0.471	0.093
12	3.33	0.30	0.075	0.541	0.106
13	3.08	0.32	0.097	0.598	0.122
14	2.86	0.35	0.123	0.650	0.138
15	2.67	0.38	0.149	0.701	0.151
16	2.50	0.40	0.169	0.753	0.158
17	2.35	0.42	0.181	0.809	0.156
18	2.22	0.45	0.185	0.869	0.150
19	2.11	0.47	0.184	0.933	0.144
20	2.00	0.50	0.184	1.000	0.142

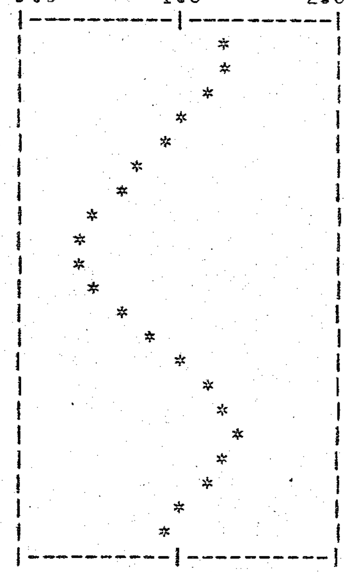
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 20 LDTN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.833	0.0	1.332
1	40.00	0.02	0.821	0.023	1.285
2	20.00	0.05	0.791	0.047	1.166
3	13.33	0.07	0.742	0.074	1.016
4	10.00	0.10	0.648	0.104	0.864
5	8.00	0.13	0.481	0.138	0.715
6	6.67	0.15	0.277	0.183	0.552
7	5.71	0.17	0.120	0.258	0.404
8	5.00	0.20	0.044	0.422	0.272
9	4.44	0.22	0.036	0.695	0.274
10	4.00	0.25	0.072	0.863	0.423
11	3.64	0.27	0.128	0.937	0.620
12	3.33	0.30	0.189	0.977	0.825
13	3.08	0.32	0.245	-0.995	1.021
14	2.86	0.35	0.287	-0.971	1.192
15	2.67	0.38	0.308	-0.948	1.312
16	2.50	0.40	0.301	-0.926	1.356
17	2.35	0.42	0.266	-0.910	1.304
18	2.22	0.45	0.212	-0.909	1.170
19	2.11	0.47	0.161	-0.937	1.016
20	2.00	0.50	0.140	-1.000	0.944

