

A Snapshot of Selected Dataplot Commands

10/92

1. Dataplot Basics

1.1 System Operations

DP
EXIT or STOP or HALT or QUIT or BYE

Execute Dataplot
Exit from Dataplot

DIMENSION 50 VARIABLES
FEEDBACK OFF
ECHO ON

Redimension internal Dataplot worksheet to 50 variables (do at start of run)
Suppress feedback from all support commands (e.g., SUBSET)
Upon execution, echo all command lines back to screen

LIST (or L)
R 2
SAVE 12 6 TO 3 1
/
/ PRINTER or / LP or / LPT1
/
/ OUT.

List last 20 command lines entered
Re-execute the 2-nd previous command
Save command lines 12, 6, 5, 4, 3, and 1 for future re-execution
Repeat the last set of command lines saved (& display output on screen)
Repeat last set of comm. lines saved & divert output from screen to laser printer
(Note--printer should here be in non-postscript DOS text mode)
Repeat last set of comm. lines saved & divert output from screen to file OUT.

DEFINE ER ESC FF
ER

Define command ER to be escape formfeed
Execute command ER (which would erase screen & leave in text mode on PC)

CALL PARETO.DP
CALL <user-provided file name>

Execute the Dataplot macro residing in file PARETO.DP
Execute the user-written Dataplot macro residing in <user-provided file name>

SUBSET/EXCEPT/FOR
e.g.,
PLOT Y X SUBSET DAY 2
ANOVA Y X1 X2 X3 SUBSET MONTH 7 TO 9

LINEAR FIT Y X EXCEPT Y > 90
NORMAL PROBABILITY PLOT Y FOR I = 1 1 20

Can append to any graphics & analysis commands to limit scope of execution of a plot or of an analysis
Plot Y versus X but only for DAY = 2
Do ANOVA of Y on X1, X2, and X3
but only for values of MONTH variable from 7 to 9
Do linear regression of Y on X but only for Y > 90
Generate normal probability plot of first 20 elements of Y

RESET
RESET VARIABLES
RESET PARAMETERS
RESET FUNCTIONS
RESET PLOT
RESET IO
RESET SUPPORT

Reset all of Dataplot; in effect, exit and reexecute Dataplot
Reset (= delete) all internal variables (= vectors)
Reset (= delete) all internal parameters (= scalars)
Reset (= delete) all internal functions (= character strings)
Reset (= blank out) all plot titles, labels, and legends
Reset settings for Dataplot's I/O commands
Reset settings for all of Dataplot's Support commands

HELP

Display general Dataplot information & the command categories

HELP <command category>
HELP GRAPHICS
HELP ANALYSIS

Display information about the Dataplot <category command> category
Display information about Dataplot Graphics Commands
Display information about Dataplot Analysis Commands

HELP <command name>
HELP PLOT
HELP FIT
HELP LET
HELP TITLE
HELP GRID
HELP TEXT
HELP BOX PLOT

Display information about the Dataplot <command name> command
Display information about the Dataplot PLOT command
Display information about the Dataplot FIT command
Display information about the Dataplot LET command
Display information about the Dataplot TITLE command
Display information about the Dataplot GRID command
Display information about the Dataplot TEXT command
Display information about the Dataplot BOX PLOT command

HELP LET SUBCOMMANDS
HELP FUNCTIONS
HELP MATH FUNCTIONS
HELP CHARACTER TYPES
HELP LINES TYPES
HELP TEXT SUBCOMMANDS

Display information about subcommands under the LET command
Display information about all off Dataplot's internal library functions
Display information about only Dataplot's internal mathematics functions
Display information about allowable plot character types
Display information about allowable plot line types
Display information about subcommands under the TEXT command

1. Dataplot Basics (Continued)

1.2 Files & I/O

DOS DIR *.DAT

Execute the DOS DIR *.BAT command while still in Dataplot

SKIP 25

Skip the first 25 header lines of a file on subsequent READs

READ BOXSPRIN.DAT Y X1 X2 X3

Read data from file BOXSPRIN.DAT into internal variables Y, X1, X2, & 3

READ BOXSPRIN.DAT ACC OVEN CARB QUENCH

Read data from file BOXSPRIN.DAT into int. var. ACC, OVEN, CARB, & QUENCH

WRITE Y X1 X2 X3

Write variables Y, X1, X2, and X3 to screen

WRITE OUT.DAT Y X1 X2 X3

Write variables Y, X1, X2, and X3 out to the user file OUT.DAT

LIST (or L)

Display the last 20 command lines entered onto the screen

LIST BOXSPRIN.DAT

Display the contents of file BOXSPRIN.DAT onto the screen

LIST BOXSPRIN.DAT FOR I = 1 1 20

Display the first 20 lines of file BOXSPRIN.DAT onto the screen

DOS PRINT BOXSPRIN.DAT

(DOS only) Temporarily exit to DOS & send file BOXSPRIN.DAT to laser printer

SYSTEM PRINT BOXSPRIN.DAT

(In general) Temporarily exit to System & send file BOXSPRIN.DAT to laser prin.

SET READ FORMAT 4F8.0

Set format for future READs to be (Fortran-like) 4F8.0 (default = free-format)

SET WRITE DECIMALS 3

Set format for future WRITES to be 3 decimal places

SET WRITE FORMAT 4F10.2

Set format for future WRITES to be (Fortran-like) 4F10.2

CAPTURE OUT.

Start diverting all screen text output into the file OUT.

LINEAR FIT Y X

Do a linear fit of Y versus X (FIT output diverted to OUT.)

END OF CAPTURE

Stop diverting all screen text output into the file OUT.

DOS PRINT OUT.

(DOS only) Temporarily exit to DOS & send file OUT. to laser printer

(Note--Laser printer must be in DOS-text mode)

