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Tape II

TITLE: LINEAR REGRESSION PROGRAM NO.: PS.01-2200.01A-00FI-1-0 TAPE NO.: 701-0120

Y=A+BX BLOCK NO.: 1

```
10 PRINT "INPUT N"
20 INPUT N
30 PRINT "INPUT DATA POINTS"
40 S1,S2,S3,S4,S5=0
50 FOR I=1 TO N
60 INPUT X,Y
70 S1=S1+X
80 S2=S2+Y
90 S3=S3+X^2
100 S4=S4+Y^2
110 S5=S5+X*Y
120 NEXT I
130 B=(N*S5-S2*S1)/(N*S3-S1^2)
140 A=(S2-B*S1)/N
150 PRINT
160 PRINT "0 DEG.  COEFF. =";A
170 PRINT "1 DEG.  COEFF. =";B
175 STOP
177 PRINT HEX(03)
180 S1=B*(S5-S1*S2/N)
190 S4=S4-S2^2/N
195 S2=S4-S1
200PRINT
210 PRINT
220 PRINT "                  REGRESSION TABLE"
230 PRINT
240 PRINT "SOURCE","SUM OF SQ.","DEG. FREEDOM","MEAN SQ. "
250 PRINT "REGRESSION",S1,1,S1
260 PRINT "RESIDUAL",S2,N-2,S2/(N-2)
270 PRINT "TOTAL",S4,N-1
280 PRINT
285 PRINT "F=";S1/S2*(N-2)
290 PRINT
295 PRINT
300 S5=S1/S4
310 PRINT "COEFF.  OF DETERMINATION=";S5
320 PRINT "COEFF.  OF CORRELATION=";SQR(S5)
330 PRINT "STANDARD ERROR OF ESTIMATE=";SQR(S2/(N-2))
340 PRINT
350 PRINT
360 PRINT "DO YOU WISH TO ESTIMATE VALUES OF Y FROM "
370 PRINT "THE REGRESSION CURVE? (1=YES,0=NO)"
380 INPUT X
390 IF X=0 THEN 999
400 PRINT "INPUT X"
410 INPUT X
420 PRINT "Y=";A+B*X
430 PRINT
440 PRINT "ANOTHER POINT? (1=YES,0=NO)"
450 GOTO 380
999 END
```

```
10 COM X(10),D(6),E(5),A(5,6),M,N
15 PRINT "INPUT M,N": INPUT M,N: PRINT "INPUT DATA POINTS"
17 FOR I=1 TO M+2: FOR J=1 TO M+1: A(J,I)=0
18 NEXT J: D(I)=0: NEXT I
20 FOR K=1 TO N: PRINT "POINT";K
25 INPUT X(1),X(2),X(3),X(4),X(5)
40 D(M+2)=D(M+2)+X(M+1)^2: D(1),A(1,M+2)=A(1,M+2)+X(M+1)
45 FOR I=1 TO M: A(I+1,1),A(1,I+1)=A(1,I+1)+X(I)
50 D(I+1),A(I+1,M+2)=A(I+1,M+2)+X(I)*X(M+1)
55 FOR J=I TO M: A(I+1,J+1),A(J+1,I+1)=A(I+1,J+1)+X(I)*X(J)
60 NEXT J: NEXT I: NEXT K
65 A(1,1)=N
70 FOR I=2 TO M+1: E(I)=A(1,I): NEXT I
75 FOR S=1 TO M+1
80 FOR T=S TO M+1: IF A(T,S)<>0 THEN 90: NEXT T
85 PRINT "NO UNIQUE SOLUTION": GOTO 999
90 GOSUB 130
95 C=1/A(S,S): GOSUB 160
100 FOR T=1 TO M+1: IF T=S THEN 120
110 C=-A(T,S): GOSUB 170
120 NEXT T: NEXT S: GOTO 180
130 FOR J=1 TO M+2
140 B=A(S,J): A(S,J)=A(T,J): A(T,J)=B
150 NEXT J: RETURN
160 FOR J=1 TO M+2: A(S,J)=C*A(S,J): NEXT J: RETURN
170 FOR J=1 TO M+2: A(T,J)=A(T,J)+C*A(S,J): NEXT J: RETURN
180 PRINT
190 FOR T=1 TO M+1: PRINT "B(";T-1;")=";A(T,M+2): NEXT T
195 STOP :PRINT HEX(03)
200 S=0
210 FOR I=2 TO M+1: S=S+A(I,M+2)*(D(I)-E(I)*D(1)/N): NEXT I
220 T=D(M+2)-D(1)^2/N: C=T-S
230 I=N-M-1: J=S/M: K=C/I
240 PRINT : PRINT
250 PRINT " "," REGRESSION TABLE": PRINT
260 PRINT "SOURCE","SUM OF SQ. ","DEG. FREEDOM","MEAN SQ. "
270 PRINT "REGRESSION",S,M,J
280 PRINT "RESIDUAL",C,I,K
290 PRINT "TOTAL",T,N-1: PRINT
300 PRINT "F=";J/K
310 PRINT : PRINT : J=S/T
320 PRINT "COEFF. OF DETERMINATION=";J
330 PRINT "COEFF. OF MULTIPLE CORRELATION=";SQR(J)
340 PRINT "STANDARD ERROR OF ESTIMATE=";SQR(C/I)
350 PRINT : PRINT
```

```
360 PRINT "DO YOU WISH TO ESTIMATE VALUES OF Y FROM THE"
370 PRINT "REGRESSION CURVE? (1=YES,0=NO)"
380  INPUT I: IF I=0 THEN 999
390 PRINT : S=A(1,M+2)
400 FOR I=1 TO M: PRINT "COORDINATE X";I
410 INPUT T: S=S+A(I+1,M+2)*T: NEXT I
420 PRINT "Y=";S: PRINT
430 PRINT "ANOTHER POINT?": GOTO 380
999 END
```

```
10 COM A(13),Q(7,8),E(8),M,N
15 PRINT "INPUT M,N": INPUT M,N: PRINT "INPUT DATA POINTS"
17 FOR I=2 TO 2*M+1: A(I)=0: NEXT I
18 FOR I=1 TO M+2: E(I)=0: NEXT I
20 A(1)=N
25 FOR I=1 TO N: INPUT X,Y
30 FOR J=2 TO 2*M+1: A(J)=A(J)+X^(J-1): NEXT J
35 FOR J=1 TO M+1: E(J),Q(J,M+2)=E(J)+Y*X^(J-1): NEXT J
40 E(M+2)=E(M+2)+Y^2: NEXT I
45 FOR I=1 TO M+1: FOR J=1 TO M+1: Q(I,J)=A(I+J-1): NEXT J: NEXT
I
50 FOR S=1 TO M+1
55 FOR T=S TO M+1: IF Q(T,S)<>0 THEN 65: NEXT T
60 PRINT "NO UNIQUE SOLUTION": STOP
65 GOSUB 90
70 C=1/Q(S,S): GOSUB 110
75 FOR T=1 TO M+1: IF T=S THEN 85
80 C=-Q(T,S): GOSUB 120
85 NEXT T: NEXT S: GOTO 130
90 FOR J=1 TO M+2
95 B=Q(S,J): Q(S,J)=Q(T,J): Q(T,J)=B
100 NEXT J: RETURN
110 FOR J=1 TO M+2: Q(S,J)=C*Q(S,J): NEXT J: RETURN
120 FOR J=1 TO M+2: Q(T,J)=Q(T,J)+C*Q(S,J): NEXT J: RETURN
130 PRINT
140 FOR I=1 TO M+1: PRINT I-1;"DEG. COEFF. =";Q(I,M+2): NEXT I
145 STOP :PRINT HEX(03)
200 S=0
210 FOR I=2 TO M+1: S=S+Q(I,M+2)*(E(I)-A(I)*E(1)/N): NEXT I
220 T=E(M+2)-E(1)^2/N: C=T-S
230 I=N-M-1: J=S/M: K=C/I
240 PRINT : PRINT : PRINT "          REGRESSION TABLE": PRINT
245 PRINT "SOURCE","SUM OF SQ. ","DEG.  FREEDOM","MEAN SQ. "
250 PRINT "REGRESSION",S,M,J
260 PRINT "RESIDUAL",C,I,K
270 PRINT "TOTAL",T,N-1: PRINT
280 PRINT "F=";J/K: PRINT : PRINT
290 J=S/T: PRINT "COEFF. OF DETERMINATION=";J
300 PRINT "COEFF. OF CORRELATION=";SQR(J)
310 PRINT "STANDARD ERROR OF ESTIMATE=";SQR(C/I): PRINT : PRINT
320 PRINT "DO YOU WISH TO ESTIMATE VALUES OF Y FROM"
330 PRINT "THE REGRESSION CURVE? (1=YES,0=NO)"
340 INPUT I: IF I=0 THEN 999
350 PRINT : S=Q(1,M+2)
360 PRINT "INPUT X":INPUT T
370 FOR I=1 TO M: S=S+Q(I+1,M+2)*T^I: NEXT I
380 PRINT "Y=";S: PRINT
390 PRINT "ANOTHER POINT? (1=YES,0=NO)": GOTO 340
999 END
```

