

I. PROGRAM DESCRIPTION:

Program Title: E.R.F.P. Polynomial Fit (Statistical) Program.

Author: C.Y. Jodat; Installation: Booz-Allen Applied Research, Bethesda, Md.

Purpose: To fit a polynomial of the form

$$\hat{Y} = C_0 + C_1X + C_2X^2 + C_kX^k$$

where

$$1 \leq k \leq 7$$

and  $Y = y, \ln y, y, \text{ or } \ln y$

as  $X = x, x, \ln x, \text{ or } \ln x$

to a set of points  $(x_i, y_i)$  using a least squares procedure.

The print out includes an analysis of variance table; the coefficients, the variance and t-test values of the coefficients; the  $x_i$  and  $y_i$ , the expected  $y_i$ , and a standardized deviate.

Restrictions:

Space available and matrix characteristics of the program have set these limits:

- |                      |  |
|----------------------|--|
| 1) $1 \leq k \leq 7$ | where k is the order of the polynomial |
| 2) $n \leq 160$      | where n is the number of observations  |

It is emphasized that -- due to the characteristic of the particular matrix that is formed -- as the order increases, the possibility of obtaining a singular matrix (a matrix where any two rows are essentially equal or are different everywhere by the same multiple) also increases. As the matrix approaches singularity there is a growing error in the inverse of that matrix and hence in the reliability of the over-all results.

Any error can be spotted early, however, by examining the S.S.<sub>reg</sub> for succeeding orders. As the order increases, so must the S.S.<sub>reg</sub>.

If it does not, STOP, go on to new type or new data.

This error is more apt to appear in the types where ln is being used.

Memory Allocation:

The program uses all but two tracks of the drum except for fractional-track sector intervals.

<p>THIS PROGRAM IS DISTRIBUTED TO MEMBERS OF POOL ONLY; DISTRIBUTION TO NON MEMBERS OF POOL IS PROHIBITED</p>
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Memory Allocation - Continued.

<u>Central Program &amp; Subroutines</u>	<u>Location</u>
Central Program, Polynomial Fit .....	0300 - 1663
E.R.F.P. Matrix-Vector Multiply (30.1) .....	1700 - 1831
E.R.F.P. Matrix Inversion (30.0) .....	1900 - 2131
(Data Storage; See just below).....	2200 - 3163
Alphanumeric Output (19.0) .....	3400 - 3457
E.R.F.P. Interpretive System .....	3500 - 6263

Note: The program also uses the E.R.F.P. Logarithm and exponential subroutines which are included in the E.R.F.P. Interpretive System .

The central program reserves location 0700 - 0963 for internal storage.

Data is stored as follows:

- 1) independent variable from 2200 - 2663
- 2) dependent variable from 2700 - 3163
- 3) n at 0700

The punched tape distributed with this Statistical Program contains the central or "Polynomial Fit" program as well as the E.R.F.P. Matrix-Vector Multiplication No. 30.1 and E.R.F.P Matrix Inversion No.30.0. These appear on the tape in this order.

*HEX  
Vorhanden*

Method:

After clearing the internal storage and having transferred to the desired type, the following are stored consecutively:

$$n, \sum X, \sum X^2, \sum X^3, \dots, \sum X^{2k} \quad (1)$$

and

$$\sum Y^2, \sum Y, \sum XY, \sum X^2 Y, \sum X^3 Y, \dots, \sum X^h Y, \dots, \sum X^k Y \quad (2)$$

Then, the following matrix is established from (1):

$$A = \begin{matrix} n & \sum X & \sum X^2 & \dots & \sum X^k \\ \sum X & \sum X^2 & \sum X^3 & \dots & \sum X^{k+1} \\ \sum X^2 & \sum X^3 & \sum X^4 & \dots & \sum X^{k+2} \\ \vdots & \vdots & \vdots & \dots & \vdots \\ \vdots & \vdots & \vdots & \dots & \vdots \\ \vdots & \vdots & \vdots & \dots & \vdots \\ \sum X^k & \sum X^{k+1} & \sum X^{k+2} & \dots & \sum X^{2k} \end{matrix}$$

This matrix is then inverted giving  $A^{-1}$ , denoted as follows:

$$A^{-1} = \begin{matrix} & \begin{matrix} c_{11} & c_{12} & c_{13} & \dots & c_{1\ k+1} \\ c_{21} & c_{22} & c_{23} & \dots & c_{2\ k+1} \\ \cdot & \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \cdot & \dots & \cdot \\ c_{k+1\ 1} & c_{k+1\ 2} & c_{k+1\ 3} & \dots & c_{k+1\ k+1} \end{matrix} \end{matrix}$$

and the inverse is multiplied by the vector G

$$G = \begin{matrix} \sum Y \\ \sum XY \\ \sum X^2Y \\ \cdot \\ \cdot \\ \sum X^hY \\ \cdot \\ \cdot \\ \sum X^kY \end{matrix} \quad \text{where } 1 \leq h \leq k$$

to obtain the coefficient vector B

$$A^{-1}G = B = \begin{matrix} c_0 \\ c_1 \\ c_2 \\ c_3 \\ \cdot \\ \cdot \\ \cdot \\ c_k \end{matrix}$$

An analysis of variance table is now computed and stored.

The following glossary defines the statistical parameters computed and gives the symbols that will be used henceforth.

<u>Parameter</u>	<u>Symbol</u>	<u>Definition</u>
Sum of Squares due to regression	$S.S._{reg}$	$S.S._{reg} = C_0 \sum Y + C_1 \sum XY + C_2 \sum X^2Y + \dots + C_k \sum X^kY$ <p>This is obtained by multiplying the corresponding coefficients of the G and B vectors, and summing</p>
Degrees of Freedom due to regression	$d.f._{reg}$	$d.f._{reg} = k + 1$
Mean Square due to regression	$s^2_{reg}$	$s^2_{reg} = S.S._{reg}/d.f._{reg}$
Degrees of Freedom due to residual	$d.f._{y.x}$	$d.f._{y.x} = n - d.f._{reg}$
Sum of Squares due to residual	$S.S._{y.x}$	$S.S._{y.x} = \sum Y^2 - S/S._{reg}$
Mean Square due to residual	$s^2_{y.x}$	$s^2_{y.x} = S.S._{y.x}/d.f._{y.x}$
F - value	F	$F = s^2_{reg} / s^2_{y.x}$
Sum of Squares Total	$S.S._{total}$	$S.S._{total} = \sum Y^2$
Degrees of Freedom total	$d.f._{total}$	$d.f._{total} = n$

With the printing of the appropriate headings, the analysis of variance table is printed as follows:

Variation due to:	Sum of Squares	Degrees of Freedom	Mean Square	F
Regression	$S.S._{reg}$	$d.f._{reg}$	$s^2_{reg}$	F
Residual	$S.S._{y.x}$	$d.f._{y.x}$	$s^2_{y.x}$	
Total	$S.S._{total}$	$d.f._{total}$		

Upon completion of the analysis of variance table, the coefficients are printed out, their variances computed and printed, and the t-test value (a check of the statistical significance of their difference from zero) is computed and printed. The following is the format:

Coefficient	Variance of Coefficient	t-test
$C_0$	$v(C_0) = c_{11}s^2_{y.x}$	$t_{C_0} = \frac{C_0}{\sqrt{v(C_0)}}$
$C_1$	$v(C_1) = c_{22}s^2_{y.x}$	$t_{C_1} = \frac{C_1}{\sqrt{v(C_1)}}$
$C_2$	$v(C_2) = c_{33}s^2_{y.x}$	$t_{C_2} = \frac{C_2}{\sqrt{v(C_2)}}$
.	.	.
.	.	.
.	.	.
$C_k$	$v(C_k) = c_{k+1, k+1}s^2_{y.x}$	$t_{C_k} = \frac{C_k}{\sqrt{v(C_k)}}$

t in the table has  $n - (k + 1)$  degrees of freedom.

Next,  $x_i$  and  $y_i$  are printed out and the expected  $y_i$  ( $=\hat{y}_i$ ) and the standardized deviate are computed and printed. The  $\hat{y}_i$  and the standardized deviate depend on the type in the following way:

Type I:  $\hat{Y} = \hat{y} = C_0 + C_1x + C_2x^2 + \dots + C_kx^k$

Type II:  $\hat{Y} = \ln \hat{y} = C_0 + C_1x + C_2x^2 + C_kx^k$

Type III:  $\hat{Y} = \hat{y} = e^{C_0 + C_1x + C_2x^2 + \dots + C_kx^k}$   
 $\hat{Y} = \hat{y} = C_0 + c_1 \ln x + C_2 (\ln x)^2 + \dots + C_k (\ln x)^k$

Type IV:  $\hat{Y} = \ln \hat{y} = C_0 + C_1 \ln x + C_2 (\ln x)^2 + \dots + C_k (\ln x)^k$   
 $\hat{y} = e^{C_0 + C_1 \ln x + C_2 (\ln x)^2 + \dots + C_k (\ln x)^k}$

The standardized deviate is defined as:

$$\text{S.D.} = \frac{Y - \hat{Y}}{\sqrt{s_{y.x}^2}}$$

where  $Y = C_0 + C_1X + C_2X^2 + \dots C_kX^k$

#### Input:

The data is stored by the Extended Range Floating Point Interpretive system in the following locations:

- 1) the sample size  $n$  in 0700
- 2) the independent variable  $x_i$  beginning in 2200
- 3) the dependent variable  $y_i$  beginning in 2700

Input manually (in hex) from the flexowriter: the type, the order ( $k$ ), and finally, the sample size ( $n$ ). These are converted to  $q = 29$  internally and stored.

Note: Within the program the type and the order are converted to ERFP format, thus removing the need for the ERFP Float-Unfloat Subroutine (25.1), which occupies over 3 tracks of storage.

#### Output:

See "Method".

#### Timing:

No attempt has been made to optimize the program. However, to speed up the program, all initializing, address modification and counter manipulations have been carried out in fixed point.

#### Operating Procedure:

After storing the central or "Polynomial Fit" program and subroutines as listed in the "Memory Allocation" section, page two, a transfer to location 0300 (i.e., ".0000300") is made and the data (in E.R.F.P. form) is read and stored. \*Immediately upon reading the "Exit" code on the data tape, (a transfer to a stop in 1662, actual, (BP#16) allows time for depression of the manual input switch) the program transfers to the  $\alpha$  - Numeric Output and prints "Type". When the input light comes on, enter the type (1,2,3, or 4) from the flex, and hit the start compute button. The type will be stored.