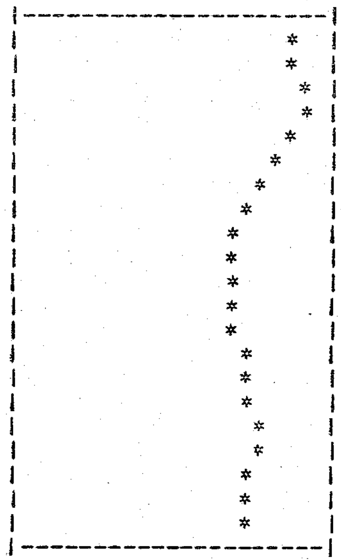


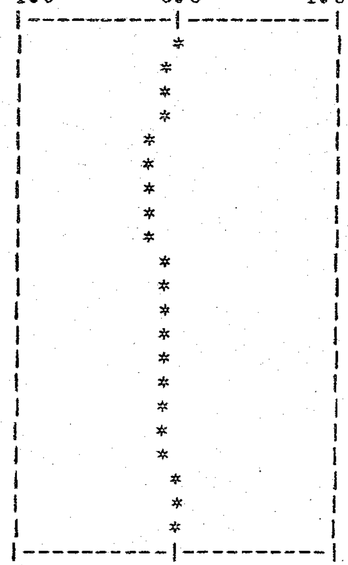


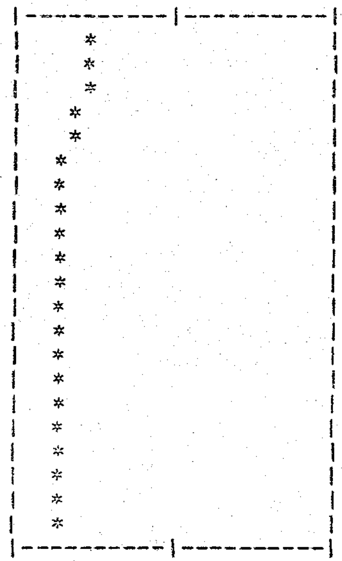


SERIES 15 YMBR AND SERIES 21 NLDN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.919	0.0	0.381
1	40.00	0.02	0.922	-0.053	0.375
2	20.00	0.05	0.927	-0.104	0.356
3	13.33	0.07	0.926	-0.148	0.324
4	10.00	0.10	0.909	-0.179	0.285
5	8.00	0.13	0.866	-0.190	0.249
6	6.67	0.15	0.805	-0.186	0.225
7	5.71	0.17	0.747	-0.173	0.212
8	5.00	0.20	0.705	-0.160	0.206
9	4.44	0.22	0.682	-0.146	0.204
10	4.00	0.25	0.676	-0.134	0.203
11	3.64	0.27	0.684	-0.123	0.203
12	3.33	0.30	0.704	-0.113	0.202
13	3.08	0.32	0.729	-0.104	0.201
14	2.86	0.35	0.753	-0.096	0.197
15	2.67	0.38	0.771	-0.088	0.191
16	2.50	0.40	0.780	-0.079	0.184
17	2.35	0.42	0.777	-0.066	0.175
18	2.22	0.45	0.767	-0.049	0.166
19	2.11	0.47	0.755	-0.027	0.159
20	2.00	0.50	0.750	-0.000	0.157



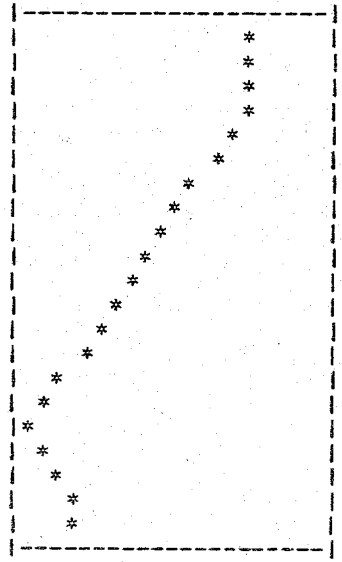


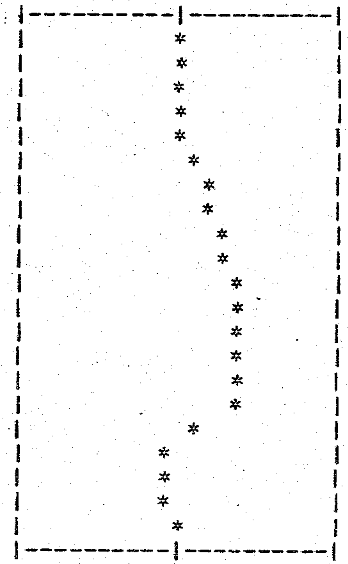


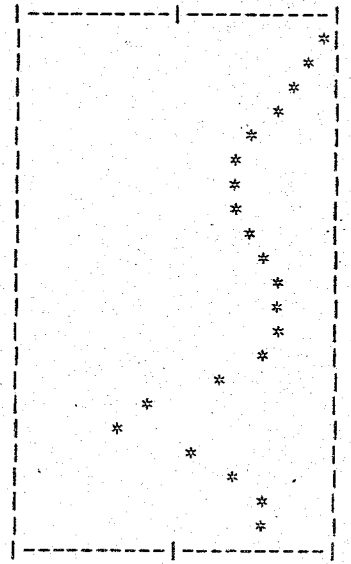
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 22 BET