1. Dataplot Basics (Continued)

1.3 Data Creation/Manipulation

LET TARGET = 20	Create the parameter (= scalar) TARGET and assign to it the value 20
LET Y = DATA 67 79 61 75 59 90 52 87	Create variable (= vector) Y with 8 elements: 67, 79, 61, ..., 87
LET X = SEQUENCE 1 1 6	Create variable X with first element = 1, increment = 1, & last element = 6, that is, X will have the 6 elements: 1 2 3 4 5 6
LET X = SEQUENCE 1 3 1 6	Create variable X with 18 elements: 1 1 1 2 2 2 3 3 3 4 4 4 5 5 5 6 6 6
LET X1 = PATTERN 1 2 FOR I = 1 1 8	Create variable X1 with 8 elements: 1 2 1 2 1 2 1 2
LET Y2 = Y**2	Create variable Y2 as the squared elements of Y
LET Y3 = LOG(Y)	Create variable Y3 as the natural logarithm of the elements of Y
LET Y3 = SQRT(Y)	Create variable Y3 as the square root of the elements of Y
LET DUMMY7 = IND(MONTH,7)	Create variable DUMMY7 as 1 whenever MONTH = 7, and as 0 elsewhere (thus IND(...) is an indicator function)
LET Y2 = MSD(Y)	Create variable Y2 as the most significant digit of Y
LET Y = NORMAL RANDOM NUMBERS FOR I = 1 1 8	Create variable Y with 8 random numbers from normal N(0,1) distribution
LET Y = UNIFORM RANDOM NUMBERS FOR I = 1 1 10	Create variable Y with 10 random numbers from uniform[0,1] distribution
LET GAMMA = 2.3	Create the parameter (= scalar) GAMMA and assign to it the value 2.3
LET Y = WEIBULL RANDOM NUMBERS FOR I = 1 1 20	Create variable Y with 20 rand. numb. from Weib. dist. with shape param. 2.3
LET X = RANDOM PERMUTATION FOR I = 1 1 16	Create variable X with a random permutation of 1 to 16
LET Y2 = CODE Y	Create variable Y2 as a coded version of Y, as follows: if Y = smallest, then Y2 = 1; if Y = next-smallest, then Y2 = 2, etc.
LET Y2 = CODE2 Y	Create variable Y2 as a coded version of Y, as follows: if Y <= median value of Y, then Y2 = 1; if Y > median value of Y, then Y2 = 2
LET Y2 = CODE4 Y	Create variable Y2 as a coded version of Y, as follows: if Y in first/second/third/fourth quartile of Y, then Y2 = 1/2/3/4
LET Y2 = SORT Y	Create variable Y2 as the sorted (smallest to largest) version of Y
LET Y2 = SORTC Y X1 X2 X3	Create variable Y2 as the sorted (smallest to largest) version of Y and carry along the corresponding elements in X1, X2, and X3
LET Y1 = Y; RETAIN Y1 SUBSET DAY 1	Copy Y to Y1; then retain (= keep, and pack to top of vector) only those elements in Y for which the corresponding elements of the variable DAY are equal to 1
LET Y1 = Y; EXTEND Y1 Y2	Copy Y to Y1; then extend Y1 by Y2 (= attach Y2 to the end of Y1)
LET Y2 = CUMULATIVE SUM Y	Create a variable Y2 = cumulative sum of elements of Y (thus Y2(1)=Y(1), Y2(2)=Y(1)+Y(2), Y2(3)=Y(1)+Y(2)+Y(3), etc.)
LET Y2 = DIFFERENCE Y	Create a variable Y2 = first difference of elements in the variable Y (thus Y2(1)=Y(2)-Y(1), Y2(2)=Y(3)-Y(2), Y2(3)=Y(4)-Y(3), etc.)
DELETE X Y Z	Delete variables X, Y and Z
DELETE X Y Z SUBSET Z = 2	Delete all elements in X, Y, and Z for which Z = 2 (and pack all remaining elements up to topmost positions)
DELETE X(1) Y(23) Z(1000)	Delete element 1 of X, element 23 of Y, and element 1000 of Z (and pack all remaining elements up to topmost positions)

2. Graphics

2.1 Plot Data

PLOT Y	Plot variable Y (vertically) versus dummy index 1, 2, 3, ... (horizontally) (Use current settings of title, label, legend, axis limits, plot characters, plot lines, plot spikes, plot bars, etc.)
PLOT Y X or PLOT Y VERSUS X or PLOT Y VS X	Plot variable Y (vertically) versus variable X (horizontally)
PLOT Y X TAG	Generate multi-trace plot of Y (vertically) versus X (horizontally) where distinct values of TAG variable define distinct traces
PLOT Y1 Y2 Y3 Y4 VERSUS X	Generate multi-trace plot of variables Y1, Y2, Y3, and Y4 (vertically) versus variable X (horizontally)
PLOT Y PRED VERSUS X	Generate 2-trace plot of Y and post-fit predicted values in PRED (vertically) versus variable X (horizontally)
PLOT Y VERSUS X AND PLOT PRED VERSUS X	Generate 2-trace plot of Y and post-fit predicted values in PRED (vertically) versus variable X (horizontally) <alternate method>
3D-PLOT Y X1 X2	Generate a 3-dimensional trace of Y versus X1 and X2
3D-PLOT Y X1 X2 X1 AND 3D-PLOT Y X1 X2 X2	Generate a 3-d trace of Y versus X1 & X2; cross-hatch at each X1 value Generate a 3-d trace of Y versus X1 & X2; cross-hatch at each X2 value (the net result will be a 3-d surface with cross-hatching in both direction)
LET X1 = SEQUENCE -5 1 5 FOR I = 1 1 121 LET X2 = SEQUENCE -5 11 1 5 LET Y = X1**2+X2**2 LET Y0 = DATA 10 20 30 40 CONTOUR PLOT Y X1 X2 Y0	Create variable X1 with elements -5, -4, -3, ..., 4, 5 repeated 11 times Create variable X2 with 11 -5's, 11 -4's, 11 -3's, ..., 11 4's, 11 5's Create variable Y = X1 squared + X2 squared Create variable Y0 with 4 elements: 10, 20, 30, and 40 Generate a contour plot of Y vs. X1 and X2 with contour lines at Y0

2.2 Plot Functions

PLOT SIN(X**2)*EXP(-X) FOR X = 0 .1 10	Generate plot of function evaluated at X = 0, .1, .2, .3, ..., 10.0
3DPLOT EXP(-X**2-Y**2) FOR X = -2 .2 2 FOR Y = -2 .2 2	Generate 3-D plot of function evaluated at X = -2.0, -1.8, -1.6, ... 1.8, 2.0 and Y = -2.0, -1.8, -1.6, ..., 1.8, 2.0

2.3 Character/Line/Spike/Bar Plots

STATUS	Display current status of worksheet dimensions, plot characters/lines/spikes/bars and existing internal Dataplot variables, parameters, & functions
CHARACTERS X BLANK CIRCLE	Set plot character types (for future plots) as follows: trace 1 = X; trace 2 = BLANK; trace 3 = CIRCLE
LINES SOLID DOT DASH	Set plot line types: trace 1 = SOLID; trace 2 = DOT; trace 3 = DASH
SPIKE ON ON OFF	Set plot spikes on/off: trace 1 = ON; trace 2 = ON; trace 3 = OFF
BAR ON OFF ON	Set plot bars on/off: trace 1 = ON; trace 2 = OFF; trace 3 = ON
BAR FILL ON OFF ON	Set plot bar fills on/off: trace 1 = ON; trace 2 = OFF; trace 3 = ON
BAR WIDTH .5 .5 .5	Set plot bar widths: trace 1 = .5; trace 2 = .5; trace 3 = .5
BAR DIMENSION 2 3 3	Set plot bar dimension: trace 1 = 2; trace 2 = 3; trace 3 = 3
BAR FILL ONTS ONTS OFF	Set 3-d bar fill patterns: trace 1 = ONTS; trace 2 = ONTS; trace 3 = OFF Note--ONTS means fill is ON for Top & Side of 3-d bars

2. Graphics (Continued)

2.4 Annotating Plots

TITLE DEFECTIVE SPRINGS ANALYSIS
Y1LABEL PERCENT DEFECTIVE
X1LABEL STEEL TEMPERATURE
LET STRING S1 = JANUARY; X2LABEL DATE = ^S1

Y1LABEL AUTOMATIC

X1LABEL AUTOMATIC

X3LABEL AUTOMATIC

Set title to DEFECTIVE SPRINGS ANALYSIS
Set left vertical axis label to PERCENT DEFECTIVE
Set first horizontal axis label to STEEL TEMPERATURE
Define string S1 to be JANUARY; then set second horizontal axis label to MONTH = <contents of S1 (namely, JANUARY)>
Set left vertical axis label so that it will automatically display the contents of the first argument of the PLOT command (e.g., PLOT PRESSURE TEMPERATURE will automatically yield PRESSURE as the left vertical axis label)
Set first horizontal axis label so that it will automatically display the contents of the second argument of the PLOT command (e.g., PLOT PRESSURE TEMPERATURE will automatically yield TEMPERATURE as the first horizontal axis label)
Set third horizontal axis label so that it will automatically display the entire command line which generated the plot (e.g., NORMAL PROBABILITY PLOT TEMPERATURE will automatically yield NORMAL PROBABILITY PLOT TEMPERATURE as the third horizontal axis label)

2.5 Modifying Plots

XLIMITS 0 3
YLIMITS 50 90
YLIMITS

LEGEND 1 LABORATORY 3
LEGEND 1 COORDINATES 20 80

GRID ON

XLOG ON
YLOG ON
LOGLOG ON
LOGLOG OFF

TIC OFFSET UNITS SCREEN
TIC OFFSET 5 5

Set (for future plots) the horizontal axis limits to 0 and 3
Set vertical axis plot limits to 50 and 90
Set vertical axis plot limits back to default (= neat and float with the dat)