When the heading "Order" is printed and the input light comes on again, enter the order (1,2,3, ..., or 7) from the flex and hit the start compute button. The order will be stored.

After the heading "Sample Size" is printed and input light is on, enter the sample size in hex from the flex, and hit the start compute button. The sample size  $n$  will then be stored and the program takes off. At the completion of the printing of the coefficients, their variances, etc; a stop (BP #4) will

\*See note following asterisk at the top<sup>6</sup> of the next page.



Flexowriter:

For 8 1/2 inch wide paper, tabs are set at 17, 26, 35, 44, and 53, with the margin at 8.

Program Stops:

1600	Break point 8 prior to examining position of transfer control button.
1608	$k + 1 > 8$ (if transfer control button is up)
1608	Break point 4 prior to examining position of transfer control button.

Storage:

Location	Item
1832-33	S.S.reg
2153-54	d.f. reg
1836-37	s <sup>2</sup> reg
1838-39	S.S.y.x.
1840-41	d.f.y.x
1842-43	s <sup>2</sup> y.x
1844-45	$\sqrt{s^2_{y.x}}$
1846-47	F
1848-49	X <sup>j</sup>
1852-53	xh <sub>y</sub>
1854-55	$\sum Y^2$
1856-57	$\hat{Y}$
1834	counter 1
1835	counter 2
1858	counter 3
2136	k + 1 at q = 29
2137	junk
2143	k at q = 29
2144-45	Y <sub>i</sub> (temp. storage)
2150	Type at q = 29
2151-52	X <sub>i</sub> (temp. storage)
2158	n at q = 29
2159-60	temporary storage
2161	2k + 4 at q = 29

Internal Storage:

Location	Item
0700-01	sample size n
0702-0729	$\sum X, \sum X^2, \sum X^3, \dots, \sum X^{2k}$
0732-0931	matrix A and its inverse, A <sup>-1</sup>

(See Page Seven, bottom, for Storage conclusion)



.000030080000700'

'14+00'

group'

80002200'

'01+00''05+00''15+00''26+00''51+00''76+00'

1'01+00'1'25+00'1'49+00'1'73+00'1'97+00'

2'11+00'2'35+00'2'59+00'

group'

80002700'

'23+00''49+00''76+00''81+00''81+00''81+00'

'73+00''31+00''27+00''42+00''32+00''28+00'

'21+00''22+00'

exit'

E.R.F.P. Polynomial Fit (Statistical)

II. ILLUSTRATIVE EXAMPLES

Type: 1

Order: 1

Sample Size: q

Type                      Order  
.10000000    01    .10000000    01

ANALYSIS OF VARIANCE TABLE

Variation due to:	Sum of Squares	Degrees of Freedom	Mean Square	F
Regression	.34943352	05	.17471676	05
Residual	.49616482	04	.41347068	03
Total	.39905000	05		

Coefficient	Variance of Coefficient	t-test
.67831198    02	.82768287    02	.74558560    01
.17403744-   00	.39562030    02-	.27669633-   01

x	y	y (exp.)	Standardized Deviate
.10000000    01	.23000000    02	.67657161    02	.21961842-   01
.50000000    01	.49000000    02	.66961011    02	.88330040-   00
.15000000    02	.76000000    02	.65220637    02	.53011578    00
.26000000    02	.81000000    02	.63306225    02	.87015802    00
.51000000    02	.81000000    02	.58955289    02	.10841317    01
.76000000    02	.81000000    02	.54604354    02	.12981054    01
.10100000    03	.72999999    02	.50253418    02	.11186489    01
.12500000    03	.31000000    02	.46076519    02	.74144462-   00
.14900000    03	.27000000    02	.41899621    02	.73274497-   00
.17300000    03	.42000000    02	.37722722    02	.21035126    00
.19700000    03	.32000000    02	.33545824    02	.76021699-   01-
.21100000    03	.28000000    02	.31109300    02	.15291153-   00
.23500000    03	.21000000    02	.26932401    02	.29174818-   00
.25900000    03	.22000000    02	.22755503    02	.37154692-   01-

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E.R.F.P. Polynomial Fit (Statistical)

## II. ILLUSTRATIVE EXAMPLES

Type		Order	
.10000000	01	.20000000	01

## ANALYSIS OF VARIANCE TABLE

Variation due to:	Sum of Squares	Degrees of Freedom	Mean Square	F
Regression	.35599075	05	.11866358	.30314029
Residual	.43059252	04	.39144774	
Total	.39905000	05		

Coefficient	Variance of Coefficient	t-test
.59207018	.12275980	.53437374
.11174761	.52501387	.48770010
.11723499-	.82046933	.12942736-

x	y	y (exp.)	Standardized Deviate
.10000000	.23000000	.59317593	.18356089-
.50000000	.49000000	.59736447	.54265485-
.15000000	.76000000	.60619453	.77738271
.26000000	.81000000	.61319947	.99469370
.51000000	.81000000	.61856864	.96755620
.76000000	.81000000	.60928343	.10144867
.10100000	.72999999	.58534385	.73113910
.12500000	.31000000	.54857501	.12058355-
.14900000	.27000000	.49830071	.11539058-
.17300000	.42000000	.43452093	.73393507-
.19700000	.32000000	.35723569	.18820125-
.21100000	.28000000	.30591573	.13098649-
.23500000	.21000000	.20724682	.13915472
.25900000	.22000000	.95072440	.63142439

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LGP-30 USERS' ORGANIZATION - POOL

Program No. F2-96

E.R.F.P. Polynomial Fit (Statistical)

II. ILLUSTRATIVE EXAMPLES

Type: 4  
Order: 1  
Sample Size: q

Type                      Order  
.40000000    01    .10000000    01

ANALYSIS OF VARIANCE TABLE

Variation due to:	Sum of Squares	Degrees of Freedom	Mean Square	F
Regression	.19502646    03	.20000000    01	.97513231    02	.32400777    03
Residual	.36115146    01	.12000000    02	.30095955    00	
Total	.19863798    03	.14000000    02		

Coefficient	Variance of Coefficient	t-test
.39963738    01	.16289564    00	.99017367    01
.65096617-    01-	.85030838    02-	.70594389-    00

x	y	y (exp.)	Standardized Deviate
.10000000    01	.23000000    02	.54400525    02	.15692366-    01
.50000000    01	.49000000    02	.48989444    02	.39249479    03-
.15000000    02	.76000000    02	.45608263    02	.93081715    00
.26000000    02	.81000000    02	.44004098    02	.11122289    01
.51000000    02	.81000000    02	.42115897    02	.11921736    01
.76000000    02	.81000000    02	.41036328    02	.12395080    01
.10100000    03	.72999999    02	.40283626    02	.10836977    01
.12500000    03	.31000000    02	.39728425    02	.45220729-    00
.14900000    03	.27000000    02	.39276793    02	.68319095-    00
.17300000    03	.42000000    02	.38896800    02	.13991597    00
.19700000    03	.32000000    02	.38569242    02	.34035747-    00
.21100000    03	.28000000    02	.38397255    02	.57561593-    00
.23500000    03	.21000000    02	.38128928    02	.10872280-    01
.25900000    03	.22000000    02	.37888328    02	.99089140-    00

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LGP-30 USERS' ORGANIZATION - POOL

Program No. F2-96

E.R.F.P. Polynomial Fit (Statistical)

II. ILLUSTRATIVE EXAMPLES

Type                      Order  
 .40000000    01    .20000000    01

ANALYSIS OF VARIANCE TABLE

Variation due to:	Sum of Squares	Degrees of Freedom	Mean Square	F
Regression	.19792549	03	.65975163	.10185808
Residual	.71248817	00	.64771653	
Total	.19863798	03	.14000000	

Coefficient	Variance of Coefficient	t-test
.29914932    01	.57616821    01-	.12462736    02
.10220511    01	.28233858    01-	.60825753    01
.17896003-    00	.71548605    03-	.66904518-    01

x	y	y (exp.)	Standardized Deviate
.10000000    01	.23000000    02	.19915398    02	.56581268    00
.50000000    01	.49000000    02	.64900964    02	.11042801-    01
.15000000    02	.76000000    02	.85357565    02	.45624631-    00
.26000000    02	.81000000    02	.83240924    02	.10722883-    00
.51000000    02	.81000000    02	.69646445    02	.59338235    00
.76000000    02	.81000000    02	.58048785    02	.13090833    01
.10100000    03	.72999999    02	.49237340    02	.15473584    01
.12500000    03	.31000000    02	.42702213    02	.12583901-    01
.14900000    03	.27000000    02	.37514081    02	.12922436-    01
.17300000    03	.42000000    02	.33310880    02	.91073869    00
.19700000    03	.32000000    02	.29845139    02	.27392160    00
.21100000    03	.28000000    02	.28093093    02	.13042737-    01-
.23500000    03	.21000000    02	.25462172    02	.75705077-    00
.25900000    03	.22000000    02	.23216594    02	.21149080-    00

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LGP-30 CODING SHEET

PREPARED FOR: LGP- 30 USERS' ORGANIZATION - POOL				PAGE 1 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY:	DATE 11/4/59
PROBLEM: E.R.F.P. Polynomial Fit (Statistical) Program				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
; 0,0,0,0,3,0,0	/						
/,0,0,0,0,3,0,0	/						
		0,0,0,10	x r	3,5,0,0	/		ERFP
		0,0,11	x u	3,5,0,0	/		
		0,0,12	x i	0,0,0,0	/	Data input	
		0,0,13	x e	0,0,0,0	/	X exit	ERFP
		0,0,14	x r	3,4,0,0	/		α- num.
		0,0,15	x u	1,3,6,2	/		
0,0,0,0,0,0,4	'	0,0,16	2,0,2,0	1,0,5,f	/	CR,CR,UC,T	Heading "Type"
		0,0,17	0,8,1,2	4,2,4,f	/	X LC,Y,P, e,	
		0,0,18	1,0,1,a	0,8,0,6	/	UC,:,LC,Sp	
		0,0,19	0,6,v,q	0,0,0,0	/	Sp, out	
		0,0,20			/		
		0,0,21	x c	2,1,3,7	/	junk	
		0,0,22	x p	0,0,0,0	/	X input	Input Type
		0,0,23			/	from flex	
		0,0,24	x i	0,0,0,0	/		
		0,0,25	d	0,1,3,2	/	1@2	and store
		0,0,26	x c	2,1,5,0	/	type @ 29	@ 29
		0,0,27	x r	3,4,0,0	/	X	α- num.
		0,0,28	x u	3,4,0,0	/		
,,0,0,0,0,0,0,4	'	0,0,29	2,0,1,0	4,6,0,8	/	CR,UC,D,LC	Heading "Order"
		0,0,30	1,f,2,f	4,f,1,f	/	r,d,e,r	
		0,0,31	1,0,1,a	0,8,0,6	/	X UC,:, LC,Sp	
		0,0,32	0,6,v,q	0,0,0,0	/	Sp, out	
		0,0,33	x c	2,1,3,7	/	junk	
		0,0,34	x p	0,0,0,0	/	input	input order
		0,0,35	x i	0,0,0,0	/	X from flex	and store
		0,0,36	d	0,1,3,2	/	1 @ 2	@ 29
		0,0,37	x h	2,1,4,3	/	K @ 29	
		0,0,38	a	1,3,5,7	/	1 @ 29	store
		0,0,39	x h	2,1,3,6	/	X k+1 @ 29	k+1 @ 29
		0,0,40	x a	2,1,3,6	/	k+1	
		0,0,41	a	1,3,5,8	/	2 @ 29	Store
		0,0,42	x c	2,1,6,1	/	2K+4 @ 29	2K+4 @ 29
		0,0,43	x r	3,4,0,0	/	X	α- num.