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.728	0.0	1.957
1	40.00	0.02	0.734	-0.005	1.925
2	20.00	0.05	0.746	-0.005	1.833
3	13.33	0.07	0.750	0.007	1.692
4	10.00	0.10	0.722	0.038	1.533
5	8.00	0.13	0.653	0.091	1.405
6	6.67	0.15	0.569	0.159	1.352
7	5.71	0.17	0.503	0.227	1.378
8	5.00	0.20	0.457	0.285	1.458
9	4.44	0.22	0.416	0.331	1.557
10	4.00	0.25	0.372	0.367	1.651
11	3.64	0.27	0.318	0.397	1.720
12	3.33	0.30	0.253	0.422	1.733
13	3.08	0.32	0.177	0.438	1.632
14	2.86	0.35	0.096	0.435	1.339
15	2.67	0.38	0.033	0.359	0.849
16	2.50	0.40	0.019	0.052	0.648
17	2.35	0.42	0.056	-0.111	1.074
18	2.22	0.45	0.113	-0.110	1.415
19	2.11	0.47	0.156	-0.063	1.556
20	2.00	0.50	0.171	-0.000	1.589

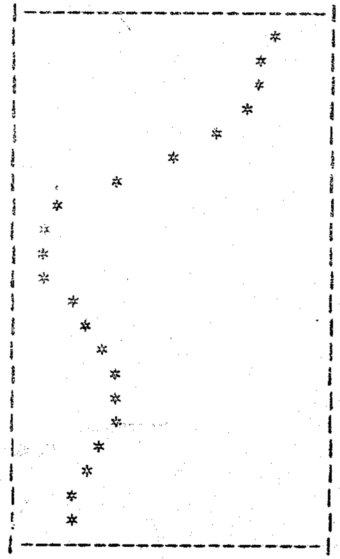


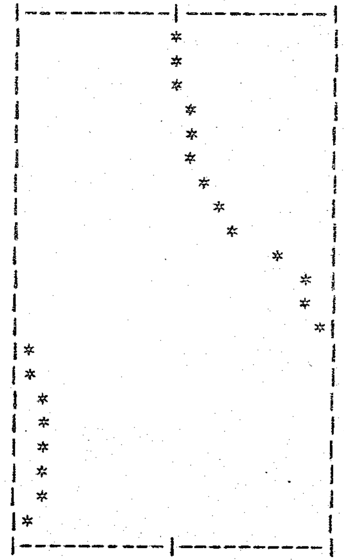


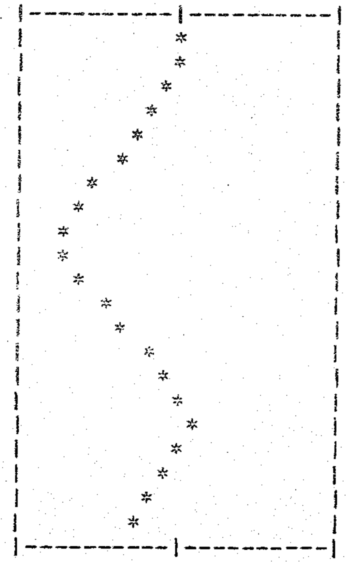


SERIES 15 YMBR AND SERIES 23 LLPN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.833	0.0	1.042
1	40.00	0.02	0.821	0.023	1.005
2	20.00	0.05	0.791	0.047	0.911
3	13.33	0.07	0.742	0.074	0.794
4	10.00	0.10	0.648	0.104	0.675
5	8.00	0.13	0.481	0.138	0.559
6	6.67	0.15	0.277	0.183	0.440
7	5.71	0.17	0.120	0.258	0.316
8	5.00	0.20	0.044	0.422	0.213
9	4.44	0.22	0.036	0.695	0.214
10	4.00	0.25	0.072	0.863	0.331
11	3.64	0.27	0.128	0.937	0.485
12	3.33	0.30	0.189	0.977	0.645
13	3.08	0.32	0.245	-0.995	0.799
14	2.86	0.35	0.287	-0.971	0.932
15	2.67	0.38	0.308	-0.948	1.026
16	2.50	0.40	0.301	-0.926	1.060
17	2.35	0.42	0.266	-0.910	1.020
18	2.22	0.45	0.212	-0.909	0.915
19	2.11	0.47	0. 61	-0.937	0.794
20	2.00	0.50	0.140	-1.000	0.738