Define legend 1 to be LABORATORY 3
Define plot coordinates for legend 1 to be 20% over and 80% up page

Set grid lines on plots to be automatically ON

Set log scale for horizontal axis to be ON
Set log scale for vertical axis to be ON
Set log scale for both axes to be ON
Set log scale for both axes to be OFF (& therefore revert to linear scale)

Set corner tic units to screen (0 to 100) (as opposed to data)
Set offset for first and last tics to be 5% from corner

2.6 Multiple Plots per Page

MULTILOT 2 2
PLOT Y X1; PLOT Y X2; PLOT Y X3; PLOT Y X4
MULTILOT OFF

TITLE HW 5 3
LABEL HW 4 2
TIC LABEL HW 4 2

Have next 2 x 2 = 4 plots automatically appear on the same page
Generate 4 separate plots
Revert back to 1 plot per page

Set height/width of plot title to be 5%/3% (of total screen height)
Set height & width of all plot labels to be 4% and 2%
Set height & width of tic labels on plots to be 4% and 2%

2. Graphics (Continued)

2.7 Word Charts

ERASE

Erase the screen (and remain in graphics mode)

(as opposed to ER which would erase screen but go to text mode)

MOVE 50 50

Move 50% across the screen & 50% up the screen (therefore, go to center of s)

JUSTIFICATION CENTER

Set justification for future text to be center-justified

FONT TRIPLEX

Set font for future text to be triplex

HW 10 7

Set height & width of future text to be 10% and 7% (of screen height & width)

TEXT ABC

Write out the text string ABC

BOX 40 40 60 60

Draw a box with one corner at (40%,40%) and other corner at (60%,60%)

CIRCLE 40 40 60 60

Draw a circle with one circumference point at (40%,40%) and opposing point a)

TEXT LC()ESUP()PI()I

Write out the text string (lower case) e with superscript Greek pi and i

2.8 Diagrams

LINE 20 20 80 80

Draw a line segment from (20%,20%) to (80%,80%)

ARROW 20 50 60 50

Draw an arrow with tail at (20%,50%) and head at (60%,50%)

HW 3 1

Set height and width to 3% and 1% (of total screen height and width)

AMPLIFIER 30 50 70 50

Draw an amplifier with mid-side at (30%,50%) and with tip at (70%,50%)

2.9 Capturing Graphics

PP

Send the current contents of the screen to a (Postscript) laser printer
(this is an important and heavily used command)

DEVICE 2 POSTSCRIPT

Activate a secondary output device (a file) and specify format to be postscript

PLOT SIN(X) FOR X = 0 .1 6

Plot the sin function—it will appear on screen and also to secondary device

EXIT

Exit from Dataplot

(from DOS) PRINT DPPL1F.DAT

Send the file DPPL1F.DAT to the postscript laser printer

3. Mathematics

LET Y = PRIME NUMBERS FOR I = 1 1 100

Create a variable Y consisting of the first 100 primes

LET Y2 = LOG(Y)

Create Y2 equal to the natural log of Y
(if Y is a parameter (= scalar), then Y2 will be a parameter (= scalar));
if Y is a variable (= vector), then Y2 will be a variable (= vector))

LET FUNCTION F = SIN(X**2)*EXP(-A*X)

Create the function (= character string) F containing the following
19 characters: SIN(X**2)*EXP(-A*X)

(F may be used directly in future operations, such as:

transformations: LET A = 1; LET Y = F
plotting: PLOT F for X = 0 .1 10
fitting: FIT Y = F
root-finding: LET R = ROOTS F WRT X FOR X = 0 TO 10
analytic differentiation: LET FUNCTION F2 = DERIVATIVE F WRT X

LINEAR FIT Y X

PLOT Y PRED VERSUS X
PLOT RES X

Perform least squares linear fit of Y on X (pred. val. => PRED, residuals => RES)

Generate a plot with 2 traces: Y versus X and PRED versus X

Generate a plot of residuals versus X (ideal: structureless)

QUARTIC FIT Y X

PLOT Y PRED VERSUS X
PLOT RES X

Perform least squares quartic fit of Y on X (pred. val. => PRED, res. => RES)

Generate a plot with 2 traces: Y versus X and PRED versus X

Generate a plot of residuals versus X (ideal: structureless)

FIT Y X1 X2 X3

PLOT Y PRED VERSUS X1
PLOT Y PRED VERSUS X2
PLOT Y PRED VERSUS X3

Perform least sq. fit of Y on X1, X2, and X3 (pred. val. => PRED, res. => RES)

Generate a plot with 2 traces: Y versus X1 and PRED versus X1

Generate a plot with 2 traces: Y versus X2 and PRED versus X2

Generate a plot with 2 traces: Y versus X3 and PRED versus X3

FIT Y = EXP(-ALPHA*X)/(A+B*X)

PLOT Y PRED VERSUS X
PLOT RES X

Perform least squares non-linear fit of Y on X (pred. val. => PRED, res. => RES)

Generate a plot with 2 traces: Y versus X and PRED versus X

Generate a plot of residuals versus X (ideal: structureless)

FILTER WIDTH 7

SMOOTH Y
LET N = NUMBER Y
LET X = SEQUENCE 1 1 N
PLOT Y PRED VERSUS X
PLOT RES X

Set width of smoothing window to be 7 observations (default = 3 observations)

Perform (moving average) smooth of Y (smoothed => PRED, residuals => RES)

Determine number of elements in the variable Y; place answer in parameter N

Create the variable X with the sequence 1, 2, 3, ..., N

Generate a plot with 2 traces: Y versus X and PRED versus X

Generate a plot of residuals (= high-frequency component) versus X

FILTER WIDTH 11

CUBIC SMOOTH Y
LET N = NUMBER Y
LET X = SEQUENCE 1 1 N
PLOT Y PRED VERSUS X
PLOT RES X

Set width of smoothing window to be 11 observations (default = 3 observations)

Perform (least squares cubic) smooth of Y (smoothed => PRED, res. => RES)

Determine number of elements in the variable Y; place answer in parameter N

Create the variable X with the sequence 1, 2, 3, ..., N

Generate a plot with 2 traces: Y versus X and PRED versus X

Generate a plot of residuals (= high-frequency component) versus X

LOWESS PROPORTION 10

LOWESS SMOOTH Y X
PLOT Y PRED VERSUS X
PLOT RES X

Set width of smoothing window to be 10% of total data width (default = 5%)

Perform (LOWESS) smooth of Y on X (smoothed => PRED, residuals => RES)

Generate a plot with 2 traces: Y versus X and PRED versus X

Generate a plot of residuals (= high-frequency component) versus X

LET A = INTEGRAL Y X

Compute the (trapezoid-rule) integral of Y versus X, place result in parameA

LET Y2 = INTERPOLATE Y X X2

PLOT Y VERSUS X Y2 VERSUS X2

Perform cubic-spline interpolation of Y on X (evaluate at X2, resultant into Y2)

Generate a plot with 2 traces: Y versus X and Y2 versus X2

LET Y2 X2 = FFT Y X

Perform a fast Fourier transform of the complex data in Y (real) & X (imag.)

the real and imaginary output are placed in Y2 and X2

LET Y2 X2 = INVERSE FFT Y X

Perform inv. fast Fourier transform of the complex data in Y (real) and X (imag.)