TITLE: EXPONENTIAL REGRESSION PROGRAM NO.: PS.01-2200.01A-00FI-4-0 TAPE NO.: 701-0120

$Y=Ae^{BX}$ BLOCK NO.: 4

```
10 PRINT "INPUT N"
20 INPUT N
30 PRINT "INPUT DATA POINTS"
40 S1,S2,S3,S4,S5=0
50 FOR I=1 TO N
60 INPUT X,Y
65 Y=LOG(Y)
70 S1=S1+X
80 S2=S2+Y
90 S3=S3+X^2
100 S4=S4+Y^2
110 S5=S5+X*Y
120 NEXT I
130 B=(N*S5-S2*S1)/(N*S3-S1^2)
140 A=(S2-B*S1)/N
150 PRINT
160 PRINT "A=";EXP(A)
170 PRINT "B=";B
180 S1=B*(S5-S1*S2/N)
190 S4=S4-S2^2/N
195 S2=S4-S1
197 STOP :PRINT HEX(03)
200 PRINT
210 PRINT
220 PRINT "                REGRESSION TABLE"
230 PRINT
240 PRINT "SOURCE","SUM OF SQ.","DEG. FREEDOM","MEAN SQ."
250 PRINT "REGRESSION",S1,1,S1
260 PRINT "RESIDUAL",S2,N-2,S2/(N-2)
270 PRINT "TOTAL",S4,N-1
280 PRINT
285 PRINT "F=";S1/S2*(N-2)
290 PRINT
295 PRINT
300 S5=S1/S4
310 PRINT "COEFF. OF DETERMINATION=";S5
320 PRINT "COEFF. OF CORRELATION=";SQR(S5)
330 PRINT "STANDARD ERROR OF ESTIMATE=";SQR(S2/(N-2))
340 PRINT
350 PRINT
360 PRINT "DO YOU WISH TO ESTIMATE VALUES OF Y FROM "
370 PRINT "THE REGRESSION CURVE? (1=YES,0=NO)"
380 INPUT X
390 IF X=0 THEN 999
400 PRINT "INPUT X"
410 INPUT X
420 PRINT "Y=";EXP(A)*EXP(B*X)
430 PRINT
440 PRINT "ANOTHER POINT? (1=YES,0=NO)"
450 GOTO 380
999 END
```

TITLE: GEOMETRIC REGRESSION PROGRAM NO.: PS.01-2200.01A-00FI-5-0 TAPE NO.: 701-0120

$Y=AX^B$ BLOCK NO.: 5

```
10 PRINT "INPUT N"
20 INPUT N
30 PRINT "INPUT DATA POINTS"
40 S1,S2,S3,S4,S5=0
50 FOR I=1 TO N
60 INPUT X,Y
65 Y=LOG(Y)
66 X=LOG(X)
70 S1=S1+X
80 S2=S2+Y
90 S3=S3+X^2
100 S4=S4+Y^2
110 S5=S5+X*Y
120 NEXT I
130 B=(N*S5-S2*S1)/(N*S3-S1^2)
140 A=(S2-B*S1)/N
150 PRINT
160 PRINT "A=";EXP(A)
170 PRINT "B=";B
180 S1=B*(S5-S1*S2/N)
190 S4=S4-S2^2/N
195 S2=S4-S1
197 STOP :PRINT HEX(03)
200PRINT
210 PRINT
220 PRINT "                REGRESSION TABLE"
230 PRINT
240 PRINT "SOURCE","SUM OF SQ.","DEG. FREEDOM","MEAN SQ."
250 PRINT "REGRESSION",S1,1,S1
260 PRINT "RESIDUAL",S2,N-2,S2/(N-2)
270 PRINT "TOTAL",S4,N-1
280 PRINT
285 PRINT "F=";S1/S2*(N-2)
290 PRINT
295 PRINT
300 S5=S1/S4
310 PRINT "COEFF. OF DETERMINATION=";S5
320 PRINT "COEFF. OF CORRELATION=";SQR(S5)
330 PRINT "STANDARD ERROR OF ESTIMATE=";SQR(S2/(N-2))
340 PRINT
350 PRINT
360 PRINT "DO YOU WISH TO ESTIMATE VALUES OF Y FROM "
370 PRINT "THE REGRESSION CURVE? (1=YES,0=NO)"
380 INPUT X
390 IF X=0 THEN 999
400 PRINT "INPUT X"
410 INPUT X
420 PRINT "Y=";EXP(A)*X^B
430 PRINT
440 PRINT "ANOTHER POINT? (1=YES,0=NO)"
450 GOTO 380
999 END
```

```
5 PRINT "NO. OF DATA POINTS, N?"
10 INPUT N
20 PRINT "INPUT DATA POINTS 1/LINE (XI,YI,CARRIAGE RETURN)"
30 S1,S2,S3,S4,S5=0
40 FOR I=1 TO N
50 INPUT X,Y
60 S1=S1+X
70 S2=S2+Y
80 S3=S3+X*X
90 S4=S4+Y*Y
100 S5=S5+X*Y
110 NEXT I
120 R=(N*S5-S1*S2)/SQR((N*S3-S1^2)*(N*S4-S2^2))
125 PRINT
130 PRINT "COEFF. OF CORRELATION=";R
140 END
```

TITLE: CORRELATION MATRIX PROGRAM NO.: PS.01-2200.01A-00FI-7-0 TAPE NO.: 701-0120

BLOCK NO.: 7

```
5 DIM R(9,9),X(10),A(9),B(9)
10 PRINT "INPUT N,M"
20 INPUT N,M
30 PRINT "INPUT MATRIX"
35 FOR K=1 TO N
40 INPUT X(1),X(2),X(3),X(4),X(5),X(6),X(7),X(8),X(9),X(10)
65 FOR I=1 TO M
70 FOR J=I TO M
75 R(I,J)=R(I,J)+X(I)*X(J)
80 NEXT J
85 A(I)=A(I)+X(I)
90 B(I)=B(I)+X(I)^2
95 NEXT I
100 NEXT K
110 FOR I=1 TO M
130 S=N*B(I)-A(I)^2
140 FOR J=I TO M
150 R(I,J),R(J,I)=(N*R(I,J)-A(I)*A(J))/SQR(S*(N*B(J)-A(J)^2))
160 NEXT J
170 R(I,I)=1
180 NEXT I
182 PRINT
184 PRINT "CORRELATION MATRIX:"
190 FOR I=1 TO M
200 PRINT
210 PRINT
220 FOR J=1 TO M
225 IF R(I,J)<=1 THEN 230
227 R(I,J)=1
230 PRINT R(I,J),
240 NEXT J
250 NEXT I
999 END
```