LGP-30 CODING SHEET

PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL				PAGE 2 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. Polynomial Fit (Statistical) Program				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
		0,0 <sub>3</sub> 2	x	u3,4,0,0	/		num
,0,0,0,0,0,0,6	1		2,0	1,0,7,f,0,8	/	CR,UC, S LC	
			7,2,3,f	4,2,0,j	/	a,m,p,l	
			4,f,0,6	1,0,7,f	/	<input checked="" type="checkbox"/> e,sp,uc,s	Heading
			0,8,2,2	0,2,4,f	/	LC,i,z,e	"sample size"
			1,0,1,a	0,8,0,6	/	UC.: ,LC,Sp	
			0,6,v,q	0,0,0,0	/	Sp out	
			x,c	2,1,3,7	/	<input checked="" type="checkbox"/> junk	
			x,p	0,0,0,0	/	input	Input
			x,i	0,0,0,0	/	from flex	Sample size
			d	0,1,3,2	/	/@ 2	and store @ 29
			x,c	2,1,5,8	/	<input checked="" type="checkbox"/> n@ 29	
			x,p	1,6,0,0	/	CR	CR
			x,z	0,0,0,9	/	delay	
			b	0,1,5,2	/	z0402	initialize loop
			y	0,0,4,9	/	<input checked="" type="checkbox"/> c [ ]	for clearing storage
			x,c	2,1,3,7	/	junk	
			c	[ ] [ ] [ ]	/		clear summation
			b	0,0,4,9	/	c [ ]	
			a	1,3,5,7	/	<input checked="" type="checkbox"/> l@ 29	storage
			h	0,0,4,9	/		
			s	0,1,5,6	/	c0700	0402-0663
			t	0,0,4,8	/		
			x,c	2,1,3,7	/	<input checked="" type="checkbox"/> junk	
			x,c	1,8,5,4	/	$\Sigma y^2$	$\Sigma y^2$ storage
			x,c	1,8,5,5	/		
			b	0,1,5,2	/	u0227	
			x,a	2,1,5,0	/	<input checked="" type="checkbox"/> type @ 29	initialize
			c	0,2,2,7	/	u [ ]	
			b	0,1,5,3	/	u0325	transfers
			x,a	2,1,5,0	/	type @ 29	
			c	0,3,2,5	/	<input checked="" type="checkbox"/> u [ ]	

PREPARED FOR: LGP- USEFS' ORGANIZATION - POOL				PAGE 3 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool reviewer	DATE
PROBLEM: E.R.F.P. Polynomial Fit (Statistical) Program				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	01010	b	0154	/	ull17	
		01	x a	2150	/	type@29	
		012	c	1117	/	u[ ]	initialize
		013	b	0155	/	X ul217	
		014	x a	2150	/	type@29	transfers
		015	c	1217	/	u [ ]	
		016	b	0157	/	xz2200	loc.x
		017	y	0231	/	X	
		018	y	1316	/		initialize
		019	y	1321	/		
		110	y	1327	/		x <sub>i</sub> and y <sub>i</sub>
		111	b	0158	/	X xz2700 locy	
		112	y	0234	/		80xB commands
		113	y	1318	/		
		114	y	1323	/		
		115	y	1330	/	X	
		116	b	0163	/	z0134	
		117	x a	2150	/	type@29	
		118	x a	2150	/	type@29	initialize
		119	y	0201	/	X B[ ] type	
		210	a	1357	/	1@29	program
		211	y	0203	/	B[ ]	
		212	b	0163	/	z0134	to convert
		213	x a	2143	/	X order@29	
		214	x a	2143	/	@29 order	type, order,
		215	y	0205	/	B [ ] k	
		216	a	1357	/	1@29	and k + 1
		217	y	0207	/	X B[ ] k	
		218	a	1357	/	1@29	to ERFP
		219	y	0209	/	B[ ] k+1	
		310	a	1357	/	1@29	format
		311	u	0200	/	X	transfer around storage

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Review	DATE 11/4/59
PROBLEM: E.R.F.P. Polynomial Fit (Statistical) Program				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	⊗					
0000020	/	01312	2000	0000	/	1@2	
	/	33	200	0000	/	1@6	
	/	314	2000	0000	/	3@14	
	/	35		3 w w j	/	⊗ mask	
	/	316	4000	0000	/	1	
	/	317			/	4	
	/	318	4000	0000	/	2	
	/	319			/	⊗ 8	
	/	410	6000	0000	/	3	
	/	411			/	8	
	/	412	4000	0000	/	4	
	/	413			/	⊗ j	
	/	414	5000	0000	/	5	
	/	415			/	j	
	/	416	6000	0000	/	6	
	/	417			/	⊗ j	
	/	418	7000	0000	/	7	
	/	419			/	j	
	/	510	4000	0000	/	8	
	/	511			/	⊗ 10	
	/	512		u 0 2 2 7	/		
	/	513		u 0 3 2 5	/		
	/	514		u 1 1 1 7	/		
	/	515		u 1 2 1 7	/	⊗	
	/	516		c 0 7 0 0	/		
	/	517		x z 2 2 0 0	/	x	
	/	518		x z 2 7 0 0	/	<sup>1</sup> y <sub>1</sub>	
	/	519		z 0 4 0 2	/	⊗ $\sum \bar{x}$	
	/	610		z 0 4 0 4	/	$\sum \bar{x}^2$	
	/	611		z 0 6 5 0	/	$\sum \bar{x} y$	
	/	612		z 0 4 0 0	/	n	
	/	613		z 0 1 3 4	/	⊗	



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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Yodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	X					
		0, 2, 10, 10	y	0, 2, 1, 1	/	B [ ]k+1	
		10, 11	b	[ ]	/		store type
		10, 12	x, c	2, 1, 4, 6	/		in ERFP
		10, 13	b	[ ]	/	X	format
		10, 14	x, c	2, 1, 4, 7	/		
		10, 15	b	[ ]	/		store K
		10, 16	x, c	2, 1, 4, 8	/		in ERFP
		10, 17	b	[ ]	/	X	format
		10, 18	x, c	2, 1, 4, 9	/		
		10, 19	b	[ ]	/		store k + 1
		11, 10	x, c	2, 1, 5, 3	/		in ERFP
		11, 11	b	[ ]	/	X	format
		11, 12	x, c	2, 1, 5, 4	/		
		11, 13	x, c	1, 8, 3, 5	/	counter 2	Clear
		11, 14	x, c	1, 8, 3, 4	/	Counter 1	Counters
		11, 15	b	0, 1, 5, 9	/	X Z0402	initialize
		11, 16	y	0, 2, 5, 0	/	800 A [ ]	$\Sigma X^2$
		11, 17	y	0, 2, 5, 1	/	800 C [ ]	
		11, 18	b	0, 1, 6, 0	/	Z0404	initialize
		11, 19	y	0, 2, 5, 4	/	X 800A [ ]	$\Sigma X^2$ #1
		12, 10	y	0, 2, 5, 5	/	800C [ ]	
		12, 11	b	0, 1, 6, 1	/	Z0650	initialize
		12, 12	y	0, 2, 5, 8	/		$\Sigma X^2 Y$
		12, 13	y	0, 2, 5, 9	/	X	
		12, 14	x, c	2, 1, 3, 7	/	junk	
		12, 15	x, r	3, 5, 0, 0	/		ERFP
		12, 16	x, u	3, 5, 0, 0	/		
0, 0, 0, 0, 0, 0, 1		12, 17	[ ]	[ ]	/	X u0228, u0229, u0230, u0231	
		12, 18	u	1, 3, 1, 6	/	Type I	store x and y
		12, 19	u	1, 3, 2, 1	/	Type II	store x and lny
		13, 10	u	1, 3, 2, 7	/	Type III	store lnx and y
		13, 11	8, 0, x, b	[ ] [ ] [ ] [ ]	/	X <sup>IV</sup> x <sub>i</sub>	

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JOB NO.