the real and imaginary output are placed in Y2 and X2

4. Probability

LET P = NORCDF(2)	Create parameter P = normal N(0,1) cum. dist. function evaluated at x = 2
LET P = TCDF(2,8)	Create parameter P = t(nu=8) cum. dist. function evaluated at x = 2
LET P = CHSCDF(2,8)	Create parameter P = chi-squared(nu=8) cum. dist. function eval. at x = 2
LET P = FCDF(2,8,11)	Create parameter P = F(nu1=8,nu2=11) cum. dist. function eval. at x = 2
LET P = WEICDF(2,8)	Create parameter P = Weibull(shape=8) cum. dist. function eval. at x = 2
LET P = WALCDF(2,8)	Create parameter P = Wald(shape=8) cum. dist. function eval. at x = 2
LET P = FLCDF(2,8)	Create parameter P = Fatigue Life(shape=8) cum. dist. func. eval. at x = 2
LET P = IGCDF(2,8)	Create parameter P = Inverse Gaussian(shape=8) cum. dist. func. eval. at x = 2
LET P = RIGCDF(2,8)	Create parameter P = Recip. Inv. Gaus.(shape=8) cum. dist. func. at x = 2
LET X = NORPPF(.975)	Create parameter P = normal N(0,1) percent point function evaluated at p = .975
LET X = TPPF(.975,8)	Create parameter P = t(nu=8) percent point function eval. at p = .975
LET X = CHSPPF(.975,8)	Create parameter P = chi-squared(nu=8) percent point function eval. at p = .975
LET X = FPPF(.975,8,11)	Create parameter P = F(nu1=8,nu2=11) percent point function eval. at p = .975
LET P = WEIPPF(2,8)	Create parameter P = Weibull(shape=8) percent point function eval. at p = .975
LET P = WALPPF(2,8)	Create parameter P = Wald(shape=8) percent point function eval. at p = .975
LET P = FLPPF(2,8)	Create parameter P = Fatigue Life(shape=8) percent point func. eval. at p = .975
LET P = IGPPF(2,8)	Create parameter P = Inv. Gaus.(shape=8) percent point func. eval. at p = .975
LET P = RIGCDF(2,8)	Create parameter P = Recip. Inv. Gaus.(shape=8) percent point func. eval. at p = .975
PLOT NORPDF(X) FOR X = -3 .1 3	Plot the normal N(0,1) density function eval. at x = -3, at increments .3
PLOT NORPDF((X-100)/10) FOR X = 70 1 130	Plot the normal N(100,10) density function evaluated at x = 70 (1) 130
PLOT WEIPDF(X,8) FOR X = .1 .1 30	Plot the Weibull (shape=8) density function for x = .1 (.1) 30
PLOT WEIPDF((X-100)/10,8) FOR X = 101 1 200	Plot the Weibull (min=100,scale=10,shape=8) dens. func. for x = 101 (1) 200
PLOT TPDF(P,3) FOR X = -10 .1 10	Plot the t(nu=3) distribution dens. func. for x = -10 (.1) 10
PLOT TPDF(P,1) FOR X = -10 .1 10 AND	Generate a plot with 3 traces: the t(nu=1) prob density function,
PLOT TPDF(P,2) FOR X = -10 .1 10 AND	the t(nu=2) probability density function, and
PLOT TPDF(P,3) FOR X = -10 .1 10	the t(nu=3) probability density function
PLOT TPPF(P,3) FOR P = .01 .01 .99	Plot the t(nu=3) distribution percent points for p = .01 (.01) .99
PLOT TPPF(.975,NU) FOR NU = 1 1 100	Plot the 97.5 percent point of the t dist. for nu = 1 (1) 100
LET Y = UNIFORM RANDOM NUMBERS FOR I = 1 1 20	Create variable Y with 20 random numbers from uniform N[0,1] distribution
LET Y = NORMAL RANDOM NUMBERS FOR I = 1 1 20	Create variable Y with 20 random numbers from normal N(0,1) distribution
LET Y = NORMAL RANDOM NUMBERS FOR I = 1 1 20	Create variable Y with 20 random numbers from normal N(0,1) distribution
LET Y2 = 100+10*Y	Create variable Y2 with 20 random numbers from normal N(100,10) distribution
LET Y = CAUCHY RANDOM NUMBERS FOR I = 1 1 100	Create variable Y with 20 random numbers from Cauchy C(0,1) distribution
LET NU = 5	
LET Y = T RANDOM NUMBERS FOR I = 1 1 40	Create variable Y with 40 random numbers from t distribution with nu = 5
LET NU = 5	
LET Y = CHI-SQUARED RAND NUMB FOR I = 1 1 40	Create variable Y with 40 random numbers from chi-squared dist. with nu = 5
LET NU1 = 5; LET NU2 = 8	
LET Y = F RANDOM NUMBERS FOR I = 1 1 40	Create variable Y with 40 random numbers from F dist. with nu1 = 5 & nu2 = 8
LET GAMMA = 4	
LET Y = WEIBULL RANDOM NUMBERS FOR I = 1 1 50	Create variable Y with 50 random numbers from Weibull dist. with shape par. = 4
LET GAMMA = 4	
LET Y = WEIBULL RANDOM NUMBERS FOR I = 1 1 50	Create variable Y with 50 random numbers from Weibull dist. with shape par. = 4
LET Y2 = 100+10*Y	Create variable Y2 with 50 random numbers from Weib. dist. with shape par. = 4 & with minimum = 100, and with scale = 10
LET RUNSEQ = RANDOM PERMUTATION FOR I = 1 1 8	Create variable RUNSEQ with a random permutation of 1 to 8

5. Statistics

5.1 Univariate Analysis

4-PLOT Y

Generate 4-plot analysis (run sequence plot, lag plot, histogram, normal probability plot of the data in the variable Y

PLOT Y

Generate a plot of Y versus the dummy index 1, 2, 3, ...

LAG PLOT Y

Generate a lag plot (with lag = 1) of the data in the variable Y
vertical axis = Y(i); horizontal axis = Y(i-1)

HISTOGRAM Y

Generate a histogram of Y

STEM-AND-LEAF DIAGRAM Y

Generate a stem-and-leaf diagram of the data in the variable Y

NORMAL PROBABILITY PLOT Y

Generate a normal probability plot of Y (ideal: linear)
(to determine if data follows a normal distribution)
vertical axis = sorted Y(i); horizontal axis = normal N(0,1) order stat medians

UNIFORM PROBABILITY PLOT Y

Generate a uniform probability plot of Y (ideal: linear)
(to determine if data follows a uniform distribution)
vertical axis = sorted Y(i); horizontal axis = uniform U[0,1] order stat medians

CAUCHY PROBABILITY PLOT Y

Generate a Cauchy probability plot of Y (ideal: linear)
(to determine if data follows a Cauchy distribution)
vertical axis = sorted Y(i); horizontal axis = Cauchy C[0,1] order stat medians

LOGNORMAL PROBABILITY PLOT Y

Generate a lognormal probability plot of Y (ideal: linear)

HALFNORMAL PROBABILITY PLOT Y

Generate a halfnormal probability plot of Y (ideal: linear)

EXPONENTIAL PROBABILITY PLOT Y

Generate a exponential probability plot of Y (ideal: linear)

EV1 PROBABILITY PLOT Y

Generate a extreme value type 1 probability plot of Y (ideal: linear)

LET NU = 6; T PROB PLOT Y

Generate t (with tail parameter = 6) probability plot (ideal: linear)
(to determine if data follows a t distribution with shape = 6)
vertical axis = sorted Y(i); horizontal axis = t t(0,1,6) order stat medians

LET GAMMA = 2.5; WEIBULL PROB PLOT Y

Generate Weibull (with shape parameter = 2.5) probability plot (ideal: linear)
(to determine if data follows a Weibull distribution with shape = 2.5)
vertical axis = sorted Y(i); horizontal axis = Weibull W(0,1,2.5) order stat medians

PPCC PLOT Y or TUKEY PPCC PLOT Y

Generate Tukey distribution probability plot correlation coefficient plot
(to determine the best-fit member of the Tukey distributional family)

T PPCC PLOT Y

Generate t distribution probability plot correlation coefficient plot
(to determine the best-fit member of the t distributional family)