TITLE: ONE-WAY ANALYSIS OF VARIANCE

PROGRAM NO.: PS.01-2200.01A-00FI-8-0

TAPE NO.: 701-0120

BLOCK NO.: 8

```
5 DIM N(99),X(4)
10 PRINT "NO. OF GROUPS"
15 INPUT K
20 FOR J=1 TO K
22 S=0
25 PRINT "NO. OF ELEMENTS IN GROUP";J
30 INPUT N(J)
35 PRINT "INPUT GROUP";J
37 FOR L=1 TO N(J) STEP 4
40 INPUT X(1),X(2),X(3),X(4)
45 FOR I=1 TO 4
50 S=S+X(I)
55 S2=S2+X(I)^2
60 NEXT I
62 NEXT L
65 S1=S1+S
70 S3=S3+S^2/N(J)
75 M=M+N(J)
80 NEXT J
85 S1=S1^2/M
90 S=S3-S1
95 S3=S2-S3
100 S2=S2-S1
110 J=M-K
120 K=K-1
130 PRINT
140 PRINT
150 PRINT "SOURCE","SUM OF SQ.","DEG. FREEDOM","MEAN SQ."
160 PRINT "BETW. GROUPS",S,K,S/K
170 PRINT "WITHIN GROUPS",S3,J,S3/J
180 PRINT "TOTAL",S2,M-1
190 PRINT
200 PRINT "F=";S/K*J/S3
210 END
```

TITLE: TWO-WAY ANALYSIS OF VARIANCE

PROGRAM NO.: PS.01-2200.01A-00FI-0-0

TAPE NO.: 701-0120

BLOCK NO.: 9

```
5 DIM X(4),T(99)
10 PRINT "NO. OF ROWS, NO. OF COLUMNS?": INPUT R,C
15 PRINT "INPUT TABLE OF DATA"
20 FOR I=1 TO R: S5=0
25 FOR J=1 TO C STEP 4: INPUT X(1),X(2),X(3),X(4)
30 FOR K=1 TO 4
35 T(J+K-1)=T(J+K-1)+X(K): S5=S5+X(K): S2=S2+X(K)^2
40 NEXT K: NEXT J
45 S3=S3+S5^2: S1=S1+S5
50 NEXT I
55 FOR J=1 TO C: S4=S4+T(J)^2: NEXT J
60 S1=S1^2/R/C: S=S2-S1: I=R*C-1
65 S4=S4/R-S1: J=C-1: V1=S4/J
70 S3=S3/C-S1: K=R-1: V2=S3/K
75 S5=S-S3-S4: L=I-J-K: V=S5/L
80 PRINT : PRINT "SOURCE","SUM OF SQ.","DEG. FREEDOM","MEAN SQ."
85 PRINT "TOTAL",S,I
90 PRINT "COLUMN",S4,J,V1
95 PRINT "ROW",S3,K,V2
100 PRINT "RESIDUAL",S5,L,V
110 PRINT : PRINT "F(COL)=";V1/V: PRINT "F(ROW)=";V2/V
999 END
```

TITLE: ANALYSIS OF VARIANCE- LATIN SQUARES

PROGRAM NO.: PS.01-2200.01A-00FI-10-0

TAPE NO.: 701-0120

BLOCK NO.: 10

```
5 DIM X(10),T(9),V(9)
10 READ R: PRINT "INPUT TABLE OF DATA"
15 FOR I=1 TO R: S6=0
20 INPUT X(1),X(2),X(3),X(4),X(5),X(6),X(7),X(8),X(9),X(10)
25 FOR K=1 TO R
30 T(K)=T(K)+X(K)
35 READ A: V(A)=V(A)+X(K)
40 S6=S6+X(K): S2=S2+X(K)^2: NEXT K
50 S3=S3+S6^2: S1=S1+S6: NEXT I
55 FOR J=1 TO R: S4=S4+T(J)^2: S5=S5+V(J)^2: NEXT J
60 S1=(S1/R)^2: S=S2-S1
65 I=R-1: J=I*(R-2)
70 S3=S3/R-S1: S4=S4/R-S1: S5=S5/R-S1
75 S6=S-S3-S4-S5:A=S6/J:PRINT
80 PRINT "SOURCE","SUM OF SQ. ","DEG. FREEDOM","MEAN SQ. "
85 PRINT "ROW",S3,I,S3/I
90 PRINT "COLUMN",S4,I,S4/I
95 PRINT "TREATMENT",S5,I,S5/I
100 PRINT "RESIDUAL",S6,J,A
110 PRINT "TOTAL",S,R^2-1
120 PRINT : PRINT "F(ROW)=";S3/I/A
130 PRINT "F(COL)=";S4/I/A
140 PRINT "F(TREAT)=";S5/I/A
999 END
```

TITLE: CHI-SQUARE TEST & DISTRIBUTION

PROGRAM NO.: PS.01-2200.01A-00FI-11-0

TAPE NO.: 701-0120

BLOCK NO.: 11

```
10 PRINT "TO COMPUTE X^2 INPUT 0, TO COMPUTE P(X^2,V) INPUT 1"
15 INPUT N
20 IF N=1 THEN 95
25 PRINT
30 PRINT "NO. OF OBSERVED VALUES?"
35 INPUT N
40 V=N-1
50 C=0
55 PRINT "INPUT OBSERVED VALUES"
60 FOR I=1 TO N
65 INPUT O,E
70 C=C+(O-E)^2/E
75 NEXT I
80 PRINT
85 PRINT "CHI-SQUARE=";C
90 GOTO 130
95 PRINT
100 PRINT "DEGREES OF FREEDOM?"
105 INPUT V
110 PRINT "CHI-SQUARE?"
115 INPUT C
120 PRINT
130 J=1
140 FOR I=V TO 2 STEP -2
150 J=J*I
160 NEXT I
170 A=C^(INT((V+1)/2))*EXP(-C/2)/J
180 IF INT(V/2)=V/2 THEN 210
190 B=SQR(2/C/3.14159)
200 GOTO 220
210 B=1
220 S,T=1
230 W=V
240 V=V+2
245 T=T*C/V
250 IF T<.00001 THEN 280
260 S=S+T
270 GOTO 240
280 PRINT "P(";C;",";W;")=";A*B*S
290 PRINT
300 PRINT
310 PRINT "MORE INPUT? (1=YES,0=NO)"
320 INPUT V
330 PRINT
340 IF V=1 THEN 10
999 END
```

```
10 DIM D(50),V(25),T(25)
20 PRINT "NUMBER OF ROWS?":INPUT R1
30 PRINT "NUMBER OF COLUMNS?":INPUT C1
40 Y=R1*C1
50 PRINT "INPUT CONTINGENCY TABLE 4 ELEMENTS/LINE"
60 FOR R=1 TO Y STEP 4
70 INPUT D(R),D(R+1),D(R+2),D(R+3)
75 NEXT R
80 G=0: R=1
90 FOR I=1 TO R1
100 FOR J=1 TO C1: T(I)=T(I)+D(R): R=R+1:NEXT J
110 G=G+T(I):NEXT I
120 FOR I=1 TO C1:FOR J=I TO Y STEP C1
130 V(I)=V(I)+D(J)
140 NEXT J:NEXT I
150 C2=0
160 PRINT "                    FOR EACH CELL"
170 PRINT "OBSERVED VALUE  EXPECTED VALUE  CHI^2 CONTRIBUTION"

180 FOR C=1 TO C1:PRINT "                COLUMN";C
190 FOR R=1 TO R1
200 E=T(R)*V(C)/G: I=C+(R-1)*C1: H=(D(I)-E)^2/E: C2=C2+H
210 PRINT D(I),E,H:NEXT R
220 PRINT :NEXT C
230 PRINT : PRINT "CHI-SQUARE=";C2
240 PRINT :PRINT "DEGREES OF FREEDOM";(R1-1)*(C1-1)
250 END
```