PROGRAM NO. F2-96

PROGRAM PREPARED BY: Calvin Y. Jodat

PROGRAM CHECKED BY: Pool Reviewer

DATE 11/4/59

PROBLEM:

E.R.F.P. ( POLYNOMIAL FIT (STATISTICAL) PROGRAM

TRACK 05

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	X					
		0 2 3 12	x n	0 0 0 0	/	ln X <sub>i</sub>	Type IV
		3 3	8 0 x c	2 1 5 1	/	X <sub>i</sub>	Store ln X <sub>i</sub> and
		3 4	8 0 x b	[ , , ]	/	Y <sub>i</sub>	
		3 5	x n	0 0 0 0	/	X ln Y <sub>i</sub>	ln Y <sub>i</sub>
		3 6	8 0 x c	2 1 4 4	/	Y <sub>i</sub>	
		3 7	8 0 0 b	0 1 3 6	/	1	store 1
		3 8	8 0 x c	1 8 4 8	/	X <sub>j</sub>	in X <sub>j</sub>
		3 9	8 0 x b	2 1 4 4	/	X Y <sub>i</sub>	Store Y
		4 0	8 0 x h	1 8 5 2	/	X <sup>h</sup> Y	in X <sup>h</sup> Y
		4 1	8 0 0 a	0 6 4 8	/	Σ Y	Σ Y
		4 2	8 0 0 c	0 6 4 8	/	Σ Y	
		4 3	8 0 x p	2 1 4 4	/	X Y <sub>i</sub>	
		4 4	8 0 x m	2 1 4 4	/	Y <sub>i</sub>	Σ Y <sup>2</sup>
		4 5	8 0 x a	1 8 5 4	/	Σ Y <sup>2</sup>	
		4 6	8 0 x c	1 8 5 4	/	Σ Y <sup>2</sup>	
		4 7	8 0 x p	2 1 5 1	/	X X <sub>i</sub>	
		4 8	8 0 x m	1 8 4 8	/	X <sub>j</sub>	X <sub>j</sub>
		4 9	8 0 x h	1 8 4 8	/	X <sub>j</sub>	
		5 0	8 0 0 a	[ , , ]	/	Σ X <sub>j</sub>	Σ X <sub>j</sub>
		5 1	8 0 0 c	[ , , ]	/	X Σ X <sub>j</sub>	
		5 2	8 0 x m	1 8 4 8	/	X <sub>j</sub> +1	
		5 3	8 0 x h	1 8 4 8	/	X <sub>j</sub> +1	Σ X <sub>j</sub> +1
		5 4	8 0 0 a	[ , , ]	/	X <sub>j</sub> +1	
		5 5	8 0 0 c	[ , , ]	/	X X <sub>j</sub> +1	
		5 6	8 0 x m	1 8 5 2	/	X <sup>h</sup> Y	
		5 7	8 0 x h	1 8 5 2	/	X <sup>h</sup> Y	Σ X <sup>h</sup> Y
		5 8	8 0 0 a	[ , , ]	/	Σ X <sup>h</sup> Y	
		5 9	8 0 0 c	[ , , ]	/	X Σ X <sup>h</sup> Y	
		6 0	x e	0 0 0 0	/	exit ERFP	
		6 1	x b	1 8 3 4	/	counter 1	
		6 2	a	1 3 5 7	/	1 at 29	counter 1
		6 3	x h	1 8 3 4	/	X counter 1	

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 06

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		POS	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	031010	x	s 2143	/	K at 29	
		1011	t	0303	/	Modify $\sum X_j$	$\sum X_{j+1}, \sum X^{hy}$ storage commands
		1012	u	0319	/		
		1013	b	0254	/	<del>800A[ ]</del> $X_{j+1}$	
		1014	a	1358	/	2 at 29	modify
		1015	y	0250	/	800A[ ] $X_j$	
		1016	y	0251	/	800C[ ] $X_j$	$\sum X_j, \sum X_{j+1}$
		1017	u	0308	/	<del>X</del>	
		1018	a	1358	/	2 at 29	$\sum X^{hy}$
		1019	y	0254	/	800A[ ] $\sum X_{j+1}$	
		1110	y	0255	/	800C[ ] $\sum X_{j+1}$	storage
		1111	b	0258	/	<del>800A[ ]</del> $\sum X^{hy}$	
		1112	a	1358	/	2 at 29	commands
		1113	y	0258	/	800A[ ] $\sum X^{hy}$	
		1114	y	0259	/	800C[ ] $\sum X^{hy}$	
		1115	x	c 2137	/	<del>X</del> junk	
		1116	x	r 3510	/		} ERFP
		1117	x	u 3510	/		
		1118	u	0247	/		
		1119	x	b 1835	/	<del>X</del> counter 2	} counter 2
		1210	a	1357	/	1 at 29	
		1211	x	h 1835	/	counter 2	
		1212	x	s 2158	/	n at 29	
		1213	t	0325	/	<del>X</del> transfer	
		1214	u	0337	/		
0000001	/	1215			/	U0326, U0327, U0328, U0329	
		1216	u	1333	/	Type I	
		1217	u	1341	/	<del>X</del> Type II	} modify $X_i$
		1218	u	1349	/	Type III	
		1219	b	0231	/	IV 80XB[ ] $X_i$	and $Y_i$ 800B commands
		1219	b	0231	/	IV 80XB[ ] $X_i$	Type IV
		1310	a	1358	/	2 at 29	modify $X_i$
		1311	y	0231	/	<del>X</del> 80XB[ ] $X_i$	80XB command

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PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL				PAGE 8 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Review	DATE 11/5/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 06

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	0 3	b	0 2 3 4	/	80XB[ ]Y <sub>i</sub>	Type IV
		3 3	a	1 3 5 8	/	2 at 29	
		3 4	y	0 2 3 4	/	80XB[ ]Y <sub>i</sub>	80XB[ ] commands
		3 5	x c	2 1 3 7	/	<input checked="" type="checkbox"/> junk	
		3 6	u	0 2 1 4	/		
		3 7	x c	2 1 3 7	/	junk	
		3 8	x c	1 8 3 4	/	counter 1	clear counters
		3 9	x c	1 8 3 5	/	<input checked="" type="checkbox"/> counter 2	
		4 0	b	0 1 6 2	/	z0400	initialize
		4 1	y	0 3 4 8	/	B[ ]	
		4 2	a	1 3 5 7	/	1 at 29	matrix storage
		4 3	y	0 3 5 0	/	<input checked="" type="checkbox"/> B[ ]	
		4 4	b	0 7 4 1	/	z0432	and beginning of matrix
		4 5	y	0 3 4 9	/	C[ ]	
		4 6	a	1 3 5 7	/	1 at 29	store matrix row element
		4 7	y	0 3 5 1	/	<input checked="" type="checkbox"/> C[ ]	
		4 8	b	[ ] [ ]	/		
		4 9	c	[ ] [ ]	/		
		5 0	b	[ ] [ ]	/		
		5 1	c	[ ] [ ]	/	<input checked="" type="checkbox"/>	
		5 2	x b	1 8 3 4	/	counter 1	
		5 3	a	1 3 5 7	/	1 at 29	
		5 4	x h	1 8 3 4	/	counter 1	
		5 5	x s	2 1 3 6	/	<input checked="" type="checkbox"/> k+1 at 29	
		5 6	t	0 3 5 8	/	modify storage commands	
		5 7	u	0 7 0 6	/		
		5 8	b	0 3 4 8	/	B[ ]	modify matrix storage
		5 9	a	1 3 5 8	/	<input checked="" type="checkbox"/> 2 at 29	
		6 0	y	0 3 4 8	/	B[ ]	commands
		6 1	a	1 3 5 7	/	1 at 29	
		6 2	y	0 3 5 0	/	B[ ]	transfer around storage
		6 3	u	0 7 0 0	/	<input checked="" type="checkbox"/>	



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JOB NO.	PROGRAM NO. <b>F2-96</b>	PROGRAM PREPARED BY: <b>Calvin Y. Jodat</b>	PROGRAM CHECKED BY: <b>Pool Reviewer</b>	DATE <b>11/4/59</b>	
PROBLEM: <b>E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM</b>				TRACK <b>07</b>	

PROGRAM INPUT CODES	C O S	LOCATION	INSTRUCTION		C O S	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/				/		
	/	0 4			/	n	
	/	10 10			/		
	/	10 11			/		
	/	10 12			/		
	/	10 13			/	X	
	/	10 14			/		
	/	10 15			/		
	/	10 16			/		
	/	10 17			/	X	
	/	10 18			/		
	/	10 19			/		
	/	11 10			/		
	/	11 11			/	X	
	/	11 12			/		
	/	11 13			/		
	/	11 14			/		$\sum x, \sum x^2,$
	/	11 15			/	X	
	/	11 16			/		$\sum x^3, \dots, \sum x^{2k}$
	/	11 17			/		
	/	11 18			/		
	/	11 19			/	X	$1 \leq k \leq 7$
	/	12 10			/		
	/	12 11			/		
	/	12 12			/		
	/	12 13			/	X	
	/	12 14			/		
	/	12 15			/		
	/	12 16			/		
	/	12 17			/	X	
	/	12 18			/		
	/	12 19			/		
	/	13 10			/		vacant
	/	13 11			/	X	

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JOB NO.	PROGRAM NO. <b>F2-96</b>	PROGRAM PREPARED BY: <b>Calvin Y. Jodat</b>	PROGRAM CHECKED BY: <b>Pool Reviewer</b>	DATE <b>11/4/59</b>
PROBLEM: <b>E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM</b>				TRACK <b>07</b>

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	0 4 3 2					
		3 3					
		3 4					
		3 5			X		
		3 6					
		3 7					
		3 8					matrix storage
		3 9			X		
		4 0					
		4 1					$n \sum X \sum X^2 \dots \sum X^k$
		4 2					
		4 3			X		$\sum X \sum X^2 \sum X^3 \dots \sum X^{k+1}$
		4 4					. . . . .
		4 5					. . . . .
		4 6					. . . . .
		4 7			X		$\sum X^k \sum X^{k+1} \sum X^{k+2} \sum X^{2k}$
		4 8					
		4 9					
		5 0					
		5 1			X		
		5 2					
		5 3					
		5 4					
		5 5			X		
		5 6					
		5 7					
		5 8					
		5 9			X		
		6 0					
		6 1					
		6 2					
		6 3			X		

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM			DATE 11/4/59
			TRACK 08

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	0,5 10 10			/		
	/	10 11			/		
	/	10 12			/		
	/	10 13			/	X	
	/	10 14			/		
	/	10 15			/		
	/	10 16			/		
	/	10 17			/	X	
	/	10 18			/		matrix storage
	/	10 19			/		
	/	11 10			/		
	/	11 11			/	X	$n \sum X \sum X^2 \dots \sum X^k$
	/	11 12			/		
	/	11 13			/		$\sum X \sum X^2 \sum X^3 \dots \sum X^{k+1}$
	/	11 14			/		. . . . .
	/	11 15			/	X	. . . . .
	/	11 16			/		. . . . .
	/	11 17			/		$\sum X^k \sum X^{k+1} \sum X^{k+1} \dots \sum X^{2k}$
	/	11 18			/		
	/	11 19			/	X	
	/	12 10			/		
	/	12 11			/		
	/	12 12			/		
	/	12 13			/	X	
	/	12 14			/		
	/	12 15			/		
	/	12 16			/		
	/	12 17			/	X	
	/	12 18			/		
	/	12 19			/		
	/	13 10			/		
	/	13 11			/	X	

JOB NO.