EV2 PPCC PLOT Y

Generate extreme value type 2 distribution prob. plot corr. coef. plot
(to determine the best-fit member of the ext. value dist. family)

PARETO PPCC PLOT Y

Generate Pareto type 2 distribution prob. plot corr. coef. plot
(to determine the best-fit member of the Pareto dist. family)

WEIBULL PPCC PLOT Y

Generate Weibull distribution probability plot correlation coefficient plot
(to determine the best-fit member of the Weibull distributional family
with common constraint: minimum = 0)

WEIBULL PLOT Y

Generate Weibull plot of the data in the variable Y

INVERSE GAUSSIAN PPCC PLOT Y

Generate Inverse Gaussian distribution prob. plot corr. coef. plot
(to determine the best-fit member of the Inv. Gaus. distributional family)

FAILURE TIME PPCC PLOT Y

Generate Failure Time distribution prob. plot corr. coef. plot
(to determine the best-fit member of the Fail. Time distributional family)

5. Statistics (Continued)

5.1 Univariate Analysis (Continued)

BOX-COX NORMALITY PLOT Y

Generate Box-Cox normality plot (to determine best transformation to normal)
vertical axis = normality measure; horizontal axis = power transformation in x

SUMMARY Y

Generate battery of location, variation, autocorrelation, & distribution statis

LET N = NUMBER Y
LET S = SUM Y
LET A = MEAN Y
LET A = MEDIAN Y
LET A = MIDMEAN Y
LET S = STANDARD DEVIATION Y
LET V = VARIANCE Y
LET SDM = STANDARD DEVIATION OF THE MEAN Y
LET A = AUTOCORRELATION Y
LET C = CORRELATION X Y

Create parameter N = number of elements in the variable (= vector) Y
Create parameter S = sum of all data in the variable Y
Create parameter A = mean of all data in the variable Y
Create parameter A = median of all data in the variable Y
Create parameter A = midmean of all data in the variable Y
Create parameter S = standard deviation of all data in the variable Y
Create parameter V = variance of all data in the variable Y
Create parameter SDM = standard deviation of the mean of all data in variable Y
Create parameter A = autocorrelation of all data in the variable Y
Create parameter A = correlation of all data in the variables X and Y

LET TARGET = 25
LET LSL = 22
LET USL = 28
LET A = CPK Y

Create parameter TARGET (process target value) as 25
Create parameter LSL (process lower spec limit) as 22
Create parameter USL (process upper spec limit) as 28
Create parameter A = Cpk (capability index) of data in variable Y

LET W = DATA 1 1 .9 .9 4 1.2 2 1.5
LET M = WEIGHTED MEAN Y W
LET S = WEIGHTED STANDARD DEVIATION Y W
LET V = WEIGHTED VARIANCE Y W

Create variable W consisting of 8 numbers (used to define desired weights)
Create parameter M = weighted mean of data in variable Y (with weights in W)
Create parameter S = weighted st. dev. of data in variable Y (with weights in W)
Create parameter V = weighted variance of data in variable Y (with weights in W)

TABULATE Y

Tabulate (= display a table of) distinct values and counts of the variable Y

AUTOCORRELATION PLOT Y SPECTRUM Y

Generate an autocorrelation plot of the data in the variable Y
Generate a spectral plot of the data in the variable Y

DEMODULATION FREQUENCY .3 COMPLEX DEMODULATION AMPLITUDE PLOT Y COMPLEX DEMODULATION PHASE PLOT Y

Set demodulation frequency to .3 (cycles per observation)
Generate a complex demod. amplitude plot (at demodulation frequency = .3)
Generate a complex demod. phase plot (at demodulation frequency = .3)

FILTER WIDTH 7 SMOOTH Y LET N = NUMBER Y LET X = SEQUENCE 1 1 N PLOT Y PRED VERSUS X PLOT RES X

Set width of smoothing window to be 7 observations (default = 3 observations)
Perform (moving average) smooth of Y (smoothed => PRED, residuals => RES)
Determine number of elements in the variable Y; place answer in parameter N
Create the variable X with the sequence 1, 2, 3, ..., N
Generate a plot with 2 traces: Y versus X and PRED versus X
Generate a plot of residuals (= high-frequency component) versus X

FILTER WIDTH 11 CUBIC SMOOTH Y LET N = NUMBER Y LET X = SEQUENCE 1 1 N PLOT Y PRED VERSUS X PLOT RES X

Set width of smoothing window to be 11 observations (default = 3 observations)
Perform (least squares cubic) smooth of Y (smoothed => PRED, res. => RES)
Determine number of elements in the variable Y; place answer in parameter N
Create the variable X with the sequence 1, 2, 3, ..., N
Generate a plot with 2 traces: Y versus X and PRED versus X
Generate a plot of residuals (= high-frequency component) versus X

LOWESS PROPORTION 25 LOWESS SMOOTH Y X PLOT Y PRED VERSUS X PLOT RES X

Set width of smoothing window to be 25% of total data width (default = 5%)
Perform (LOWESS) smooth of Y on X (smoothed => PRED, residuals => RES)
Generate a plot with 2 traces: Y versus X and PRED versus X
Generate a plot of residuals (= high-frequency component) versus X

5. Statistics (Continued)

5.2 Regression Analysis

PLOT Y X or PLOT Y VERSUS X or PLOT Y VS X

Plot variable Y versus variable X (to assist in selecting a model)

LET C = CORRELATION Y X

Create parameter C = product moment corr. coef. of Y and X
(to assist in measuring linear relatedness of 2 variables)

LET C = RANK CORRELATION Y X

Create parameter C = Spearman's rank moment corr. coef. of Y and X
(to assist in measuring relatedness of 2 variables)

LINEAR FIT Y X

CHARACTERS X BLANK; LINES BLANK SOLID
PLOT Y PRED VERSUS X
PLOT RES X
NORMAL PROBABILITY PLOT RES
PRINT A0 A1 RESSD

Perform least squares linear fit of Y on X (pred. val. => PRED, res. => RES)
Set plot characters for next plots to X and blank; set plot lines to blank ad
Generate a plot with 2 traces: Y versus X and PRED versus X
Generate a plot of residuals versus X (ideal: structureless)
Generate a normal probability plot of the residuals (ideal: linear)
Print intercept, slope, and residuals standard deviation (ideal: near-zero)

QUARTIC FIT Y X

PLOT Y PRED VERSUS X
PLOT RES X

Perform least squares quartic fit of Y on X (pred. val. => PRED, res. => RES)
Generate a plot with 2 traces: Y versus X and PRED versus X
Generate a plot of residuals versus X (ideal: structureless)

FIT Y X1 X2 X3

PLOT Y PRED VERSUS X1
PLOT Y PRED VERSUS X2
PLOT Y PRED VERSUS X3

Perform least squares fit of Y on X1, X2, & X3 (pred. val. => PRED, res. => RES)
Generate a plot with 2 traces: Y versus X1 and PRED versus X1
Generate a plot with 2 traces: Y versus X2 and PRED versus X2
Generate a plot with 2 traces: Y versus X3 and PRED versus X3

FIT Y = EXP(-ALPHA*X)/(A+B*X)

PLOT Y PRED VERSUS X

Perform least squares non-linear fit of Y on X (pred. val. => PRED, res. => RES)
Generate a plot with 2 traces: Y versus X and PRED versus X

WEIGHTS W

FIT Y = EXP(-ALPHA*X)/(A+B*X)

Specify W as the variable containing desired weights for the upcoming fit
Perf. weighted lst. sq. non-lin. fit of Y on X (pred. val. => PRED, res. => RES)

FIT Y = EXP(-ALPHA*X)/(A+B*X)

LET W = BIWEIGHT RES

WEIGHTS W

FIT Y = EXP(-ALPHA*X)/(A+B*X)