TITLE: T-TEST PROGRAM NO.: PS.01-2200.01A-00FI-13-0 TAPE NO.: 701-0120

BLOCK NO.: 13

```
1 DIM X(4,2),N(2),S(2),U(2),M(2)
5 PRINT "HYPOTHESIS TO BE TESTED?"
10 INPUT H
15 IF H=4 THEN 400
20 FOR I=1 TO 1.7+H/5
22 S(I),U(I)=0
25 PRINT
30 PRINT "NO. OF ELEMENTS IN SAMPLE";I
35 INPUT N(I)
40 PRINT "ENTER SAMPLE";I
45 FOR J=1 TO N(I) STEP 4
50 INPUT X(1,I),X(2,I),X(3,I),X(4,I)
55 FOR K=1 TO 4
60 S(I)=S(I)+X(K,I)
65 U(I)=U(I)+X(K,I)^2
70 NEXT K
75 NEXT J
80 M(I)=S(I)/N(I)
85 S(I)=(U(I)-S(I)^2/N(I))/(N(I)-1)
90 NEXT I
95 PRINT
100 IF H=2 THEN 200
110 IF H=3 THEN 300
120 PRINT "ENTER GIVEN VALUE OF MEAN"
130 INPUT K
140 T=(M(1)-K)*SQR(N(1)/S(1))
150 D=N(1)-1
160 GOTO 600
200 T=(M(1)-M(2))/SQR(1/N(1)+1/N(2))
210 D=N(1)+N(2)-2
220 T=T/SQR(((N(1)-1)*S(1)+(N(2)-1)*S(2))/D)
230 GOTO 600
300 T=(M(1)-M(2))/SQR(S(1)/N(1)+S(2)/N(2))
310 D=(S(1)/N(1)+S(2)/N(2))^2
320 D=D/((S(1)/N(1))^2/(N(1)+1)+(S(2)/N(2))^2/(N(2)+1))-2
330 D=INT(D+.5)
340 GOTO 600
400 PRINT
410 PRINT "NO. OF PAIRS OF ELEMENTS?"
420 INPUT N(1)
430 PRINT "ENTER SAMPLES (1 PAIR/LINE)"
435 S(1),S(2)=0
440 FOR I=1 TO N(1)
450 INPUT X(1,1),X(1,2)
460 D=X(1,1)-X(1,2)
470 S(1)=S(1)+D
480 S(2)=S(2)+D^2
490 NEXT I
500 T=S(1)/N(1)*SQR(N(1)-1)
510 T=T/SQR(S(2)/N(1)-(S(1)/N(1))^2)
520 D=N(1)-1
600 PRINT
610 PRINT "T VALUE=";ABS(T)
620 PRINT "DEG. FREEDOM=";D
630 END
```

TITLE: WILCOXON MATCHED-PAIRS SIGNED-RANKS TEST

PROGRAM NO.: PS.01-2200.01A-00FI-14-0

TAPE NO.: 701-0120

BLOCK NO.: 14

```
5 DIM A(130)
10 PRINT "NO. OF PAIRS?"
15 INPUT N
20 PRINT "INPUT PAIRS OF DATA"
25 FOR I=1 TO N
30 INPUT X,Y
35 A(I)=X-Y
40 NEXT I
45 FOR I=1 TO N
50 FOR J=1 TO N-I
55 X=A(J)
60 Y=A(J+1)
65 IF ABS(X)<=ABS(Y) THEN 80
70 A(J)=Y
75 A(J+1)=X
80 NEXT J
85 NEXT I
90 FOR I=1 TO N
95 X=A(I)
100 FOR J=I+1 TO N
110 IF ABS(X)<>ABS(A(J)) THEN 140
120 NEXT J
130 J=N+1
140 Z=(J+I-1)/2
150 FOR K=I TO J-1
160 A(K)=SGN(A(K))*Z
170 NEXT K
180 I=J-1
190 NEXT I
200 X,Y=0
210 FOR I=1 TO N
220 IF A(I)<0 THEN 250
230 X=X+A(I)
240 GOTO 260
250 Y=Y+ABS(A(I))
260 NEXT I
270 IF X<=Y THEN 290
280 X=Y
290 PRINT
300 PRINT "T=";X
310 END
```

TITLE: MANN-WHITNEY-TEST PROGRAM NO.: PS.01-2200.01A-00FI-15-0 TAPE NO.: 701-0120

BLOCK NO.: 15

```
1 DIM A(40),B(40),N(2)
5 FOR K=1 TO 2: PRINT "ENTER N";K: INPUT N(K)
10 PRINT "ENTER SAMPLE";K
15 FOR I=1 TO N(K) STEP 4: INPUT B(I),B(I+1),B(I+2),B(I+3): NEXT
I
20 FOR I=1 TO N(K): FOR J=1 TO N(K)-I
25 X1=B(J): Y1=B(J+1): IF X1<=Y1 THEN 35
30 B(J)=Y1: B(J+1)=X1
35 NEXT J: NEXT I: PRINT
40 IF K=2 THEN 50
45 FOR I=1 TO N(1): A(I)=B(I): NEXT I
50 NEXT K
55 X1,X2=1
60 Y1,Y2=0
65 IF X1>=N(1) THEN 70: FOR K=X1+1 TO N(1)
68 IF A(X1)<A(K) THEN 69: Y1=Y1+1
69 NEXT K
70 IF X2>=N(2) THEN 75: FOR K=X2+1 TO N(2)
72 IF B(X2)<B(K) THEN 73: Y2=Y2+1
73 NEXT K
75 Z=Y2/2
80 I=B(X2)+1: IF X1>N(1) THEN 85: I=A(X1)
85 J=B(X2): IF I<>J THEN 90: Z=(Y1+Y2+1)/2
90 IF I<J THEN 95: R=R+(X1+X2+Z-1)*(Y2+1): X2=X2+Y2+1
95 IF I>J THEN 100: X1=X1+Y1+1
100 IF X2<=N(2) THEN 60
105 Y1=N(1)*N(2)+N(2)*(N(2)+1)/2-R: Y2=N(1)*N(2)-Y1
110 IF Y1<=Y2 THEN 120: Y1=Y2
120 PRINT : PRINT "U=";Y1
130 END
```