PROGRAM NO.  
F2-96

PROGRAM PREPARED BY:  
Calvin Y. Jodat

PROGRAM CHECKED BY:  
Pool Reviewer

DATE  
11/4/59

PROBLEM:

E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM

TRACK  
08

PROGRAM INPUT CODES	OBS	LOCATION	INSTRUCTION		OBS	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/				/		
	/	X			/		
		0 5			/		
		3 2			/		
		3 3			/		
		3 4			/		
		3 5			/	X	
		3 6			/		
		3 7			/		matrix storage
		3 8			/		
		3 9			/	X	
		4 10			/		$n \sum X \sum X^2 \dots \sum X^k$
		4 11			/		
		4 12			/		$\sum X \sum X^2 \sum X^3 \dots \sum X^{k+1}$
		4 13			/	X	. . . . .
		4 14			/		. . . . .
		4 15			/		. . . . .
		4 16			/		$\sum X^k \sum X^{k-1} \sum X^{k+2} \dots \sum X^{2k}$
		4 17			/	X	
		4 18			/		
		4 19			/		
		5 10			/		
		5 11			/	X	
		5 12			/		
		5 13			/		
		5 14			/		
		5 15			/	X	
		5 16			/		
		5 17			/		
		5 18			/		
		5 19			/	X	
		6 10			/		
		6 11			/		
		6 12			/		
		6 13			/	X	



CARRIAGE RETURN



= CONDITIONAL STOP CODE



LGP-30 CODING SHEET

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 09

PROGRAM INPUT CODES	POS	LOCATION	INSTRUCTION		POS	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	0 6					
	/	0 10					
	/	0 11					
	/	0 12					
	/	0 13			X		
	/	0 14			/		
	/	0 15			/		
	/	0 16			/		
	/	0 17			X		matrix storage
	/	0 18			/		
	/	0 19			/		$n \sum X \sum X^2 \dots \sum X^k$
	/	1 10			/		
	/	1 11			X		$\sum X \sum X^2 \sum X^3 \dots \sum X^{k+1}$
	/	1 12			/		. . . . .
	/	1 13			/		. . . . .
	/	1 14			/		. . . . .
	/	1 15			X		$\sum X^k \sum X^{k+1} \sum X^{k+2} \dots \sum X^{2k}$
	/	1 16			/		
	/	1 17			/		
	/	1 18			/		
	/	1 19			X		
	/	2 10			/		
	/	2 11			/		
	/	2 12			/		
	/	2 13			X		
	/	2 14			/		
	/	2 15			/		
	/	2 16			/		
	/	2 17			X		
	/	2 18			/		
	/	2 19			/		
	/	3 0			/		
	/	3 1			X		

LGP-30 CODING SHEET

PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL				PAGE 14 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 09

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	0 6 3 2					
		3 3					
		3 4					
		3 5			X		
		3 6					product vector B
		3 7					storage
		3 8					
		3 9			X		C <sub>0</sub>
		4 0					C <sub>1</sub>
		4 1				B =	C <sub>2</sub>
		4 2					C <sub>3</sub>
		4 3			X		.
		4 4					.
		4 5					.
		4 6					C <sub>k</sub>
		4 7			X		
		4 8					
		4 9					
		5 0					
		5 1			X		$\sum X^h Y$ vector G
		5 2					storage
		5 3					
		5 4					Y
		5 5			X		$\sum XY$
		5 6				G =	$\sum X^2 Y$
		5 7					$\sum X^3 Y$
		5 8					.
		5 9			X		.
		6 0					$\sum X^h Y$
		6 1					.
		6 2					.
		6 3			X		$\sum X^k Y$

LGP-30 CODING SHEET

PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL				PAGE 15 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Yodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 10

PROGRAM INPUT CODES	LOC	LOCATION	INSTRUCTION		LOC	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
: 0 0 0 1 0 0 0	/						
/ 0 0 0 0 3 0 0	/	<input checked="" type="checkbox"/>					
		0 7 0 0	b	0 3 4 9	/	C[ ]	
		0 11	a	1 3 5 8	/	2 at 29	Modify
		0 12	y	0 3 4 9	/	C[ ]	Matrix
		0 13	a	1 3 5 7	/	<input checked="" type="checkbox"/> 1 at 29	Storage
		0 14	y	0 3 5 1	/	C[ ]	Commands
		0 15	u	0 3 4 8	/		Store Matrix
		0 16	x b	1 8 3 5	/		Counter 2
		0 17	a	1 3 5 7	/	<input checked="" type="checkbox"/> 1 at 29	
		0 18	x h	1 8 3 5	/		Counter 2
		0 19	x s	2 1 3 6	/		k + 1 at 29
		1 10	t	0 7 1 2	/		Modify start of previous row
		1 11	u	0 7 2 6	/	<input checked="" type="checkbox"/>	
		1 12	b	0 1 6 2	/	z0400	
		1 13	x a	1 8 3 5	/	Counter 2	Modify start
		1 14	x a	1 8 3 5	/	Counter 2	
		1 15	y	0 3 4 3	/	<input checked="" type="checkbox"/> B[ ]	of previous
		1 16	a	1 3 5 7	/	1 at 29	
		1 17	y	0 3 5 0	/	B[ ]	row
		1 18	t	0 3 4 9	/	C[ ]	
		1 19	a	1 3 5 8	/	<input checked="" type="checkbox"/> 2 at 29	Modify
		2 0	y	0 3 4 9	/	C[ ]	storage
		2 1	a	1 3 5 7	/	1 at 29	location
		2 2	y	0 3 5 1	/	C[ ]	
		2 3	x c	2 1 3 7	/	<input checked="" type="checkbox"/> junk	clear
		2 4	x c	1 8 3 4	/		counter 1
		2 5	u	0 3 4 8	/		
		2 6	x b	2 1 3 6	/	k + 1 at 29	
		2 7	d	0 1 3 4	/	<input checked="" type="checkbox"/> 1 at 14	Matrix
		2 8	a	0 7 4 1	/	z0432	inversion
		2 9	c	0 7 3 2	/		to obtain
		3 0	x r	1 9 1 4	/		A-1
		3 1	x u	1 9 0 0	/	<input checked="" type="checkbox"/>	



JOB NO.

PROGRAM NO. F2-96

PROGRAM PREPARED BY: GALVIN Y. JODAT

PROGRAM CHECKED BY: POOL REVIEWER

DATE 11/4/59

PROBLEM:

E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM

TRACK 10

PROGRAM INPUT CODES	SOS	LOCATION	INSTRUCTION		SOS	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
, 0 0 0 0 0 0 0 1	'	0 7 3 2	[		/		
		3 3	x b	2 1 3 6	/	k + 1 at 29	
		3 4	d	0 1 3 3	/	1 at 6	Matrix
		3 5	x a	2 1 3 6	/	<input checked="" type="checkbox"/> k + 1 at 29	vector
		3 6	e	0 1 3 5	/	mask	multiply
		3 7	c	0 7 4 2	/		to obtain
		3 8	x r	1 7 0 0	/		coefficient
		3 9	x u	1 7 0 0	/	<input checked="" type="checkbox"/>	vector
		4 0	x z	3 5 0 0	/	loc ERFP	B
		4 1	z	0 4 3 2	/	loc matrix	
0 0 0 0 0 0 0 1	'	4 2	[		/		
		4 3	z	0 6 4 8	/	<input checked="" type="checkbox"/> loc vector $\sum X_k y$	
		4 4	z	0 6 3 2	/	loc prod vector B	
		4 5	x r	3 4 0 0	/		$\Delta$ - num
		4 6	x u	3 4 0 0	/		
0 0 0 0 0 0 0 5	'	4 7	2 0 2 0	1 0 5 2	/	<input checked="" type="checkbox"/> CR, CR, UCT	
		4 8	0 8 1 2	4 2 4 f	/	LC, Y, P, E	
		4 9	3 0 1 0	4 6 0 8	/	Tab, UC, G, U	
		5 0	1 f 2 f	4 f 1 f	/	r d, e, r	
		5 1	2 0 v q	0 0 0 0	/	<input checked="" type="checkbox"/> CR, out	
		5 2	x r	3 5 0 0	/		ERFP
		5 3	x u	3 5 0 0	/		
		5 4	8 0 x b	2 1 4 6	/	type	Print type
		5 5	x p	0 0 0 0	/	<input checked="" type="checkbox"/>	
		5 6	8 0 x b	2 1 4 8	/	Order	Print order
		5 7	x p	0 0 0 0	/		
		5 8	x e	0 0 0 0	/	Exit ERFP	
		5 9	x p	1 6 0 0	/	<input checked="" type="checkbox"/> CR	CR
		6 0	x z	0 0 0 0	/	delay	
		6 1	b	0 7 4 3	/	z0648	Initialize P and M
		6 2	v	0 8 0 7	/	800P[ ]	commands for com-
		6 3	b	0 7 4 4	/	<input checked="" type="checkbox"/> z0632	putation of SS <sub>reg</sub>

LGP-30 CODING SHEET

PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL			PAGE 17 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM			DATE 11/4/59
			TRACK 11

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
		0,8,0,0	y	0,8,0,8	/	800M[ ]	
		0,0,1	x,c	2,1,3,7	/	junk	clear
		0,0,2	x,c	1,8,5,8	/	counter 3	counter
		0,0,3	x,c	1,8,3,2	/	<input checked="" type="checkbox"/> SS <sub>reg</sub>	clear
		0,0,4	x,c	1,8,3,3	/		SS <sub>reg</sub>
		0,0,5	x,r	3,5,0,0	/		ERFP
		0,0,6	x,u	3,5,0,0	/		
		0,0,7	8,0,0,p	[ , , , ]	/	<input checked="" type="checkbox"/> coef.of vector G	Compute
		0,0,8	8,0,0,m	[ , , , ]	/	coef.of vector B	and store
		0,0,9	8,0,x,a	1,8,3,2	/	SS <sub>reg</sub>	SS <sub>reg</sub>
		0,0,10	8,0,x,c	1,8,3,2	/	"	
		0,0,11	x,e	0,0,0,0	/	<input checked="" type="checkbox"/> exit ERFP	
		0,0,12	x,b	1,8,5,8	/	counter 3	
		0,0,13	a	1,3,5,7	/	1 at 29	
		0,0,14	x,h	1,8,5,8	/	counter 3	
		0,0,15	x,s	2,1,3,6	/	<input checked="" type="checkbox"/> k+1 at 29	
		0,0,16	t	0,8,1,8	/	modify 800P+800M commands in loop	
		0,0,17	u	0,8,2,6	/		
		0,0,18	b	0,8,0,7	/	800P[ ]	
		0,0,19	a	1,3,5,8	/	<input checked="" type="checkbox"/> 2 at 29	Modify
		0,0,20	y	0,8,0,7	/	800P[ ]	800P+800M
		0,0,21	b	0,8,0,8	/	800M[ ]	Commands
		0,0,22	a	1,3,5,8	/	2 at 29	in previous
		0,0,23	y	0,8,0,8	/	<input checked="" type="checkbox"/> 800M[ ]	loop
		0,0,24	x,c	2,1,3,7	/	junk	
		0,0,25	u	0,8,0,5	/		
		0,0,26	x,c	2,1,3,7	/	junk	
		0,0,27	x,r	3,5,0,0	/	<input checked="" type="checkbox"/>	ERFP
		0,0,28	x,u	3,5,0,0	/		
		0,0,29	8,0,x,b	1,8,5,4	/	Σ Y <sup>2</sup>	
		0,0,30	8,0,x,s	1,8,3,2	/	SS <sub>reg</sub>	SS <sub>y.x</sub>
		0,0,31	8,0,x,c	1,8,3,8	/	<input checked="" type="checkbox"/> SS <sub>y.x</sub>	