Perf. (unweighted) lst. sq. non-lin. fit of Y on X (pred. val. => PRED, res. => RES)
Create variable W = (Tukey robust) biweights based on previous unweighted fit
Specify W as the variable containing desired weights for the upcoming fit
Perform robust, weighted least sq. non-linear fit of Y on X
(pred. values => PRED, residuals => RES)

FIT Y = A1*IND(TAG,1) + B1*IND(TAG,2) + SLOPE*X

Perform joint fit of 2 data sets with distinct intercepts (A1 and B1)
but both having common slope (SLOPE). IND(.,.) is Dataplot indicator function

BOX-COX LINEARITY PLOT Y X

Generate Box-Cox linearity plot (determine best transf. of X to achieve linearity)
vertical axis = linearity measure; horizontal axis = power transformation ix

LET KNOTS = DATA 10 30 80

CUBIC SPLINE FIT Y X KNOTS

Create a variable KNOTS consisting of 3 values: 10, 30, and 80
Carry out a cubic spline fit of the data in Y and X with partition points in S

LINEAR CORRELATION PLOT Y X TAG

Generate a linear correlation plot of Y on X
(For each distinct value of TAG, extract the subset consisting of
the corresponding values of Y and X; compute the correlation coefficient
of this subset; plot this correlation coefficient versus the TAG value;
repeat for all distinct values of TAG; therefore,
vertical axis = subset correlation coefficient; horizontal axis = TAG)

LINEAR SLOPE PLOT Y X TAG

Generate a linear slope plot of Y on X
vertical axis = slope from linear fit of subset; horizontal axis = TAG)

LINEAR INTERCEPT PLOT Y X TAG

Generate a linear intercept plot of Y on X
vertical axis = intercept from linear fit of subset; horizontal axis = TAG)

LINEAR RESSD PLOT Y X TAG

Generate a linear residual standard deviation plot of Y on X
vertical axis = res. s.d. from linear fit of subset; horizontal axis = TAG)

5. Statistics (Continued)

5.3 Multi-Factor Analysis

BOX PLOT Y X

Generate Box Plot of Y on X

MEAN PLOT Y X

Generate a mean plot of Y on X
(For each distinct value of X, compute the mean of all corresponding values of Y, and then plot the means versus each X)

MEDIAN PLOT Y X
SD PLOT Y X

Generate a median plot of Y on X
Generate a standard deviation plot of Y on X

TABULATE COUNTS Y X
TABULATE MEAN Y X
TABULATE STANDARD DEVIATION Y X
TABULATE RANGE Y X

Tabulate (= display a table of) number of Y values at each distinct value in X
Tabulate (= display a table of) mean of Y values at each distinct value in X
Tabulate (= display a table of) stsn. dev. of Y values at each distinct value in X
Tabulate (= display a table of) range of Y values at each distinct value in X

PLOT Y1 Y2 Y3 Y4 VS X

Generate multi-trace plot of variables Y1, Y2, Y3, and Y4 (vertically)
versus variable X (horizontally)

MULTIPLY 2 3
LOOP FOR K = 1 1 6
HISTOGRAM Y^K
END LOOP

Have next 2 x 3 = 6 plots automatically appear on the same page
Initiate a loop with dummy parameter K taking on the values 1, 2, ..., 6
Generate a series of 6 plots: histogram of Y1, histogram of Y2, ..., histogram6
Terminate the loop

MULTIPLY 2 3
LOOP FOR K = 1 1 6
PLOT Y^K VERSUS X
END LOOP

Have next 2 x 3 = 6 plots automatically appear on the same page
Initiate a loop with dummy parameter K taking on the values 1, 2, ..., 6
Generate a series of 6 plots: Y1 versus X, Y2 versus X, ..., Y6 versus X
Terminate the loop

MULTIPLY 2 3
LOOP FOR K = 1 1 6
LOOP FOR L = 1 1 6
PLOT Y^K VERSUS Y^L
END LOOP
END LOOP

Have next 2 x 3 = 6 plots automatically appear on the same page
Initiate a loop with dummy parameter K taking on the values 1, 2, ..., 6
Initiate a loop with dummy parameter L taking on the values 1, 2, ..., 6
Generate a series of 36 plots: Y1 versus X, Y2 versus X, ..., Y6 versus X
Terminate the loop for L
Terminate the loop for K

ANOVA Y X1 X2 X3 X4 X5
MEDIAN POLISH Y X1 X2 X3 X4 X5

Carry out a (balanced) Analysis of Variance of Y on X1, X2, X3, X4, X5
Carry out a (balanced) (Tukey) Median Polish of Y on X1, X2, X3, X4, X5

BLOCK PLOT Y X2 X1

Generate a block plot of Y on X2 and X1
vertical axis = Y; horizontal axis = X2; plot character = X1

BLOCK PLOT Y X2 X3 X4 X1

Generate a block plot of Y on X2, X3, X4 and X1
vertical axis = Y; horizontal axis = X2 x X3 x X4; plot character = X1

5. Statistics (Continued)

5.4 Multi-Response (Multivariate) Analysis

MULTILOT 2 2

PLOT Y1

PLOT Y2

PLOT Y1 Y2

MULTILOT OFF

Have next 2 x 2 = 4 plots automatically appear on the same page

Generate the 1st plot: Y1 versus the dummy index 1, 2, 3, ...

Generate the 2nd plot: Y2 versus the dummy index 1, 2, 3, ...

Generate the 3rd plot: Y1 versus Y2

Revert back to 1 plot per page

BIHISTOGRAM Y1 Y2

QUANTILE-QUANTILE PLOT Y1 Y2

Generate a bihistogram of the data in Y1 and Y2

Generate a quantile-quantile plot of the data in Y1 and Y2

CROSS-TAB Y1 Y2

T TEST Y1 Y2

Tabulate (= display a table of) distinct values & counts of the variables Y1 & Y2

Carry out a t-test for the 2 variables Y1 and Y2

LET N = NUMBER Y1

LET X = SEQUENCE 1 1 N

PLOT Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 VERSUS X

Create parameter N = number of elements in the variable (= vector) Y

Create variable X with elements 1, 2, 3, 4, ..., N

Generate multi-trace plot of Y1, Y2, ..., Y8 versus X

MULTILOT 2 4

LOOP FOR K = 1 1 8

HISTOGRAM Y^K

END LOOP

Have next 2 x 4 = 8 plots automatically appear on the same page

Initiate a loop with dummy parameter K taking on the values 1, 2, ..., 8

Generate a series of 8 plots: histogram of Y1, histogram of Y2, ..., histogram Y8

Terminate the loop

MULTILOT 2 4

LOOP FOR K = 1 1 8

PLOT Y^K

END LOOP

Have next 2 x 4 = 8 plots automatically appear on the same page

Initiate a loop with dummy parameter K taking on the values 1, 2, ..., 8

Generate a series of 8 plots: Y1 versus i, Y2 versus i, ..., Y8 versus i

Terminate the loop

STAR PLOT Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

PROFILE PLOT Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

Generate a star plot for the 8 variables Y1 to Y8

Generate a profile plot for the 8 variables Y1 to Y8

LET V1 = FIRST PRIN COMP Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

LET V2 = SECOND PRIN COMP Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

PLOT V1 V2

Create the 8-element variable V1 = the 1st prin. comp. for the 8 variables

Create the 8-element variable V2 = the 2nd prin. comp. for the 8 variables

Plot the 1st prin. comp. (vertically) vs. the 2nd prin. comp. (horizontally)

LET V1 = FIRST PRIN EIGEN Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

LET V2 = SECOND PRIN EIGEN Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

Create the 8-element variable V1 = the 1st prin. eigenvalue for the 8 variables

Create the 8-element variable V2 = the 2nd prin. eigenvalue for the 8 variables

5. Statistics (Continued)

5.5 Time Series Analysis

4-PLOT Y

Generate 4-plot analysis (run sequence plot, lag plot, histogram, normal probability plot of the data in the variable Y

PLOT Y

Plot the data in the variable Y (versus the dummy index 1, 2, 3, ...)