CROSS SPECTRA

SERIES 15 YMBR AND SERIES 24 LYF

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.573	1.000	1.390
1	40.00	0.02	0.535	0.952	1.327
2	20.00	0.05	0.441	0.890	1.145
3	13.33	0.07	0.348	0.813	0.902
4	10.00	0.10	0.301	0.767	0.684
5	8.00	0.13	0.306	0.799	0.548
6	6.67	0.15	0.378	0.871	0.509
7	5.71	0.17	0.496	0.927	0.522
8	5.00	0.20	0.613	0.960	0.545
9	4.44	0.22	0.708	0.979	0.566
10	4.00	0.25	0.779	0.991	0.583
11	3.64	0.27	0.831	0.998	0.598
12	3.33	0.30	0.869	-0.997	0.613
13	3.08	0.32	0.896	-0.993	0.627
14	2.86	0.35	0.914	-0.990	0.640
15	2.67	0.38	0.924	-0.987	0.652
16	2.50	0.40	0.928	-0.985	0.662
17	2.35	0.42	0.926	-0.984	0.670
18	2.22	0.45	0.920	-0.986	0.676
19	2.11	0.47	0.913	-0.992	0.680
20	2.00	0.50	0.909	-1.000	0.681

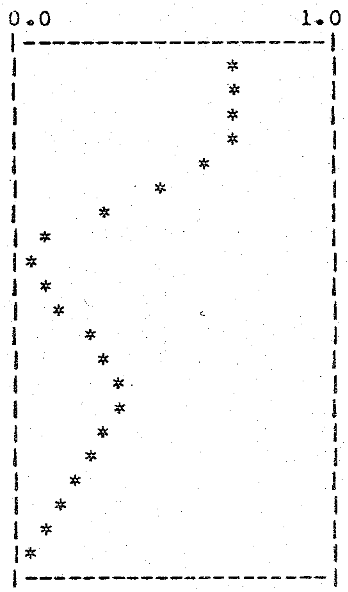
SERIES 15 YMBR AND SERIES 25 PIYX

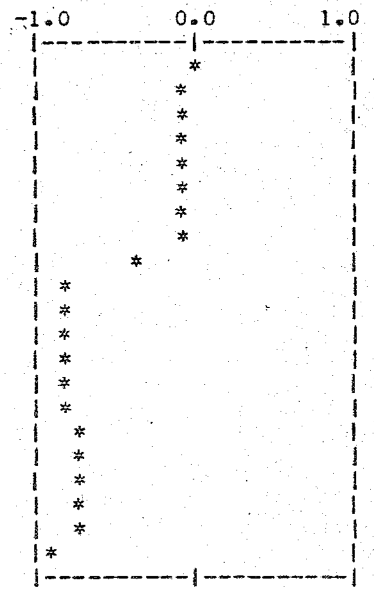
I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.694	1.000	2.891
1	40.00	0.02	0.703	0.968	2.785
2	20.00	0.05	0.715	0.952	2.493
3	13.33	0.07	0.698	0.959	2.097
4	10.00	0.10	0.617	0.982	1.690
5	8.00	0.13	0.445	-0.986	1.307
6	6.67	0.15	0.228	-0.959	0.927
7	5.71	0.17	0.065	-0.960	0.524
8	5.00	0.20	0.005	0.778	0.161
9	4.44	0.22	0.032	0.327	0.443
10	4.00	0.25	0.106	0.313	0.893
11	3.64	0.27	0.137	0.340	1.337
12	3.33	0.30	0.251	0.381	1.776
13	3.08	0.32	0.286	0.430	2.221
14	2.86	0.35	0.291	0.485	2.679
15	2.67	0.38	0.269	0.543	3.140
16	2.50	0.40	0.223	0.602	3.573
17	2.35	0.42	0.161	0.654	3.959
18	2.22	0.45	0.094	0.687	4.399
19	2.11	0.47	0.043	0.663	5.735
20	2.00	0.50	0.023	0.500	4.875

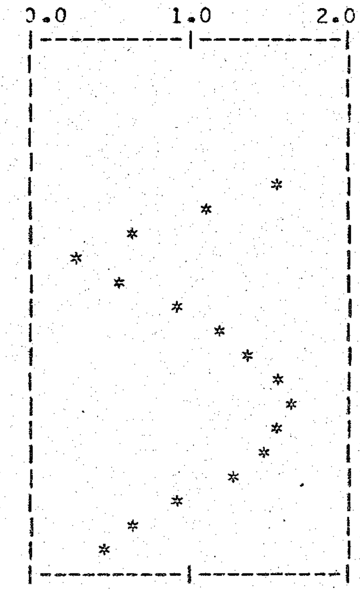
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 26 PUMX