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 11

PROGRAM INPUT CODES	SOP	LOCATION	INSTRUCTION		SOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
		0 8 3 2	8 0 x b 1 8 3 2	/	SS reg	} s <sup>2</sup> reg	
		3 3	8 0 x d 2 1 5 3	/	k + 1		
		3 4	8 0 x c 1 8 3 6	/	s <sup>2</sup> reg		
		3 5	8 0 0 b 0 4 0 0	/	<input checked="" type="checkbox"/> n	} d.f.y.x	
		3 6	8 0 x s 2 1 5 3	/	k + 1		
		3 7	8 0 x c 1 8 4 0	/	d.f.y.x	} s <sup>2</sup> y.x	
		3 8	8 0 x b 1 8 3 8	/	S.S.y.x		
		3 9	8 0 x d 1 8 4 0	/	<input checked="" type="checkbox"/> d.f.y.x		
		4 0	8 0 x h 1 8 4 2	/	s <sup>2</sup> y.x	} $\sqrt{s^2 y.x}$	
		4 1	x r 0 0 0 0	/	$\sqrt{\quad}$		
		4 2	8 0 x c 1 8 4 4	/		} F	
		4 3	8 0 x b 1 8 3 6	/	<input checked="" type="checkbox"/> s <sup>2</sup> reg		
		4 4	8 0 x d 1 8 4 2	/	s <sup>2</sup> y.x		
		4 5	8 0 x c 1 8 4 6	/	F	} exit ERFP	
		4 6	x e 0 0 0 0	/			
		4 7	x r 3 4 0 0	/	<input checked="" type="checkbox"/>	} $\alpha$ - ram	
		4 8	x u 3 4 0 0	/			
0 0 0 0 0 1 5	'	14 9	2 0 2 0 1 0 7 2	/	CR, CR, UC, A	} Headings for Analysis of Variance Table	
		15 0	3 2 7 2 0 j 1 2	/	N, A, L, Y		
		15 1	7 f 2 2 7 f 0 6	/	<input checked="" type="checkbox"/> S, I, S, Sp		
		15 2	4 6 5 4 0 6 3 a	/	O, F, Sp, V		
		15 3	7 2 1 f 2 2 7 2	/	A, R, I, A		
		15 4	3 2 6 f 4 f 0 6	/	N, C, E, Sp		
		15 5	5 f 7 2 0 f 0 j	/	<input checked="" type="checkbox"/> T, A, B, L		
		15 6	4 f 2 0 2 0 1 8	/	E, CR, CR, CB		
		15 7	3 a 0 8 7 2 1 f	/	V, LC, a,		
		15 8	2 2 7 2 5 f 2 2	/	i, a, t i		
		15 9	4 6 3 2 3 0 1 0	/	<input checked="" type="checkbox"/> O, N, tab, UC		
		16 0	7 f 0 8 5 2 3 f	/	S, LC, u, m		
		16 1	0 6 4 6 5 4 3 0	/	Sp, o, f, Tab		
		16 2	1 0 2 f 0 8 4 f	/	UC, D, LC, e		
		16 3	5 j 1 1 f 4 f 4 f	/	<input checked="" type="checkbox"/> q, r, e, e		

LGP-30 CODING SHEET

PREPARED FOR: <b>LGP-30 USERS' ORGANIZATION - POOL</b>				PAGE 19	OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59	
PROBLEM: <b>E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM</b>				TRACK 12	

PROGRAM INPUT CODES	LOC	LOCATION	INSTRUCTION		LOC	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
, 0 0 0 0 0 17		0 9 0 10	7 f 0 6 4 6 5 4	/		s,sp,o,f	
		10 11	3 0 1 0 3 f 0 8	/		Tab,UC,M,LC	
		10 12	4 f 7 2 3 2 2 0	/		e,a,n,CR	
		10 13	2 f 5 2 4 f 0 6	/	<input checked="" type="checkbox"/>	d,u,e,sp	
		10 14	5 f 4 6 1 0 1 a	/		T,O,UC,:	
		10 15	3 0 7 f 0 8 7 4	/		Tab,S,LC,q	Headings
		10 16	5 2 7 2 1 f 4 f	/		u,a,r,e	
		10 17	7 f 3 0 1 0 5 4	/	<input checked="" type="checkbox"/>	S,tab,UCF	for
		10 18	0 8 1 f 4 f 4 f	/		LC,r,e,	
		10 19	2 f 4 6 3 f 3 0	/		d,o,m, Tab	
		11 0	1 0 7 f 0 8 7 4	/		Uc,S,LC,q	Analysis
		11 1	5 2 7 2 1 f 4 f	/	<input checked="" type="checkbox"/>	u,a,r,e	of
		11 2	3 0 1 0 5 4 1 8	/		Tab,UC,F,LS	Variance
		11 3	2 0 2 0 1 f 0 8	/		CR,CR,R,LC,	Table
		11 4	4 f 5 j 1 f 4 f	/		e,p,r,e	
		11 5	7 f 7 f 2 2 4 5	/	<input checked="" type="checkbox"/>	S,S,L,O	
		11 6	3 2 3 0 v q 0 0	/		n,Tab, out	
		11 7	x r 3 5 0 0	/			ERFP
		11 8	x u 3 5 0 0	/			
		11 9	8 0 x b 1 8 3 2	/	<input checked="" type="checkbox"/>		Print SS <sub>reg</sub>
		12 0	x p 0 0 0 0	/			
		12 1	8 0 x b 2 1 5 3	/			Print d.f.reg
		12 2	x p 0 0 0 0	/			
		12 3	8 0 x b 1 8 3 6	/	<input checked="" type="checkbox"/>		Print s <sup>2</sup> reg
		12 4	x p 0 0 0 0	/			
		12 5	8 0 x b 1 8 4 6	/			Print F
		12 6	x p 0 0 0 0	/			
		12 7	x e 0 0 0 0	/	<input checked="" type="checkbox"/>	exit ERFP	
		12 8	x r 3 4 0 0	/			α - num
		12 9	x u 3 4 0 0	/			
, 0 0 1 0 0 1 0 2	1	13 0	2 0 1 0 1 f 0 8	/		CR,UC,R,LC	Heading
		13 1	4 f 7 f 2 2 2 f	/	<input checked="" type="checkbox"/>	e,s,i,d	"Residual"

PREPARED FOR: <b>LGP- 30 USERS' ORGANIZATION - POOL</b>			PAGE <b>20</b> OF <b>28</b>
JOB NO.	PROGRAM NO. <b>F2-96</b>	PROGRAM PREPARED BY: <b>Calvin Y. Jodat</b>	PROGRAM CHECKED BY: <b>Pool Reviewer</b>
PROBLEM: <b>E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM</b>			DATE <b>11/4/59</b>
			TRACK <b>12</b>

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	09312					
, 0 0 0 0 0 0 2	'	09312	5 2 7 2 0 j	3 0	/	u,a,l,Tab	
		313	v q	0 0 0 0 0	/	Out	
		314	x r	3 5 0 0	/		} ERFP
		315	x u	3 5 0 0	/	X	
		316	8,0 x b	1 8,3 8	/		} Print S.S.v,x
		317	x p	0 0 0 0	/		
		318	8,0 x b	1 8,4 0	/		} Print d.f.y,x
		319	x p	0 0 0 0	/	X	
		410	8,0 x b	1 8,4 2	/		} Print s <sup>2</sup> <sub>v,x</sub>
		411	x p	0 0 0 0	/		
		412	x e	0 0 0 0	/	Exit ERFP	
		413	x r	3 4 0 0	/	X	} α - num
		414	x u	3 4 0 0	/		
, 0 0 0 0 0 0 3	'	415	2,0 1,0	5 f 0 8	/	CR,UC,T,LC	} Heading
		416	4,6 5 f	7 2 0 j	/	o,t,a,l	
		417	3,0 v q	0 0 0 0	/	X Tab, out	} "Total"
		418	x r	3 5 0 0	/		
		419	x u	3 5 0 0	/		} ERFP
		510	8,0 x b	1 8,5 4	/		
		511	x p	0 0 0 0	/	X	} Print zY <sup>2</sup>
		512	8,0 0 b	0 4 0 0	/		
		513	x p	0 0 0 0	/		} Print n
		514	x e	0 0 0 0	/	exit ERFP	
		515	x p	1 6 0 0	/	X CR	} CR
		516	x z	0 0 0 0	/	delay	
		517	x r	3 4 0 0	/		} α - num
		518	x u	3 4 0 0	/		
, 1 0 1 0 1 0 0 1 0 1 5	'	519	2,0 2,0	3 0 1 8	/	X CR,CR,Tab,CS	} Headings
		610	1,0 3 a	0 8 7 2	/	UC,V,LC,a	
		611	1 f 2 2	7 2 3 2	/	r,i,a,n	
		612	6 f 4 f	0 6 4 6	/	c,c,r,n,o	
		613	5,4 2 0	1 0 6 f	/	X f,CR,UC	



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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11-4-59
PROBLEM: E.R.F. P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 13