LAG PLOT Y

Generate a lag plot (with lag = 1) of the data in the variable Y
vertical axis = Y(i); horizontal axis = Y(i-1)

LAG 2 PLOT Y

Generate a lag plot (with lag = 2) of the data in the variable Y
vertical axis = Y(i); horizontal axis = Y(i-2)

LAG 12 PLOT Y

Generate a lag plot (with lag = 12) of the data in the variable Y
vertical axis = Y(i); horizontal axis = Y(i-12)

AUTOCORRELATION PLOT Y

Generate an autocorrelation plot of the data in the variable Y
vertical axis = autocorr. of Y(i) and Y(i+h); horizontal axis = lag h

SPECTRUM Y

Generate a spectral plot of the data in the variable Y
vertical axis = variance component; horizontal axis = frequency (0 to .5 cyc)

LOGLOG

Set both axes to be log scale for future plots

ALLAN VARIANCE

Generate an Allan variance plot of the data in the variable Y
vertical axis = Allan variance; horizontal axis = subset size

DEMODULATION FREQUENCY .3

Set demodulation frequency to .3 (cycles per observation)

COMPLEX DEMODULATION AMPLITUDE PLOT Y

Generate a complex demod. amplitude plot (at demodulation frequency = .3)

COMPLEX DEMODULATION PHASE PLOT Y

Generate a complex demod. phase plot (at demodulation frequency = .3)

LET Y2 X2 = FFT Y

Perform a fast Fourier transform of the real data in Y

the real and imaginary output are placed in Y2 and X2

LET Y2 X2 = FFT Y X

Perform a fast Fourier transform of the complex data in Y and X

the real and imaginary output are placed in Y2 and X2

LET Y2 X2 = INVERSE FFT Y X

Perform an inverse fast Fourier transform of the complex data in Y (real) and X

the real and imaginary output are placed in Y2 and X2

LET Y2 X2 = FOURIER TRANSFORM Y

Perform a (slow) Fourier transform of the real data in Y

the real and imaginary output are placed in Y2 and X2

LET Y2 X2 = FOURIER TRANSFORM Y X

Perform a (slow) Fourier transform of the complex data in Y and X

the real and imaginary output are placed in Y2 and X2

LET Y2 X2 = INVERSE FOURIER TRANSFORM Y X

Perform an inv. (slow) Fourier transform of complex data in Y (real) & X (imag.)

the real and imaginary output are placed in Y2 and X2

FILTER WIDTH 7

Set width of smoothing window to be 7 observations (default = 3 observations)

SMOOTH Y

Perform (moving average) smooth of Y (smoothed => PRED, residuals => RES)

LET N = NUMBER Y

Determine number of elements in the variable Y; place answer in parameter N

LET X = SEQUENCE 1 1 N

Create the variable X with the sequence 1, 2, 3, ..., N

PLOT Y PRED VERSUS X

Generate a plot with 2 traces: Y versus X and PRED versus X

PLOT RES X

Generate a plot of residuals (= high-frequency component) versus X

FILTER WIDTH 11

Set width of smoothing window to be 11 observations (default = 3 observations)

CUBIC SMOOTH Y

Perform (least squares cubic) smooth of Y (smoothed => PRED, res. => RES)

LET N = NUMBER Y

Determine number of elements in the variable Y; place answer in parameter N

LET X = SEQUENCE 1 1 N

Create the variable X with the sequence 1, 2, 3, ..., N

PLOT Y PRED VERSUS X

Generate a plot with 2 traces: Y versus X and PRED versus X

PLOT RES X

Generate a plot of residuals (= high-frequency component) versus X

LOWESS PROPORTION 25

Set width of smoothing window to be 25% of total data width (default = 5%)

LOWESS SMOOTH Y X

Perform (LOWESS) smooth of Y on X (smoothed => PRED, residuals => RES)

PLOT Y PRED VERSUS X

Generate a plot with 2 traces: Y versus X and PRED versus X

PLOT RES X

Generate a plot of residuals (= high-frequency component) versus X

5. Statistics (Continued)

5.6 Uncertainty Analysis

JACKKNIFE MEAN PLOT Y

Generate a jackknife mean plot for the data in the variable Y
vert. axis = mean for i-th jackknife sample; hor. axis = bootstrap)
Generate a jackknife median plot for the data in the variable Y
vert. axis = median for i-th jackknife sample; hor. axis = bootstrap)

JACKKNIFE MEDIAN PLOT Y

BOOTSTRAP MEAN PLOT Y

Generate a bootstrap mean plot for the data in the variable Y
vert. axis = mean for i-th bootstrap sample; hor. axis = bootstrap)
Generate a bootstrap median plot for the data in the variable Y
vert. axis = median for i-th bootstrap sample; hor. axis = bootstrap)

BOOTSTRAP MEDIAN PLOT Y

BOOTSTRAP MIDMEAN PLOT Y

Generate a bootstrap midmean plot for the data in the variable Y

BOOTSTRAP RANGE PLOT Y

Generate a bootstrap range plot for the data in the variable Y

BOOTSTRAP SD PLOT Y

Generate a bootstrap sd plot for the data in the variable Y

BOOTSTRAP LINEAR CORRELATION PLOT Y X

Generate a bootstrap linear correlation plot for Y and X

BOOTSTRAP LINEAR INTERCEPT PLOT Y X

Generate a bootstrap linear intercept plot for Y and X

BOOTSTRAP LINEAR SLOPE PLOT Y X

Generate a bootstrap linear slope plot for Y and X

BOOTSTRAP LINEAR RESSD PLOT Y X

Generate a bootstrap linear residual s.d. plot for Y and X

LET NUMBOOT = 100

Create parameter NUMBOOT and set = 100

LET N = NUMBER Y

Create parameter N = number of elements in the variable Y

LOOP FOR K = 1 1 NUMBOOT

Initiate a loop with dummy parameter K taking on the values 1, 2, ..., NUMBOOT

LET IND = BOOTSTRAP INDEX FOR I = 1 1 N

Create a variable IND = random sample with replacement of 1, 2, 3, ..., N

LET Y2 = BOOTSTRAP SAMPLE Y IND

Create a variable Y2 = bootstrap sample of Y based on current contents of IND

WEIBULL PLOT Y2

Generate a Weibull Plot of Y2 (which also computes B99 = est. 99 percent point)

LET STAT(K) = B99

Place the current value of B99 into the k-th element of the variable (vector)T

END LOOP

Terminate the loop

LET MEANSTAT = MEAN STAT

Generate the parameter MEANSTAT = mean of the B99 values in variable STAT

LET SDSTAT = STANDARD DEVIATION STAT

Generate the parameter SDSTAT = stan. dev. of the B99 values in variable STAT

X2LABEL MEAN(B99) = ^MEANSTAT

Set 2nd horiz. axis label for upcoming histogram to the computed mean B99

X3LABEL SD(B99) = ^SDSTAT

Set 3rd horiz. axis label for upcoming histogram to the computed s.d. of B99

HISTOGRAM STAT

Generate a histogram of the B99 values in the variable STAT

6. Design of Experiment

6.1 Organization

LIST DEXSUMSH.TEX
DOS PRINT DEXSUMSH.TEX

List the Exp. Design Summary Sheet file DEXSUMSH.TEX to the screen
Send the Exp. Design Summary Sheet file DEXSUMSH.TEX to laser printer

LIST DEXSUMS2.TEX
DOS PRINT DEXSUMS2.TEX

List the Exp. Design Summary Sheet file DEXSUMS2.TEX to the screen
Send the Exp. Design Summary Sheet file DEXSUMS2.TEX to laser printer