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.694	0.0	3.944
1	40.00	0.02	0.703	-0.057	3.788
2	20.00	0.05	0.715	-0.098	3.359
3	13.33	0.07	0.698	-0.116	2.781
4	10.00	0.10	0.617	-0.118	2.193
5	8.00	0.13	0.445	-0.111	1.648
6	6.67	0.15	0.228	-0.109	1.127
7	5.71	0.17	0.065	-0.135	0.609
8	5.00	0.20	0.005	-0.422	0.178
9	4.44	0.22	0.032	-0.898	0.460
10	4.00	0.25	0.106	-0.937	0.861
11	3.64	0.27	0.187	-0.935	1.185
12	3.33	0.30	0.251	-0.919	1.424
13	3.08	0.32	0.286	-0.895	1.583
14	2.86	0.35	0.291	-0.865	1.659
15	2.67	0.38	0.269	-0.832	1.640
16	2.50	0.40	0.223	-0.798	1.506
17	2.35	0.42	0.161	-0.771	1.261
18	2.22	0.45	0.094	-0.763	0.939
19	2.11	0.47	0.043	-0.812	0.614
20	2.00	0.50	0.023	-1.000	0.446

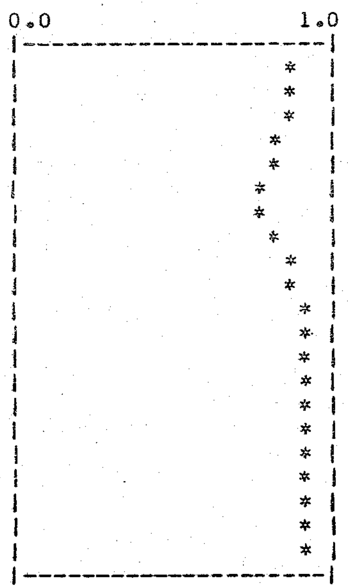


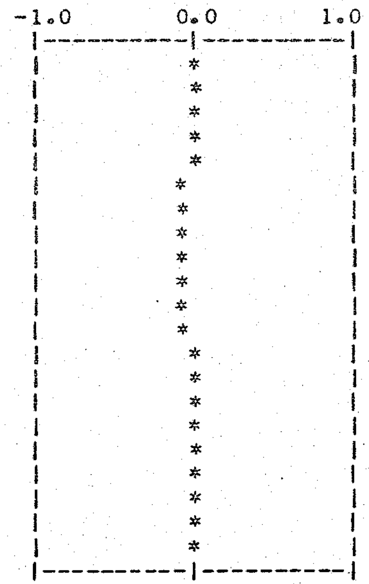


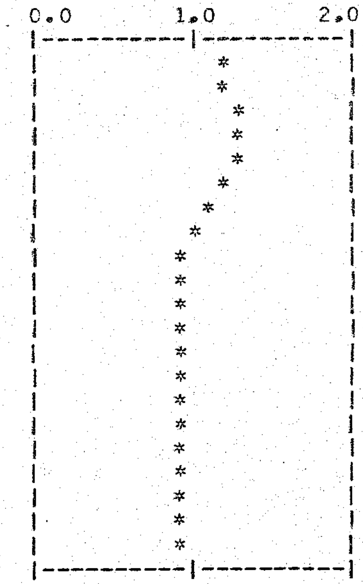


SERIES 15 YMBR AND SERIES 27 YBFR

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.915	0.0	1.228
1	40.00	0.02	0.911	0.003	1.238
2	20.00	0.05	0.899	0.003	1.266
3	13.33	0.07	0.874	-0.004	1.297
4	10.00	0.10	0.833	-0.027	1.278
5	8.00	0.13	0.303	-0.061	1.174
6	6.67	0.15	0.817	-0.084	1.055
7	5.71	0.17	0.853	-0.088	0.976
8	5.00	0.20	0.886	-0.083	0.930
9	4.44	0.22	0.910	-0.073	0.903
10	4.00	0.25	0.927	-0.063	0.886
11	3.64	0.27	0.940	-0.052	0.876
12	3.33	0.30	0.950	-0.041	0.871
13	3.08	0.32	0.957	-0.031	0.869
14	2.86	0.35	0.962	-0.020	0.871
15	2.67	0.38	0.964	-0.010	0.876
16	2.50	0.40	0.964	-0.001	0.886
17	2.35	0.42	0.961	0.005	0.900
18	2.22	0.45	0.956	0.008	0.917
19	2.11	0.47	0.950	0.006	0.933
20	2.00	0.50	0.948	0.000	0.939