TITLE: NORMAL FREQUENCY AND DISTRIBUTION FUNCTION

PROGRAM NO.: PS.01-2200.01A-00FI-16-0

TAPE NO.: 701-0120

BLOCK NO.: 16

```
10 PRINT "INPUT '0' FOR A STANDARDIZED VARIABLE OR"
15 PRINT "      '1' FOR A NON-STANDARDIZED VARIABLE"
20 INPUT M
30 IF M=0 THEN 70
40 PRINT "INPUT 'MEAN, STANDARD DEVIATION'"
50 INPUT M,D
60 GOTO 80
70 D=1
80 PRINT
90 PRINT "INPUT 'X' (OR '99999' TO END PROGRAM)"
100 INPUT X
105 IF X=99999 THEN 999
110 X=(X-M)/D
120 E=EXP(-X^2/2)/2.5066283
130 PRINT "F(X)=";E
135 Z=X
140 X=1/(1+.33267*ABS(X))
150 Q=1-E*(.4361836*X-.1201676*X^2+.937298*X^3)
160 IF Z>=0 THEN 180
170 Q=1-Q
180 PRINT "Q(X)=";Q
190 PRINT
200 PRINT "INPUT 'X'"
210 GOTO 100
999 END
```

TITLE: NEGATIVE BINOMIAL DISTRIBUTION

PROGRAM NO.: PS.01-2200.01A-00FI-17-0

TAPE NO.: 701-0120

BLOCK NO.: 17

```
10 T=0
20 DIM N(3)
30 PRINT "INPUT 'K,R,P' (OR '0,0,-1' TO PRINT THE SUM OF THE PRO
B-"
35 PRINT "ABILITIES CALCULATED THUS FAR, OR '0,0,0' TO END PROGR
AM)"
40 INPUT K,R,P
50 IF P=0 THEN 999
60 IF P=-1 THEN 250
70 N(1)=R+K-1
80 N(2)=K
90 N(3)=R-1
100 FOR I=1 TO 3
110 IF N(I)=0 THEN 200
130 S=1
140 FOR J=1 TO N(I)
150 S=S*J
160 NEXT J
170 N(I)=LOG(S)
200 NEXT I
210 J=EXP(N(1)-N(2)-N(3)+R*LOG(P)+K*LOG(1-P))
220 PRINT "P(K,R,P)=";J
230 T=T+J
240 GOTO 260
250 PRINT "SUM OF PROBABILITIES=";T
260 PRINT
270 PRINT "INPUT 'K,R,P'"
280 GOTO 40
999 END
```

TITLE: BINOMIAL DISTRIBUTION PROGRAM NO.: PS.01-2200.01A-00FI-18-0 TAPE NO.: 701-0120

BLOCK NO.: 18

```
5 DIM A(3)
10 T=0
20 PRINT "INPUT 'K,N,P' (OR '0,0,-1' TO PRINT THE SUM OF PROBABI
LITIES"
25 PRINT "CALCULATED THUS FAR, OR '0,0,0' TO END PROGRAM)"
30 INPUT K,N,P
40 IF P=0 THEN 999
50 IF P=-1 THEN 240
60 A(1)=N
70 A(2)=K
80 A(3)=N-K
90 FOR I=1 TO 3
100 IF A(I)=0 THEN 190
120 S=1
130 FOR J=1 TO A(I)
140 S=S*J
150 NEXT J
160 A(I)=LOG(S)
190 NEXT I
200 J=EXP(A(1)-A(2)-A(3)+K*LOG(P)+(N-K)*LOG(1-P))
210 PRINT "P(K,N,P)=";J
220 T=T+J
230 GOTO 250
240 PRINT "SUM OF PROBABILITIES=";T
250 PRINT
260 PRINT "INPUT 'K,N,P'"
270 GOTO 30
999 END
```

TITLE: POISSON DISTRIBUTION PROGRAM NO.: PS.01-2200.01A-00FI-19-0 TAPE NO.: 701-0120

BLOCK NO.: 19

```
10 J,T=0
20 PRINT "INPUT 'K, LAMBDA' (OR '-1,-1' TO PRINT THE SUM OF THE
"
30 PRINT "PROBABILITES CALCULATED THUS FAR, OR '0,0' TO END PROG
RAM.)"
35 INPUT K,L
40 IF L=0 THEN 999
45 IF L=-1 THEN 110
50 IF K=0 THEN 70
54 J=1
56 FOR I=1 TO K
58 J=J*I
60 NEXT I
62 J=LOG(J)
70 J=EXP(-L+K*LOG(L)-J)
80 PRINT "P(K,LAMBDA)=";J
90 T=T+J
100 GOTO 120
110 PRINT "SUM OF PROBABILITIES=";T
120 PRINT
130 PRINT "INPUT 'K,LAMBDA'"
140 GOTO 35
999 END
```

TITLE: F-VALUE PROGRAM NO.: PS.01-2200.01A-00FI-20-0 TAPE NO.: 701-0120

BLOCK NO.: 20

```
5 PRINT "F-VALUE? (TO END PROGRAM INPUT 99999)"
10 INPUT F
12 IF F=99999 THEN 999
15 PRINT "DEG. FREEDOM IN NUMERATOR?"
20 INPUT N
25 PRINT "DEG. FREEDOM IN DENOMINATOR?"
30 INPUT D
35 P=1
40 IF F<1 THEN 65
45 A=N
50 B=D
55 F1=F
60 GOTO 80
65 A=D
70 B=N
75 F1=1/F
80 A1=2/9/A
85 B1=2/9/B
90 Z=ABS((1-B1)*F1^(1/3)-1+A1)/SQR(B1*F1^(2/3)+A1)
100 IF B<4 THEN 140
110 P=.5/(1+Z*(.196854+Z*(.115194+Z*(.000344+Z*.019527))))^4
130 GOTO 160
140 Z=Z*(1+.08*Z^4/B^3)
150 GOTO 110
160 IF F<1 THEN 180
170 GOTO 200
180 P=1-P
200 PRINT "PROBABILITY OF F=";INT(P*1E6)/1E6
210 PRINT
220 PRINT "F-VALUE?"
230 GOTO 10
999 END
```

TITLE: T-VALUE PROGRAM NO.: PS.01-2200.01A-00FI-21-0 TAPE NO.: 701-0120

BLOCK NO.: 21

```
10 PRINT "T-VALUE? (TO END PROGRAM INPUT 99999)"
15 INPUT T
20 IF T=99999 THEN 999
25 PRINT "DEG. FREEDOM?"
30 INPUT D
35 P,M=1
40 T=T*T
45 IF T<1 THEN 65
50 A=M
55 B=D
57 T1=T
60 GOTO 80
65 A=D
70 B=M
75 T1=1/T
80 A1=2/9/A
85 B1=2/9/B
90 Z=ABS((1-B1)*T1^(1/3)-1+A1)/SQR(B1*T1^(2/3)+A1)
95 IF B<4 THEN 120
100 P=.5/(1+Z*(.196854+Z*(.115194+Z*(.000344+Z*.019527))))^4
110 GOTO 140
120 Z=Z*(1+.08*Z^4/B^3)
130 GOTO 100
140 IF T<1 THEN 160
150 GOTO 180
160 P=1-P
180 PRINT "PROBABILITY OF T=";INT(1E6*P)/1E6
200 PRINT
210 PRINT "T-VALUE?"
220 GOTO 15
999 END
```

TITLE: RANDOM NORMAL DEVIATES PROGRAM NO.: PS.01-2200.01A-00FI-22-0 TAPE NO.: 701-0120

BLOCK NO.: 22

```
1 X=1
10 PRINT "NO. PRINT OLOG( RANDOM NORMAL DEVIATES"
20 INPUT N
25 PRINT
30 FOR I=1 TO N
40 IF A=2.347 THEN 110
50 A=2.347
60 B=SQR(-2*LOG(RND(X)))
70 C=6.2831853*RND(X)
80 D=B*COS(C)
90 B=B*SIN(C)
100 GOTO 130
110 D=B
120 A=1
130 PRINT D,
140 NEXT I
150 PRINT
160 END
```