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/						
0,0,0,0,0,0,9	/	1,0,10,0	8,4,6,4,2,5,4	/		LC,o,e,f	
		10,11	5,4,2,2,6,f,2,2	/		f,i,c,i	Headings
		10,12	4,f,3,2,5,f,3,0	/		e,n,t,tab	
		10,13	1,0,6,f,0,8,4,6	/	X	UC,C,LC,0	"Coefficient"
		10,14	4,f,5,4,5,4,2,2	/		e,f,f,i	
		10,15	6,f,2,2,4,f,3,2	/		c,i,e,n	"Variance of
		10,16	5,f,3,0,5,f,0,a	/		t,tab,t,-	Coefficient"
		10,17	5,f,4,f,7,f,5,f	/	X	t,e,s,t	
		10,18	2,0,1,8,v,q,0,0	/		CR,CS,out	"t-test"
		10,19	x,c,2,1,3,7	/		junk	clear
		11,10	x,c,1,8,5,8	/		counter 3	counter
		11,11	b,0,7,4,1	/	X	z0432	
		11,12	y,1,0,2,1	/		800P[ ]	initialize
		11,13	b,0,7,4,4	/		z0632	print-out
		11,14	y,1,0,1,9	/		800B[ ]	loop
		11,15	y,1,0,2,5	/	X	"	
		11,16	x,c,2,1,3,7	/		junk	
		11,17	x,r,3,5,0,0	/			ERFP
		11,18	x,u,3,5,0,0	/			
		11,19	8,0,0,b,[ ]	/	X		print coefficient
		12,20	x,p,0,0,0,0	/			of B vector
		12,21	8,0,0,p,[ ]	/		C <sub>kk</sub>	compute and
		12,22	8,0,x,m,1,8,4,2	/		s <sup>2</sup> y.x	print
		12,23	x,p,0,0,0,0	/	X		Variance
		12,24	x,r,0,0,0,0	/		√	√Variance
		12,25	8,0,x,c,1,8,5,9	/		temp.stor.	
		12,26	8,0,0,b,[ ]	/			compute and
		12,27	8,0,x,d,1,8,5,9	/	X	√variance	print
		12,28	x,p,0,0,0,0	/			t-test
		12,29	x,e,0,0,0,0	/		exit ERFP	
		13,30	x,p,1,6,0,0	/		CR	CR
		13,31	x,z,0,0,0,0	/	X	delay	

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PREPARED FOR: LGP- 30 USERS' ORGANIZATION - POOL				PAGE 22 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11-5-59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 13

PROGRAM INPUT CODES	LOC	LOCATION	INSTRUCTION		LOC	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	1,0	x	b 1,8,5,8	/	counter	} counter
		13,3		a 1,3,5,7	/	1 at 29	
		13,4	x	h 1,8,5,8	/	counter	
		13,5	x	s 2,1,3,6	/	<input checked="" type="checkbox"/> k+1 at 29	
		13,6		t 1,0,3,8	/	modify commands	
		13,7		u 1,3,5,9	/		
		13,8		b 1,0,1,9	/	800B[ ]	modify
		13,9		a 1,3,5,8	/	<input checked="" type="checkbox"/> 2 at 29	800B + 800 P
		14,10		y 1,0,1,9	/	800B[ ]	commands in
		14,11		y 1,0,2,6	/	"	previous
		14,12		b 1,0,2,1	/	800P[ ]	loop
		14,13	x	a 2,1,6,1	/	<input checked="" type="checkbox"/> 2K+Y at 29	
		14,14		y 1,0,2,1	/	800P[ ]	
		14,15		u 1,0,1,6	/		
		14,16	x	r 3,4,0,0	/		} - num
		14,17	x	u 3,4,0,0	/	<input checked="" type="checkbox"/>	
0000012		14,18	2	0,2,0,1,8,4	a	/	CR,CR,CS,X
		14,19	3	0,1,2,3,0,1,2	/	tab,y,tab,y	Headings
		15,10	0	6,1,0,4,j,0,8	/	Sp,UC,L,LI	
		15,11	4	f,4,a,4,2,2,a	/	<input checked="" type="checkbox"/> e,x,p,	
		15,12	1	0,0,4,3,0,7,f	/	UC, tab S	"X" "Y"
		15,13	0	8,5,f,7,2,3,2	/	LC, + a,n	
		15,14	2	f,7,2,1,f,2,f	/	d,a,r,d	"y(exp)"
		15,15	2	2,0,2,4,f,2,f	/	<input checked="" type="checkbox"/> i,z,e,d	
		15,16	0	6,1,0,2,f,0,8	/	Sp,UC,D,LC	"Standardized
		15,17	4	f,3,a,2,2,7,2	/	e,v,i,a	Deviate
		15,18	5	f,4,f,1,8,2,0	/	t,e,CS,CR	
		15,19	v	a,0,0,0,0,0,0	/	<input checked="" type="checkbox"/> out	
		16,10		b,0,1,5,7	/	xz2200xi	
		16,11		y,1,1,2,1	/	BOXB[ ]	
		16,12		y,1,1,3,0	/		
		16,13		y,1,1,3,7	/	<input checked="" type="checkbox"/>	



PREPARED FOR: LGP - 30 USERS' ORGANIZATION - POOL			PAGE 23	OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11-4-59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 14

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
		1, 10 10	y	1, 1, 4, 5	/		
		10 11	b	0, 1, 5, 8	/	xz2700 yi	initialize
		10 12	y	1, 1, 2, 5	/	80XB[ ]	80 XB[ ]
		10 13	y	1, 1, 3, 3	/	<input checked="" type="checkbox"/> "	commands
		10 14	y	1, 1, 4, 0	/	"	
		10 15	y	1, 1, 4, 9	/	"	
		10 16	b	0, 7, 4, 4	/	z0632	initialize
		10 17	y	1, 1, 5, 4	/	<input checked="" type="checkbox"/> 800B[ ]	loop
		10 18	a	1, 3, 5, 8	/	2 at 29	for computing
		10 19	y	1, 1, 6, 1	/	800M[ ]	Y
		11 10	x c	2, 1, 3, 7	/	junk	
		11 11	x c	1, 8, 3, 5	/	<input checked="" type="checkbox"/> counter 2	clear
		11 12	x c	1, 8, 5, 8	/	counter 3	counters
		11 13	x c	1, 8, 5, 6	/	Y	clear
		11 14	x c	1, 8, 5, 7	/		Y
		11 15	x r	3, 5, 0, 0	/	<input checked="" type="checkbox"/>	ERFP
		11 16	x u	3, 5, 0, 0	/		
0 0 0 0 0 0 1		11 17	[		/	U118, U119, U1120, U1121	
		11 18	u	1, 1, 3, 0	/	Type I	
		11 19	u	1, 1, 3, 7	/	<input checked="" type="checkbox"/> Type II	
		12 10	u	1, 1, 4, 5	/	Type III	
		12 11	8, 0 x b	[ ]	/	IV X <sub>i</sub>	Type IV
		12 12	x p	0, 0, 0, 0	/		Print X <sub>i</sub>
		12 13	x n	0, 0, 0, 0	/	<input checked="" type="checkbox"/> ln X <sub>i</sub>	take ln X <sub>i</sub>
		12 14	8, 0 x c	2, 1, 5, 1	/	X <sub>i</sub>	and store
		12 15	8, 0 x b	[ ]	/	Y <sub>i</sub>	Print Y <sub>i</sub>
		12 16	x p	0, 0, 0, 0	/		take in Y <sub>i</sub>
		12 17	x n	0, 0, 0, 0	/	<input checked="" type="checkbox"/> ln Y <sub>i</sub>	and store
		12 18	8, 0 x c	2, 1, 4, 4	/	Y <sub>i</sub>	
		12 19	u	1, 1, 5, 2	/		
		13 10	8, 0 x b	[ ]	/	X <sub>i</sub>	Type I Print X <sub>i</sub> and
		13 11	x p	0, 0, 0, 0	/	<input checked="" type="checkbox"/>	store.

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PREPARED FOR: LGP- 30 USERS ORGANIZATION - POOL			PAGE 24 OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM			DATE 11/4-59 TRACK 14

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		OS	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	1, 1, 3, 2	8, 0, x, c	2, 1, 5, 1	/	$X_i$	Type I Print $y_i$ and store
		3, 3	8, 0, x, b	[ ]	/	$Y_i$	
		3, 4	x, p	0, 0, 0, 0	/		
		3, 5	8, 0, x, c	2, 1, 4, 4	/	$\times Y_i$	Type II print $X_i$ and store print $Y_i$ take in $Y_i$ and store
		3, 6	u	1, 1, 5, 2	/		
		3, 7	8, 0, x, b	[ ]	/	$X_i$	
		3, 8	x, p	0, 0, 0, 0	/		Type III print $X_i$ take $\ln x_i$ & store print $Y_i$ and store
		3, 9	8, 0, x, c	2, 1, 5, 1	/	$\times X_i$	
		4, 10	8, 0, x, b	[ ]	/	$Y_i$	
		4, 11	x, p	0, 0, 0, 0	/		Type III print $X_i$ take $\ln x_i$ & store print $Y_i$ and store
		4, 12	x, n	0, 0, 0, 0	/	$\ln y_i$	
		4, 13	8, 0, x, c	2, 1, 4, 4	/	$\times Y_i$	
		4, 14	u	1, 1, 5, 2	/		Type III print $X_i$ take $\ln x_i$ & store print $Y_i$ and store
		4, 15	8, 0, x, b	[ ]	/	$X_i$	
		4, 16	x, p	0, 0, 0, 0	/		
		4, 17	x, n	0, 0, 0, 0	/	$\times \ln x_i$	Type III print $X_i$ take $\ln x_i$ & store print $Y_i$ and store
		4, 18	8, 0, x, c	2, 1, 5, 1	/	$X_i$	
		4, 19	8, 0, x, b	[ ]	/	$Y_i$	
		5, 10	x, p	0, 0, 0, 0	/		Type III print $X_i$ take $\ln x_i$ & store print $Y_i$ and store
		5, 11	8, 0, x, c	2, 1, 4, 4	/	$\times Y_i$	
		5, 12	8, 0, 0, b	0, 1, 3, 6	/	1	
		5, 13	8, 0, x, c	2, 1, 5, 9	/	temp store	compute and store
		5, 14	8, 0, 0, b	[ ]	/	$C_0$	
		5, 15	8, 0, x, a	1, 8, 5, 6	/	$\hat{Y}$	
		5, 16	8, 0, x, c	1, 8, 5, 6	/	"	and store
		5, 17	8, 0, x, p	2, 1, 5, 1	/	$X_i$	
		5, 18	8, 0, x, m	2, 1, 5, 9	/	temp stor	
		5, 19	8, 0, x, h	2, 1, 5, 9	/	$\times "$	$\hat{Y}$
		6, 10	x, u	0, 0, 0, 0	/	reverse registers	and store
		6, 11	8, 0, 0, m	[ ]	/	$C_1 C_2 \dots C_k$	
		6, 12	8, 0, x, a	1, 8, 5, 6	/	$\hat{Y}$	
		6, 13	8, 0, x, c	1, 8, 5, 6	/	$\times "$	