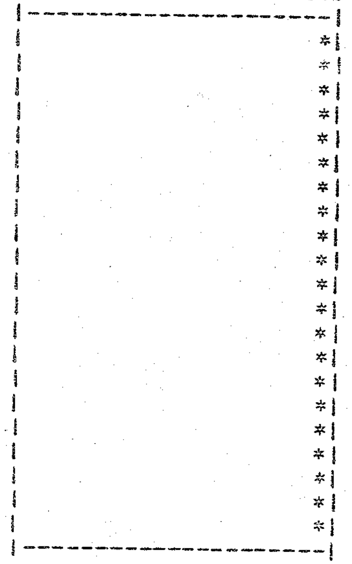


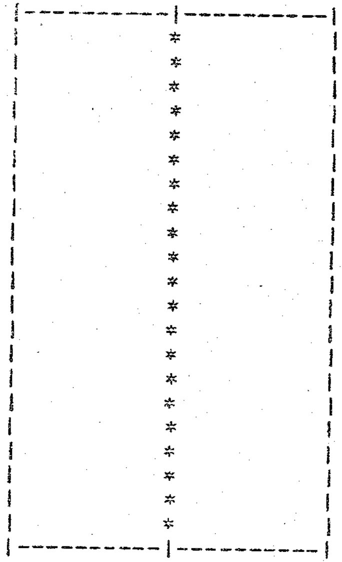


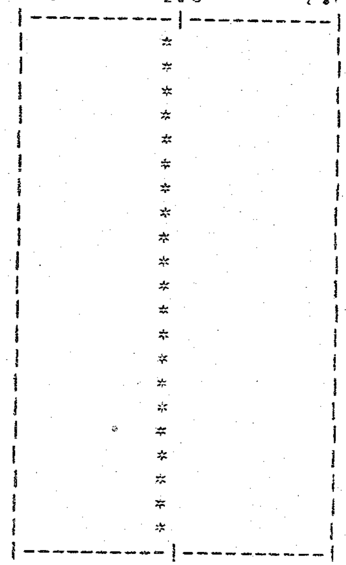
CROSS SPECTRA

SERIES 15 YMBR AND SERIES 28 YFBR

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	1.000	0.0	0.895
1	40.00	0.02	1.000	-0.000	0.895
2	20.00	0.05	1.000	0.000	0.895
3	13.33	0.07	1.000	0.000	0.895
4	10.00	0.10	1.000	-0.000	0.895
5	8.00	0.13	1.000	0.000	0.895
6	6.67	0.15	1.000	0.000	0.895
7	5.71	0.17	1.000	0.000	0.895
8	5.00	0.20	1.000	0.0	0.895
9	4.44	0.22	1.000	0.000	0.895
10	4.00	0.25	1.000	-0.000	0.895
11	3.64	0.27	1.000	-0.000	0.895
12	3.33	0.30	1.000	-0.000	0.895
13	3.08	0.32	1.000	-0.000	0.895
14	2.86	0.35	1.000	-0.000	0.895
15	2.67	0.38	1.000	-0.000	0.895
16	2.50	0.40	1.000	0.000	0.895
17	2.35	0.42	1.000	-0.000	0.895
18	2.22	0.45	1.000	-0.000	0.895
19	2.11	0.47	1.000	0.000	0.895
20	2.00	0.50	1.000	-0.000	0.895