TITLE: MEAN, VARIANCE, STANDARD DEVIATION I

PROGRAM NO.: PS.01-2200.01A-00FI-23-0

TAPE NO.: 701-0120

BLOCK NO.: 23

```
5 DIM X(4)
10 PRINT "INPUT 0 FOR A POPULATION, 1 FOR A SAMPLE"
15 INPUT P
20 PRINT "NO. OF OBSERVATIONS"
25 INPUT N
30 S,T=0
35 PRINT "INPUT OBSERVATIONS 4/LINE."
40 FOR I=1 TO N STEP 4
50 INPUT X(1), X(2),X(3),X(4)
55 FOR J=1 TO 4
60 S=S+X(J)
70 T=T+X(J)^2
75 NEXT J
80 NEXT I
90 M=S/N
100 V=(T-N*M^2)/(N-P)
105 PRINT
110 PRINT "MEAN=";M
120 PRINT "VARIANCE=";V
130 PRINT "ST. DEV. =";SQR(V)
999 END
```

TITLE: MEAN, VARIANCE, STANDARD DEVIATION II

PROGRAM NO.: PS.01-2200.01A-00FI-24-0

TAPE NO.: 701-0120

BLOCK NO.: 24

```
10 PRINT "INPUT 0 FOR A POPULATION, 1 FOR A SAMPLE"
15 INPUT P
20 PRINT "NO. OF OBSERVATIONS"
25 INPUT M
30 S,T,N=0
35 PRINT "INPUT XI,FI (I=1,2,...,M)"
40 FOR I=1 TO M
50 INPUT X,F
60 S=S+F*X
65 N=N+F
70 T=T+F*X^2
80 NEXT I
90 M=S/N
100 V=(T-N*M^2)/(N-P)
105 PRINT
110 PRINT "MEAN=";M
120 PRINT "VARIANCE=";V
130 PRINT "ST. DEV. =";SQR(V)
999 END
```

TITLE: GEOMETRIC MEAN AND STANDARD DEVIATION

PROGRAM NO.: PS.01-2200.01A-00FI-25-0

TAPE NO.: 701-0120

BLOCK NO.: 25

```
5 PRINT
10 PRINT "NO. OF DATA ELEMENTS"
15 INPUT N
20 N1=1/N
30 M=1
35 PRINT "DATA ELEMENTS 1/LINE"
40 FOR I=1 TO N
50 INPUT A
60 M=M*A^N1
70 B=B+LOG(A)^2
80 NEXT I
90 S=EXP(SQR(B/(N-1)-(N/(N-1))*(LOG(M))^2))
100 PRINT "GEOMETRIC MEAN IS:";M
110 PRINT "GEOMETRIC STANDARD DEVIATION IS:";S
999 END
```

TITLE: CROSS-COVARIANCE OF TIME SERIES

PROGRAM NO.: PS.01-2200.01A-00FI-26-0

TAPE NO.: 701-0120

BLOCK NO.: 26

```
10 DIM A(70),B(70)
20 PRINT "INPUT N,L"
30 INPUT N,L
40 C,D=0
50 PRINT "INPUT SERIES A AND B, 2 ELEMENTS/LINE (IE, A1,B1,CARRI
AGE"
55 PRINT "RETURN,A2,B2,CARRIAGE RETURN,...)"
60 FOR I=1 TO N
70 INPUT A(I),B(I)
80 C=C+A(I)
90 D=D+B(I)
100 NEXT I
110 C=C/N
120 D=D/N
130 PRINT
140 PRINT "LAG/LEAD          LAG COVARIANCE    LEAD COVARIANCE"
150 FOR J=1 TO L
160 N1=N-J+1
170 S1,S2=0
180 FOR I=1 TO N1
190 I1=I+J-1
200 S1=S1+(A(I)-C)*(B(I1)-D)
210 S2=S2+(A(I1)-C)*(B(I)-D)
220 NEXT I
230 S1=S1/N1
240 S2=S2/N1
250 PRINT J-1,S1,S2
260 NEXT J
270 END
```

TITLE: AUTO-COVARIANCE OF TIME SERIES

PROGRAM NO.: PS.01-2200.01A-00FI-27-0

TAPE NO.: 701-0120

BLOCK NO.: 27

```
10 DIM A(96)
20 PRINT "INPUT N,L"
30 INPUT N,L
40 B=0
50 PRINT "INPUT SERIES, 4 ELEMENTS/LINE.  IF NECESSARY FILL LAST"

55 PRINT "INPUT LINE WITH ZEROES."
60 FOR I=0 TO INT((N+3)/4)-1
70 INPUT A(4*I+1),A(4*I+2),A(4*I+3),A(4*I+4)
80 NEXT I
90 FOR I=1 TO N
100 B=B+A(I)
110 NEXT I
120 B=B/N
130 PRINT
140 PRINT "LAGS            AUTOCOVARIANCE"
150 FOR J=1 TO L
160 N1=N-J+1
170 S=0
180 FOR I=1 TO N1
190 I1=I+J-1
200 S=S+(A(I)-B)*(A(I1)-B)
210 NEXT I
220 PRINT J-1,S/N1
230 NEXT J
250 END
```

TITLE: SYSTEM RELIABILITY PROGRAM NO.: PS.01-2200.01A-00FI-28-0 TAPE NO.: 701-0120

BLOCK NO.: 28

```
10 PRINT "NO. OF COMPONENTS,OPERATING TIME"
11 INPUT N,T
35 LET S=0
40 FOR I= 1TO N
45 PRINT "MEAN WEAROUT TIME,CHANCE FAILURE RATE FOR COMPONENT";I
50 INPUT M,L
55 S=S+L+1/M
60 NEXT I
70 LET R=EXP(-S*T)
75 PRINT
80 PRINT "SYSTEM RELIABILITY=";R
90 END
```

TITLE: ERROR FUNCTION PROGRAM NO.: PS. 1-2200. 1A-00FI-20-0 TAPE NO.: 701-0120

BLOCK NO.: 20

```
5 DIM T(8)
7 PRINT "TO END PROGRAM INPUT 0."
10 PRINT "INPUT 'INTEGRATION LIMIT X'"
20 INPUT X2
30 IF X2<0 THEN 10
40 IF X2=0 THEN 999
60 X1=0
80 FOR N1=1 TO 7
90 L=X2-X1
100 X=X1
110 GOSUB 900
120 Y1=Y
130 X=X2
140 GOSUB 900
150 T(1)=(Y1+Y)/2
160 N=1
170 FOR H=1 TO N1
180 U=0
190 M=L/(2*N)
200 FOR J=1 TO 2*N-1 STEP 2
210 X=X1+J*M
220 GOSUB 900
230 U=U+Y
240 NEXT J
250 T(H+1)=(U/N+T(H))/2
260 F=1
270 FOR J=H TO 1 STEP -1
280 F=4*F
290 T(J)=T(J+1)+(T(J+1)-T(J))/(F-1)
300 NEXT J
310 N=2*N
320 NEXT H
330 I2=T(1)*L
335 IF N1=1 THEN 350
340 IF ABS(I1-I2)<=1E-4*ABS(I2) THEN 700
350 I1=I2
360 NEXT N1
370 PRINT "UNABLE TO COMPUTE THE INTEGRAL TO 4 SIGNIFICANT DIGIT
S."
380 PRINT "CLOSEST APPROXIMATION IS:"
700 PRINT
710 PRINT "INTEGRAL=";1.1283792*I2
720 PRINT
730 GOTO 10
900 Y=EXP(-(X^2))
910 RETURN
999 END
```