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PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL				PAGE 25	OF 28
JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59	
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 15	

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
		1 2 0 0	x e	0 0 0 0	/	exit ERFP	
		0 1	x b	1 8 5 8	/	counter 3	}
		0 2	a	1 3 5 7	/	1 at 29	
		0 3	x h	1 8 5 8	/	<input checked="" type="checkbox"/> counter 3	counter
		0 4	x s	2 1 4 3	/	K at 29	
		0 5	t	1 2 0 7	/	Modify 800M[ ]	
		0 6	u	1 2 1 4	/		
		0 7	b	1 1 6 1	/	<input checked="" type="checkbox"/> 800M[ ]	}
		0 8	a	1 3 5 8	/	2 at 29	
		0 9	y	1 1 6 1	/	800M[ ]	previous loop
		1 0	x c	2 1 3 7	/	junk	
		1 1	x r	3 5 0 0	/	<input checked="" type="checkbox"/>	}
		1 2	x u	3 5 0 0	/		
		1 3	u	1 1 5 7	/	80XP2151	
		1 4	x c	2 1 3 7	/		
		1 5	x r	3 5 0 0	/	<input checked="" type="checkbox"/>	}
		1 6	x u	3 5 0 0	/		
0 0 0 0 0 0 1	/	1 7	[		/	U1218,U1219,U1220, U1221	
		1 8	u	1 2 2 5	/	Type I	
		1 9	u	1 2 2 8	/	<input checked="" type="checkbox"/> Type II	
		2 0	u	1 2 3 2	/	Type II	
		2 1	8 0 x b	1 8 5 6	/	IV $\hat{Y}$	}
		2 2	x h	0 0 0 0	/	$e^{\hat{Y}}$	
		2 3	x p	0 0 0 0	/	<input checked="" type="checkbox"/>	}
		2 4	u	1 2 3 4	/	and print	
		2 5	8 0 x b	1 8 5 6	/	$\hat{Y}$	}
		2 6	x p	0 0 0 0	/		
		2 7	u	1 2 3 4	/	<input checked="" type="checkbox"/>	}
		2 8	8 0 x b	1 8 5 6	/	$\hat{Y}$	
		2 9	x h	0 0 0 0	/		}
		3 0	x p	0 0 0 0	/		
		3 1	u	1 2 3 4	/	<input checked="" type="checkbox"/>	

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/5/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 15

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/						
	/	1,2,3,12	8,0,x,b	1,8,5,6	/	Y	Type III
	/		x,p	0,0,0,0	/		print Y (=Y)
	/		8,0,x,b	2,1,4,4	/	Y	compute and
	/		8,0,x,s	1,8,5,6	/	X Y	print
	/		8,0,x,d	1,8,4,4	/	$\sqrt{s^2 y.x}$	Standardized
	/		x,p	0,0,0,0	/		Deviate
	/		x,e	0,0,0,0	/	exit ERFP	
	/		x,p	1,6,0,0	/	X CR	CR
	/		x,z	0,0,0,0	/	delay	
	/		x,b	1,8,3,5	/	counter 2	
	/		a	1,3,5,7	/	1 at 29	
	/		x,h	1,8,3,5	/	X counter 2	counter
	/		x,s	2,1,5,8	/	n at 29	
	/		t	1,2,4,7	/		
	/		u	1,3,0,0	/		
	/		b	0,7,4,1	/	X z0632	re-initialize
	/		a	1,3,5,8	/	2 at 29	800M[ ] in
	/		y	1,1,6,1	/		Y loop
	/		b	1,1,2,1	/	80XB[ ]X <sub>i</sub>	
	/		a	1,3,5,8	/	X 2 at 29	modify
	/		y	1,1,2,1	/	80XB[ ]X <sub>i</sub>	80XB[ ]
	/		y	1,1,3,0	/	"	commands
	/		y	1,1,3,7	/	"	for X <sub>i</sub> and
	/		y	1,1,4,5	/	X "	Y <sub>i</sub>
	/		b	1,1,2,5	/	80XB[ ]Y <sub>i</sub>	
	/		a	1,3,5,8	/	2 at 29	for all
	/		y	1,1,2,5	/	80XB[ ]Y <sub>i</sub>	
	/		y	1,1,3,3	/	X "	four types
	/		y	1,1,4,0	/	"	
	/		y	1,1,4,9	/	"	
	/		x,c	2,1,3,7	/	junk	
	/		u	1,1,1,2	/	X	

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: <b>E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM</b>			TRACK 16	

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	1,3,0,0	x,z	0,8,0,0	/	breakpoint 8	
		0,0,1	8,0,0,t	1,3,0,8	/		
		0,0,2	x,b	2,1,3,6	/	k+1 at 29	
		0,0,3	x,h	2,1,4,3	/	X k at 29	increase k by 1
		0,0,4	a	1,3,5,7	/	1 at 29	stop if
		0,0,5	x,h	2,1,3,6	/	k+1 at 29	
		0,0,6	s	0,0,4,5	/	9 at 29	k+1 > 8
		0,0,7	t	1,3,1,1	/	X	
		0,0,8	x,z	0,4,0,0	/	brkpt.4	
		0,0,9	8,0,0,t	0,0,0,4	/		
		0,0,10	u	0,0,0,0	/		
		0,0,11	x,b	2,1,3,6	/	X k+lat 29	
		0,0,12	x,a	2,1,3,6	/	k+lat 29	
		0,0,13	a	1,3,5,8	/	2 at 29	
		0,0,14	x,c	2,1,6,1	/	2k+4 at 29	
		0,0,15	u	0,0,4,1	/	X	
		0,0,16	8,0,x,b	[     ]	/	X <sub>i</sub>	Type I
		0,0,17	8,0,x,c	2,1,5,1	/	X <sub>i</sub>	store X <sub>i</sub>
		0,0,18	8,0,x,b	[     ]	/	Y <sub>i</sub>	and Y <sub>i</sub>
		0,0,19	8,0,x,c	2,1,4,4	/	X Y <sub>i</sub>	
		0,0,20	u	0,2,3,7	/		
		0,0,21	8,0,x,b	[     ]	/	X <sub>i</sub>	Type II
		0,0,22	8,0,x,c	2,1,5,1	/	X <sub>i</sub>	store X <sub>i</sub>
		0,0,23	8,0,x,b	[     ]	/	X Y <sub>i</sub>	take ln v <sub>i</sub>
		0,0,24	x,n	0,0,0,0	/	lny <sub>i</sub>	and store
		0,0,25	8,0,x,c	2,1,4,4	/	Y <sub>i</sub>	
		0,0,26	u	0,2,3,7	/		
		0,0,27	8,0,x,b	[     ]	/	X X <sub>i</sub>	Type III
		0,0,28	x,n	0,0,0,0	/	lnX <sub>i</sub>	take lnX <sub>i</sub>
		0,0,29	8,0,x,c	2,1,5,1	/	X <sub>i</sub>	and store
		0,0,30	8,0,x,b	[     ]	/	Y <sub>i</sub>	store Y <sub>i</sub>
		0,0,31	8,0,x,c	2,1,4,4	/	X	

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JOB NO.	PROGRAM NO. F2-96	PROGRAM PREPARED BY: Calvin Y. Jodat	PROGRAM CHECKED BY: Pool Reviewer	DATE 11/4/59
PROBLEM: E.R.F.P. POLYNOMIAL FIT (STATISTICAL) PROGRAM				TRACK 16

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
		1, 3   3   2	u	0   2   3   7	/		
		3   3	b	1   3   1   6	/	80XB[ ]X <sub>i</sub>	
		3   4	a	1   3   5   8	/	2 at 29	Type I
		3   5	y	1   3   1   6	/	<input checked="" type="checkbox"/> 80XB[ ]X <sub>i</sub>	modify X <sub>i</sub>
		3   6	b	1   3   1   8	/	80XB[ ]Y <sub>i</sub>	and Y <sub>i</sub> bring
		3   7	a	1   3   5   8	/	2 at 29	commands
		3   8	y	1   3   1   8	/	80XB[ ]Y <sub>i</sub>	
		3   9	x   c	2   1   3   7	/	<input checked="" type="checkbox"/> junk	
		4   10	u	0   2   1   4	/		
		4   11	b	1   3   2   1	/	80XB[ ]X <sub>i</sub>	Type II
		4   12	a	1   3   5   8	/	2 at 29	modify X <sub>i</sub>
		4   13	y	1   3   2   1	/	<input checked="" type="checkbox"/> 80XB[ ]X <sub>i</sub>	and Y <sub>i</sub>
		4   14	b	1   3   2   3	/	80XB[ ]Y <sub>i</sub>	bring commands
		4   15	a	1   3   5   8	/	2 at 29	
		4   16	y	1   3   2   3	/	80XB[ ]Y <sub>i</sub>	
		4   17	x   c	2   1   3   7	/	<input checked="" type="checkbox"/> junk	
		4   18	u	0   2   1   4	/		
		4   19	b	1   3   2   7	/	80XB[ ]X <sub>i</sub>	
		5   10	a	1   3   5   8	/	2 at 29	Type III
		5   11	y	1   3   2   7	/	<input checked="" type="checkbox"/> 80XB[ ]K <sub>i</sub>	modify X <sub>i</sub>
		5   12	b	1   3   3   0	/	80XB[ ]Y <sub>i</sub>	and Y <sub>i</sub>
		5   13	a	1   3   5   8	/	2 at 29	bring commands
		5   14	y	1   3   3   0	/	80XB[ ]Y <sub>i</sub>	
		5   15	x   c	2   1   3   7	/	<input checked="" type="checkbox"/> junk	
		5   16	u	0   2   1   4	/		
		5   17	x   z	0   0   0   1	/	1 at 29	
		5   18	x   z	0   0   0   2	/	2 at 29	
		5   19	x   z	0   4   0   0	/	<input checked="" type="checkbox"/>	
		6   10	8   0   0   t	1   3   0   0	/		
		6   11	u	1   0   4   6	/		
		6   12	x   z	1   6   0   0	/		
		6   13	x   u	3   4   0   0	/	<input checked="" type="checkbox"/>	