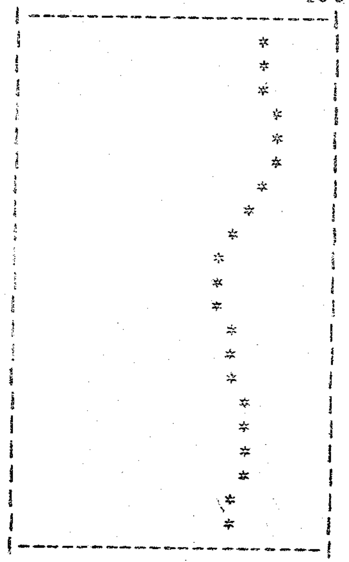


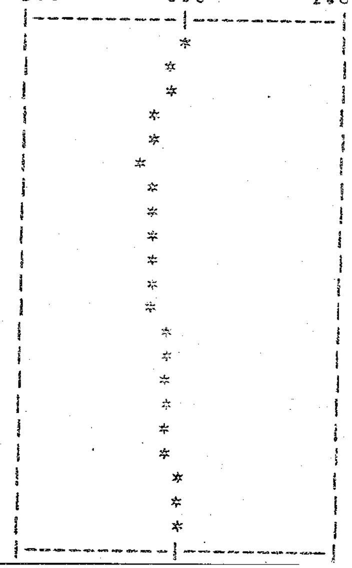


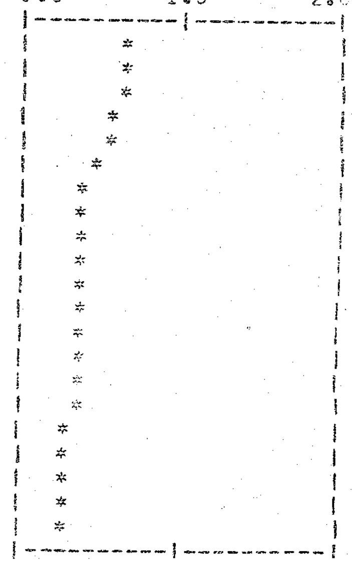


SERIES 15 YMBR AND SERIES 29 NBPN

I	T(I)	L(I)	COHERENCE	PHASE	GAIN
0	999.99	0.0	0.784	0.0	0.605
1	40.00	0.02	0.795	-0.070	0.600
2	20.00	0.05	0.825	-0.138	0.579
3	13.33	0.07	0.855	-0.199	0.529
4	10.00	0.10	0.863	-0.241	0.452
5	8.00	0.13	0.837	-0.255	0.378
6	6.67	0.15	0.786	-0.248	0.326
7	5.71	0.17	0.733	-0.230	0.297
8	5.00	0.20	0.691	-0.210	0.281
9	4.44	0.22	0.665	-0.190	0.272
10	4.00	0.25	0.655	-0.171	0.267
11	3.64	0.27	0.659	-0.152	0.265
12	3.33	0.30	0.676	-0.135	0.263
13	3.08	0.32	0.700	-0.120	0.261
14	2.86	0.35	0.724	-0.106	0.258
15	2.67	0.38	0.741	-0.094	0.252
16	2.50	0.40	0.748	-0.080	0.244
17	2.35	0.42	0.744	-0.065	0.233
18	2.22	0.45	0.731	-0.047	0.223
19	2.11	0.47	0.717	-0.025	0.215
20	2.00	0.50	0.711	-0.000	0.212