TITLE: TALBOT'S FORMULA PROGRAM NO.: PE.11-2200.01A-00FI-30-0 TAPE NO.: 701-`120

BLOCK NO.: 30

```
10 PRINT "DRAINAGE AREA?"
20 INPUT A
30 PRINT "RUNOFF COEFF. ?"
40 INPUT C
50 PRINT "REQUIRED WATERWAY OPENING=";C*A^.75
60 PRINT
70 PRINT "MORE INPUT? (1=YES,0=NO)"
80 INPUT A
90 PRINT
100 IF A=1 THEN 10
110 END
```

TITLE: MANNING'S FORMULA PROGRAM NO.: PE.11-2200.01A-00FI-31-0 TAPE NO.: 701-0120

BLOCK NO.: 31

```
10 PRINT
20 PRINT "AREA OF FLOW CROSS SECTION (SQ. FT. )?"
30 INPUT A
40 PRINT "MANNING'S ROUGHNESS COEFF. ?"
50 INPUT N
60 PRINT "HYDRAULIC RADIUS (FT. )?"
70 INPUT R
80 PRINT "SLOPE OF CHANNEL (FT/FT)?"
90 INPUT S
100 PRINT
110 Q=1.486/N*A*R^(2/3)*SQR(S)
120 PRINT "DISCHARGE=";Q;"CU. FT. /SEC. "
130 PRINT
140 PRINT "MORE INPUT? (1=YES,0=NO)"
150 INPUT Q
160 IF Q=1 THEN 10
170 END
```

TITLE: HEADLOSS IN A PIPE PROGRAM NO.: PE.11-2200.1A-10FI-32-0 TAPE NO.: 701-0120

BLOCK NO.: 32

```
10 PRINT
20 PRINT "LENGTH (FT)?"
30 INPUT L
40 PRINT "D-DIAMETER OF PIPE (FT)?"
50 INPUT D
60 PRINT "FRICTION FACTOR"
70 INPUT F
80 PRINT
90 A=F*L/D+1.5
100 B=(5.0929582/D^2)^2/64.4
110 PRINT "HEAD LOSS=";A*B
120 PRINT
130 PRINT "MORE INPUT? (1=YES,0=NO)"
140 INPUT L
150 IF L=1 THEN 10
160 END
```

TITLE: BERNOULLI'S EQUATION PROGRAM NO.: PE.11-2200.01A-00FI-33-0 TAPE NO.: 701-0120

BLOCK NO.: 33

```
10 PRINT
20 PRINT "VELOCITY HEAD (FT.)?"
30 INPUT V
40 PRINT "COEFF. OF ENTRANCE LOSS?"
50 INPUT K
60 PRINT "MANNING'S ROUGHNESS COEFF.?"
70 INPUT N
80 PRINT "LENGTH OF CULVERT (FT.)?"
90 INPUT L
100 PRINT "HYDRAULIC RADIUS (FT.)?"
110 INPUT R
120 PRINT
130 PRINT "HEADWATER DEPTH (FT.)=";(1+K+29*N^2*L/R^(4/3))*V
140 PRINT
150 PRINT "MORE INPUT? (1=YES,0=NO)"
160 INPUT V
170 IF V=1 THEN 10
180 END
```

TITLE: WARPING STRESS DUE TO PROGRAM NO.: PE.11-2200.01A-00FI-34-0 TAPE NO.: 701-0120

BLOCK NO.: 34

```
10 PRINT
20 PRINT "MODULUS OF ELASTICITY OF CONCRETE (PSI)?"
30 INPUT E
40 PRINT "TEMPERATURE DIFFERENTIAL?"
50 INPUT T
60 PRINT "COEFF. OF SLAB LENGTH IN DESIRED DIRECTION?"
70 INPUT C1
80 PRINT "COEFF. OF SLAB LENGTH NORMAL TO C1?"
90 INPUT C2
100 M=.15
110 E1=.000005
120 PRINT
130 PRINT "WARPING STRESS=";E*E1*T/2*(C1+M*C2)/(1-M^2)
140 PRINT
150 PRINT "MORE INPUT? (1=YES,0=NO)"
160 INPUT E
170 IF E=1 THEN 10
180 END
```

TITLE: PRESSURE DUE TO SURFACE LOADS, PRINT LOADS, FINITE OR INFINITE LINE LOADS

PROGRAM NO.: PE.11-2200.01A-00FI-35-0

TAPE NO.: 701-0120

BLOCK NO.: 35

```
10 PRINT "CASE NO. "
11 INPUT S
15 IF S=2 THEN 40
20 IF S=3 THEN 65
25 PRINT "P,X,Y,Z":INPUT P,X,Y,Z
30 PRINT "HC=";P*X^2*Z/(SQR(X^2+Y^2+Z^2))^5
35 GOTO 75
40 PRINT "P,X,Y,Z":INPUT P,X,Y,Z
45 R=SQR(X^2+Z^2)
50 T=SQR(R^2+Y^2)
55 PRINT "HS=";P*X^2*Z*Y/3/R^4*(R^2/T^3+2/T)
60 GOTO 75
65 PRINT "P,X,Z":INPUT P,X,Z
70 PRINT "HS=";4*P*X^2*Z/(3*(X^2+Z^2)^2)
75 PRINT "ANOTHER CASE (1=YES,0=NO)"
80 INPUT A
85 IF A=1 THEN 10
999 END
```