6.2 Construction

LIST DEXPLANS.TEX

List the Dataplot file DEXPLANS.TEX onto the screen
DEXPLANS.TEX contains a list of all experimental plans available in Dataplot
List (onto screen) the file DEXRES4.TEX containing instructions
for resolution 4 designs for numbers of factors = 3, 4, 5, 6, ..., 11, 15, 2

LIST DEXRES4.TEX

SKIP 25; READ LATSQ4.DAT X1 X2 X3
SKIP 25; READ 2TO3.DAT X1 X2 X3
SKIP 25; READ 2TO8M4.DAT X1 X2 X3 X4 X5 X6 X7 X8
SKIP 25; READ L8.DAT X1 X2 X3 X4 X5 X6 X7
SKIP 25; READ PLACBURM.DAT X1 TO X11

Read the Exp. Des. 4-by-4 Latin Square design file into Dataplot
Read the Exp. Des. 2^{**3} full factorial design file into Dataplot
Read the Exp. Des. $2^{**}(8-4)$ fractional fact. design file into Dataplot
Read the Exp. Des. Taguchi L8 design file into Dataplot
Read the Exp. Des. Plackett-Burman design file into Dataplot

LET X1 = PATTERN -1 +1 FOR I = 1 1 8
LET X1 = PATTERN 1 2 FOR I = 1 1 8
LET X2 = DATA 1 1 2 2 1 1 2 2

Create the variable X with 8 elements: -1 +1 -1 +1 -1 +1 -1 +1
Create the variable X1 with 8 elements: 1 2 1 2 1 2 1 2
Create the variable X with 8 elements: 1 1 2 2 1 1 2 2

LET RUNSEQ = RANDOM PERMUTATION FOR I = 1 1 8

Create a variable RUNSEQ consisting of a random permutation of 1 to 8

6. Design of Experiment (Continued)

6.3 Analysis

LIST DEXEXAMP.TEX

List the Dataplot file DEXEXAMP.TEX onto the screen

LIST BOXSPRIN.DAT

DEXEXAMP.TEX contains a list of all experimental design data sets available

SKIP 25; READ BOXSPRIN.DAT Y X1 X2 X3

List onto screen the contents of Dataplot file BOXSPRIN.DAT

Read into Dataplot the contents of Dataplot file BOXSPRIN.DAT

LIST BOXBIKE2.DAT

List onto screen the contents of Dataplot file BOXBIKE2.DAT

SKIP 25; READ BOXBIKE2.DAT Y X1 X2 X3 X4 X5 X6 X7

Read into Dataplot the contents of Dataplot file BOXSPRIN.DAT

PLOT Y RUNSEQ

Plot the data in variable Y versus the variable RUNSEQ

DEX SCATTER PLOT Y X1 TO X7

Generate a Des. of Exp. Scatter Plot of Y on X1 to X7

DEX MEAN PLOT Y X1 TO X7

Generate a Des. of Exp. Mean Plot of Y on X1 to X7 (very important)

DEX SD PLOT Y X1 TO X7

Generate a Des. of Exp. Standard deviation Plot of Y on X1 to X7

DEX TAGUCHI SN0 PLOT Y X1 TO X7

Gen. a Des. of Exp. Taguchi Sig.-to-Noise ("on target") Plot of Y on X1 to X7

DEX TAGUCHI SN- PLOT Y X1 TO X7

Gen. a Des. of Exp. Taguchi Sig.-to-Noise ("small is good") Plot of Y on X1 to X7

DEX TAGUCHI SN+ PLOT Y X1 TO X7

Gen. a Des. of Exp. Taguchi Sig.-to-Noise ("large is good") Plot of Y on X1 to X7

READ BOXSPRIN.DAT Y X1 X2 X3

Read in the 2**3 full factorial data from dataplot file BOXSPIN.DAT

DEX MEAN PLOT Y X1 TO X3

Generate a Des. of Exp. Mean Plot of Y on X1 to X3 (very important)

LET NUMFAC = 3

Create the parameter NUMFAC (# of factors) as 3 (needed by DEXSTAT2.DP)

LET DP = 2

Create the parameter DP (# of decimals places) as 2 (needed by DEXSTAT2.DP)

LET STRING STAT = MEAN

Create the string STAT (desired stat) as MEAN (needed by DEXSTAT2.DP)

YLIMITS 50 90

Set plot vertical axis limits as 50 to 90 (needed by DEXSTAT2.DP)

CALL DEXSTAT2.DP

Execute the Dataplot macro file DEXSTAT2.DP

which carries out a main-effect & 2-factor graphical analysis of effects

YATES ANALYSIS Y

Carry out a Yates analysis of the data in variable Y (assumed to be in Yates)

SKIP 0; READ DPST1F.DAT TAG COEF

(Note--estimated effects automatically written out to file DPST1F.DAT)

NORMAL PROBABILITY PLOT COEF

Read Yates analysis estimated effects in from file

Generate normal probability plot of coefficients

ANOVA Y X1 X2 X3

Carry out a (balanced) Analysis of Variance of Y on X1, X2, and X3

PLOT RES RUNSEQ

Plot the residuals from a fit versus the variable RUNSEQ

NORMAL PROBABILITY PLOT RES

Generate a normal probability plot of residuals (ideal = linear)

CALL DEXCUBE.DP

Execute the Dataplot 2**3 full factorial menu macro DEXCUBE.DP

CALL DEXSQUAR.DP

Execute the Dataplot 2**2 full factorial menu macro DEXSQUAR.DP

7. Quality and Productivity

7.1 General Q & P

4-PLOT Y

Generate 4-plot analysis (run sequence plot, lag plot, histogram, normal probability plot of the data in the variable Y

XBAR CHART Y X
RANGE CHART Y X

Generate an Xbar Control Chart of the raw data in Y with tags in X
Generate an Range Control Chart of the raw data in Y with tags in X

SUMMARY Y
LET M = MEAN Y
LET S = STANDARD DEVIATION Y
LET SDM = STANDARD DEVIATION OF THE MEAN Y

Generate battery of location, variation, autocorrelation, & distribution statis
Create parameter A = mean of all data in variable Y
Create parameter S = standard deviation of all data in variable Y
Create parameter SDM = standard deviation of the mean for all data in variable Y

CONFIDENCE LIMITS Y

Compute a table of various confidence limits for mu and sigma for the data in Y

HISTOGRAM Y
NORMAL PROBABILITY PLOT Y

Generate a histogram of the data in the variable Y
Generate a normal probability plot of the data in the variable Y (ideal: lin)

LET TARGET = 25
LET LSL = 22
LET USL = 28
LET A = CPK Y

Create parameter TARGET (process target value) as 25
Create parameter LSL (process lower spec limit) as 22
Create parameter USL (process upper spec limit) as 28
Create parameter A = Cpk (capability index) of data in variable Y

7.2 7 Old Tools

CALL ISHIKAWA.DP
CALL PARETO.DP
HISTOGRAM Y
BIHISTOGRAM Y1 Y2
PLOT Y X or PLOT Y VERSUS X or PLOT Y VS X

Execute the Dataplot Ishikawa menu macro in file ISHIKAWA.DP
Execute the Dataplot Pareto Diagram menu macro in file PARETO.DP
Generate a histogram of the data in the variable Y
Generate a bihistogram of the data in Y1 and the data in Y2
Generate a scatter plot of variable Y versus variable X

LET TARGET = 25
LET LSL = 22
LET USL = 28
XBAR CONTROL CHART Y X

Create parameter TARGET (process target value) as 25
Create parameter LSL (process lower spec limit) as 22
Create parameter USL (process upper spec limit) as 28
Generate a xbar (= mean) control chart for the raw data in Y and X

RANGE CONTROL CHART Y X

Generate a range control chart for the raw data in Y and X