APPENDIX 3

LIST OF EQUATIONS

1. Behavioral Equations

1. $ALO = .170 - .332\ BEP + .534\ BBS + .016\ FRQ$

2. $BEP = .472 + .725\ BEP_{-1} + .171\ \Delta UMSN - .160\ LBPN_{-1} + .147\ NBPN_{-1}$

3. $CTPN = .400 + .576\ LDTN + .118\ NLDN - 1.706\ DLA + .623\ PV2X - .160\ RLA$

4. $IAPR = -.185 + .660\ NLDN + .358\ NLDN_{-1} + .437\ NLDN_{-2} - 5.869\ ALO + .135\ ITON_{-1} - 1.318\ PIAX_{-1}$

5. $IBPR = 2.140 - 10.271\ DIB + .277\ NLPN_{-1} + .608\ ITON_{-2} - .734\ PIBX_{-1}$

6. $ILDN = .159 + .415\ UMSN - .220\ UMSN_{-1} - .399\ PYMX + .352\ PYMX_{-1} - .822\ LV2N$

7. $IMIN = 1.627 + 1.919\ UMSN - 1.178\ UMSN_{-1} + .681\ PIMX - .735\ PIYX$

8. $LBPN = .013 + .359\ LTAX + .235\ LTAX_{-1} - 1.686\ ALO + .536\ LBPN_{-1}$

9. $NLPN = .779 + 1.532\ \Delta YBFR - 1.136\ LYF_{-1} + .707\ UMSN + .283\ EXIN_{-1} + .115$

10. $PIAX = -.390 + .069\ SDDN + .100\ IAPN + .071\ IAPN_{-1} + .153\ LBPN$

11. $PIBX = -.729 + 1.211\ LTAX - .844\ LTAX_{-1} + .096\ \Delta SDDN + .124\ IBPN + .387\ PIBX_{-1}$

12. $PV2X = .089 + .278\ LBPN + .175\ PIMX_{-1} + .126\ FRQ + + .218\ SIDN_{-1} + 1.459\ DLA$

13. $PYMX = .553 + .171\ UMSN + .616\ LBPN + .327\ PIMX_{-1} - .537\ LBPN_{-1} + + .360\ SIDN_{-1} + .027\ SDDN$

2. Definition Equations

14. $BET = .797\ BEP + .203\ BEO$

15. $IAPN = 1.0\ IAPR + 1.0\ PIAX$

16. $IBPN = 1.0\ IBPR + 1.0\ PIBX$

17. $LDTN = .782\ LLPN + .228\ LLON - 1.000\ SDBN$

18. $LLPN = 1.0\ BEP + 1.0\ LBPN$

19. $LYF = 1.0\ LBPN - 1.0\ YBFR$

20. $NLDN = 1.368\ NLPN - .368\ SDUN$

21. $PIYX = -.500\ PYMX + 1.000\ PIMX - .500\ PYMX_{-1}$

22. $PUMX = .733\ PYMX + .267\ PIMX$

23. $UMSN = .463\ CTPN + .090\ IAPN + .069\ IBPN + 1.000\ ILDN + + .108\ CTON + .196\ EXIN + .044\ ITON$

24. UMSR = -1.0 PUMX +1.0 UMSN

25. YBFR = -1.0 BET +1.0 YFBR

26. YFBR = 1.117 YMBR -.117 SISR

27. YMBN = -.278 IMIN + 1.278 UMSN

28. YMBR = -1.0 PYMX + 1.0 YMBN

29. NBPN = 1.0 NLPN - 1.0 BEP

APPENDIX 4

LIST OF VARIABLES

The forth digit of the label has the following meaning:

N the variable is expressed in current values
R the variable is expressed in constant values
X the varibale is expressed in index form

If not indicated otherwise all variables are expressed in relative first differences with the exception of ALO and FRQ which are transformed into first differences of the level values.

ALO	rate of unemployment
BBS	potential labor force
BEO	employees in the public sector
BEP	employees in the private sector
BET	employees, total
CTO	public consumption
CTP	private consumption
DIB	dummy variable for investment in construction
DLA	dummy variable for agricultural sector
EXI	total exports
FRQ	weather variable
IAP	private investment in equipment
IBP	private investment in construction
ILD	inventory changes / total output
IMI	total imports
ITO	public investment
LBP	labor income per employee in the private sector
LDT	disposable labor income
LLO	gross wage bill in the public sector
LLP	gross wage bill in the private sector
LLT	gross wage bill, total
LTA	index of minimum wages
LV2	inventory changes / total output (t-1)
LYF	cf. equation 19
NBP	cf. equation 29
NLD	disposable non-labor income
NLP	gross non-labor income
PIA	deflator of IAP
PIB	deflator of IBP
PIM	deflator of IMI
PIY	cf. equation 21

PUM	deflator of UMS
PV2	consumer price index
PYM	deflator of YMB
RLA	rendite of securities
SDB	cf. equation 17
SDD	incidence of direct taxes
SDU	direct taxes of entrepreneurs
SID	incidence of indirect taxes
SIS	indirect taxes minus subsidies
UMS	total output
YBF	cf. equation 25
YFB	gross national product at factor costs
YMB	gross national product at market prices