TITLE: BEAM PROGRAM NO.: PE.11-2200.01A-00FI-36-0 TAPE NO.: 701-0120

BLOCK NO.: 36

```
5 DIM Q(4,4)
14 DATA 1,2,3,4,5,6,7,8,10,11,12,13,9,0,0,0
15 FOR I=1 TO 4: FOR J=1 TO 4: READ Q(I,J): NEXT J: NEXT I
20 PRINT :PRINT :PRINT :PRINT "L,B,S,W,P,A"
22 INPUT C1,C2,L,W,P,A: PRINT
24 C=Q(C1,C2): IF C>0 THEN 30
26 PRINT "CANNOT SOLVE THAT CASE. FOR L=4, CAN COMPUTE"
27 PRINT "RECOMMENDED BEAM ONLY FOR B=1."
28 GOTO 20
30 IF C<3 THEN 42
31 IF C>3 THEN 32: M=W*L*L/12: GOTO 65
32 IF C>4 THEN 33: M=W*L*L/2: GOTO 65
33 IF C>5 THEN 34: M=P*L/4: GOTO 65
34 IF C>6 THEN 35: M=3*P*L/16: GOTO 65
35 IF C>7 THEN 36: M=P*L/8: GOTO 65
36 IF C>8 THEN 37: M=P*L/2: GOTO 65
37 IF C>9 THEN 38: M=P*A: GOTO 65
38 IF C>10 THEN 39: M=W*L*L/8+P*L/4: GOTO 65
39 IF C>11 THEN 40: M=W*L*L/8+3*P*L/16: GOTO 65
40 IF C>12 THEN 41: M=W*L*L/12+P*L/8: GOTO 65
41 M=W*L*L/2+P*L/2: GOTO 65
42 M=W*L*L/8
65 S=12*M/20000
67 FOR I=1 TO 53: READ S9,D,K,W
71 IF S<S9 THEN 76
72 NEXT I
73 PRINT "LARGE ENOUGH BEAM DOES NOT EXIST, REDEFINE PROBLEM":GO
TO 20
76 IF C=3 THEN 89: IF C=4 THEN 91
80 IF C=7 THEN 89: IF C=8 THEN 91
85 IF C=12 THEN 89: IF C=13 THEN 91
87 M1=M+W*L*L/8: GOTO 92
89 M1=M+W*L*L/12: GOTO 92
91 M1=M+W*L*L/2
92 S2=12*M1/20000
93 IF S9>=S2 THEN 96: S=S2: GOTO 71
96 PRINT "RECOMMENDED BEAM IS A ";D;
97 IF K>1 THEN 98: PRINT "U";: GOTO 111
98 IF K>2 THEN 99: PRINT "JR";: GOTO 111
99 IF K>3 THEN 100: PRINT "JRU";: GOTO 111
100 IF K>4 THEN 101: PRINT "B";: GOTO 111
101 PRINT "WF";
111 PRINT W:PRINT "MORE INPUT (1=YES,0=NO)":INPUT A7:IF A7=1THEN
20:END
113 DATA 1.1,3,1,4.1
```

```
114 DATA 1. 2, 3, 1, 5
115 DATA 2. 4, 6, 2, 4. 4
116 DATA 3. 5, 7, 2, 5. 5
117 DATA 4. 7, 8, 2, 6. 5
118 DATA 6. 5, 10, 3, 8. 4
119 DATA 7. 8, 10, 2, 9
120 DATA 9. 3, 12, 3, 10. 6
121 DATA 10. 5, 10, 4, 11. 5
122 DATA 12, 12, 2, 11. 8
123 DATA 14. 8, 12, 4, 14
124 DATA 17. 5, 12, 4, 16. 5
125 DATA 18. 8, 10, 4, 19
126 DATA 21. 4, 12, 4, 19
127 DATA 21. 5, 10, 5, 21
128 DATA 25. 3, 12, 4, 22
129 DATA 26. 4, 10, 4, 25
130 DATA 34. 1, 12, 5, 27
131 DATA 41. 8, 14, 5, 30
132 DATA 48. 5, 14, 5, 34
133 DATA 56. 3, 16, 5, 36
134 DATA 64. 4, 16, 5, 40
135 DATA 72. 4, 16, 5, 45
136 DATA 80. 7, 16, 5, 50
137 DATA 89, 18, 5, 50
138 DATA 98. 2, 18, 5, 55
139 DATA 107. 8, 18, 5, 60
140 DATA 126. 4, 21, 5, 62
141 DATA 139. 9, 21, 5, 68
142 DATA 150. 7, 21, 5, 73
143 DATA 175. 4, 24, 5, 76
144 DATA 196. 3, 24, 5, 84
145 DATA 220. 9, 24, 5, 94
146 DATA 242. 8, 27, 5, 94
147 DATA 248. 9, 24, 5, 100
148 DATA 266. 3, 27, 5, 102
149 DATA 299. 2, 30, 5, 108
150 DATA 327. 9, 30, 5, 116
151 DATA 354. 6, 30, 5, 124
152 DATA 404. 8, 33, 5, 130
153 DATA 446. 8, 33, 5, 141
154 DATA 502. 9, 36, 5, 150
155 DATA 541, 36, 5, 160
156 DATA 579. 1, 36, 5, 170
157 DATA 621. 2, 36, 5, 182
158 DATA 663. 6, 36, 5, 194
159 DATA 669. 6, 33, 5, 200
160 DATA 740. 6, 33, 5, 220
161 DATA 835. 5, 36, 5, 230
162 DATA 892. 5, 36, 5, 245
163 DATA 951. 1, 36, 5, 260
164 DATA 1031. 2, 36, 5, 280
165 DATA 1105. 1, 36, 5, 300
```

TITLE: OIL WELL DEPLETION PROGRAM NO.: PE.04-2200.01A-00FI-37-0 TAPE NO.: 701-0120

BLOCK NO.: 37

```
5 PRINT "RESERVE TO BE RECOVERED ON DECLINE (BARRELS)?"
10 INPUT C
15 PRINT "INITIAL RATE (BARRELS/MO.)?"
20 INPUT I
25 PRINT "ECONOMIC LIMIT RATE (BARRELS/MO.)?"
30 INPUT Q
35 D=C/I/LOG(I/Q)
40 Y=D/12*(I/Q-1)
42 PRINT
45 PRINT "Y=";Y
50 PRINT
55 Z=Y-INT(Y)
60 P=0
65 FOR J=1 TO Y
70 A=P
75 P=LOG(J*12/D+1)*I*D
80 PRINT "CP(";J;")=";P
85 PRINT "P(";J;")=";P-A
90 NEXT J
95 IF Z=0 THEN 120
100 PRINT "CP(";INT(Y)+1;")=";C
110 PRINT "P(";INT(Y)+1;")=";C-P
120 PRINT
130 PRINT "MORE INPUT? (1=YES,0=NO)"
140 INPUT Z
150 PRINT
160 IF Z=1 THEN 5
170 END
```

TITLE: NETWORK IMPEDANCE-FINDING PROGRAM NO.: PE.03-2200.01A-00FI-33-0 TAPE NO.: 701-0120

A SERIES OR PARALELL CIRCUIT BLOCK NO.: 33

```
5 PRINT
10 PRINT "INPUT CASE NO.  (1 OR 2)"
20 INPUT N
30 PRINT "RESISTANCE?"
40 INPUT R
50 PRINT "REACTANCE?"
60 INPUT X
70 PRINT
75 A=X^2
80 B=R^2
90 IF N=2 THEN 130
100 PRINT "RS=";R+A/(A+B)
110 PRINT "XS=";X+B/(A+B)
120 GOTO 150
130 PRINT "RP=";R+A/R
140 PRINT "XP=";X+B/X
150 PRINT
160 PRINT "MORE INPUT? (1=YES, 0=NO)"
170 INPUT X
180 IF X=1 THEN 5
190 END
```

TITLE: CHARACTERISTIC GENERATOR RESISTANCE AND SOURCE emf VOLTAGE

PROGRAM NO.: PE.03-2200.01A-00FI-39-0

TAPE NO.: 701-0120

BLOCK NO.: 39

```
10 PRINT
20 PRINT "CHARA. IMPEDANCE OF TRANSMISSION LINE (OHMS)?"
30 INPUT Z
40 PRINT "REAL LOAD RESISTANCE (OHMS)?"
50 INPUT R1
60 PRINT "MAX. FORWARD-GOING POWER (WATTS)?"
70 INPUT P1
80 PRINT "MIN. FORWARD-GOING POWER (WATTS)?"
90 INPUT P2
100 PRINT
110 A=SQR(P1/P2)
120 R=Z*(1-R1*A/Z)/(A-R1/Z)
130 E=2*(R+R1)/(Z+R1)*SQR(Z*P1)
140 PRINT "CHARACTERISTIC GENERATOR RESISTANCE=";R;"OHMS"
150 PRINT "SOURCE EMF VOLTAGE=";E;"VOLTS"
160 PRINT
170 PRINT "MORE INPUT? (1=YES,0=NO)"
180 INPUT E
190 IF E=1 THEN 10
200 END
```

TITLE: "ERLANG B" EQUATION PROGRAM NO.: PE.03-2200.01A-00FI-40-0 TAPE NO.: 701-0120

BLOCK NO.: 40

```
5 PRINT "TRAFFIC IN ERLANGS"
10 INPUT T
20 PRINT "NO. OF EQUIPMENTS"
30 INPUT N
40 S=1
50 FOR I=1TO N
60 S=S*I
70 NEXT I
80 PRINT "P=";T^N/(EXP(T)*S)
90 PRINT :PRINT "MORE INPUT (1=YES,0=NO)"
100 INPUT A
110 IF A=1THEN 5
120 END
```

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