A Snapshot of Selected Dataplot Commands

10/92

1. Dataplot Basics

1.1 System Operations

DP	Execute Dataplot
EXIT or STOP or HALT or QUIT or BYE	Exit from Dataplot
DIMENSION 50 VARIABLES	Redimension internal Dataplot worksheet to 50 variables (do at start of run)
FEEDBACK OFF	Suppress feedback from all support commands (e.g., SUBSET)
ECHO ON	Upon execution, echo all command lines back to screen
LIST (or L)	List last 20 command lines entered
R 2	Re-execute the 2-nd previous command
SAVE 12 6 TO 3 1	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)
/ PRINTER or / LP or / LPT1	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)
/ OUT.	Repeat last set of comm. lines saved & divert output from screen to file OUT.
DEFINE ER ESC FF	Define command ER to be escape formfeed
ER	Execute command ER (which would erase screen & leave in text mode on PC)
CALL PARETO.DP	Execute the Dataplot macro residing in file PARETO.DP
CALL <user-provided file name>	Execute the user-written Dataplot macro residing in <user-provided file name>
SUBSET/EXCEPT/FOR	Can append to any graphics & analysis commands to limit scope of execution
e.g.,	of a plot or of an analysis
PLOT Y X SUBSET DAY 2	Plot Y versus X but only for DAY = 2
ANOVA Y X1 X2 X3 SUBSET MONTH 7 TO 9	Do ANOVA of Y on X1, X2, and X3 but only for values of MONTH variable from 7 to 9
LINEAR FIT Y X EXCEPT Y > 90	Do linear regression of Y on X but only for Y > 90
NORMAL PROBABILITY PLOT Y FOR I = 1 1 20	Generate normal probability plot of first 20 elements of Y
RESET	Reset all of Dataplot; in effect, exit and reexecute Dataplot
RESET VARIABLES	Reset (= delete) all internal variables (= vectors)
RESET PARAMETERS	Reset (= delete) all internal parameters (= scalars)
RESET FUNCTIONS	Reset (= delete) all internal functions (= character strings)
RESET PLOT	Reset (= blank out) all plot titles, labels, and legends
RESET IO	Reset settings for Dataplot's I/O commands
RESET SUPPORT	Reset settings for all of Dataplot's Support commands
HELP	Display general Dataplot information & the command categories
HELP <command category>	Display information about the Dataplot <category command> category
HELP GRAPHICS	Display information about Dataplot Graphics Commands
HELP ANALYSIS	Display information about Dataplot Analysis Commands
HELP <command name>	Display information about the Dataplot <command name> command
HELP PLOT	Display information about the Dataplot PLOT command
HELP FIT	Display information about the Dataplot FIT command
HELP LET	Display information about the Dataplot LET command
HELP TITLE	Display information about the Dataplot TITLE command
HELP GRID	Display information about the Dataplot GRID command
HELP TEXT	Display information about the Dataplot TEXT command
HELP BOX PLOT	Display information about the Dataplot BOX PLOT command
HELP LET SUBCOMMANDS	Display information about subcommands under the LET command
HELP FUNCTIONS	Display information about all off Dataplot's internal library functions
HELP MATH FUNCTIONS	Display information about only Dataplot's internal mathematics functions
HELP CHARACTER TYPES	Display information about allowable plot character types
HELP LINES TYPES	Display information about allowable plot line types
HELP TEXT SUBCOMMANDS	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 signficant 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	Create variable X1 with elements -5, -4, -3, ..., 4, 5 repeated 11 times
LET X2 = SEQUENCE -5 11 1 5	Create variable X2 with 11 -5's, 11 -4's, 11 -3's, ..., 11 4's, 11 5's
LET Y = X1**2+X2**2	Create variable Y = X1 squared + X2 squared
LET Y0 = DATA 10 20 30 40	Create variable Y0 with 4 elements: 10, 20, 30, and 40
CONTOUR PLOT Y X1 X2 Y0	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	Set title to DEFECTIVE SPRINGS ANALYSIS
Y1LABEL PERCENT DEFECTIVE	Set left vertical axis label to PERCENT DEFECTIVE
X1LABEL STEEL TEMPERATURE	Set first horizontal axis label to STEEL TEMPERATURE
LET STRING S1 = JANUARY; X2LABEL DATE = ^S1	Define string S1 to be JANAUARY; then set second horizontal axis label to MONTH = <contents of S1 (namely, JANAURY)>
Y1LABEL AUTOMATIC	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)
X1LABEL AUTOMATIC	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)
X3LABEL AUTOMATIC	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	Set (for future plots) the horizontal axis limits to 0 and 3
YLIMITS 50 90	Set vertical axis plot limits to 50 and 90
YLIMITS	Set vertical axis plot limits back to default (= neat and float with the dat)
LEGEND 1 LABORATORY 3	Define legend 1 to be LABORATORY 3
LEGEND 1 COORDINATES 20 80	Define plot coordinates for legend 1 to be 20% over and 80% up page
GRID ON	Set grid lines on plots to be automatically ON
XLOG ON	Set log scale for horizontal axis to be ON
YLOG ON	Set log scale for vertical axis to be ON
LOGLOG ON	Set log scale for both axes to be ON
LOGLOG OFF	Set log scale for both axes to be OFF (& therefore revert to linear scale)
TIC OFFSET UNITS SCREEN	Set corner tic units to screen (0 to 100) (as opposed to data)
TIC OFFSET 5 5	Set offset for first and last tics to be 5% from corner

2.6 Multiple Plots per Page

MULTIPLOT 2 2	Have next 2 x 2 = 4 plots automatically appear on the same page
PLOT Y X1; PLOT Y X2; PLOT Y X3; PLOT Y X4	Generate 4 separate plots
MULTIPLOT OFF	Revert back to 1 plot per page
TITLE HW 5 3	Set height/width of plot title to be 5%/3% (of total screen height)
LABEL HW 4 2	Set height & width of all plot labels to be 4% and 2%
TIC LABEL HW 4 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 to secondaty deve
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	Perform least squares linear fit of Y on X (pred. val. => 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 versus X (ideal: structureless)
QUARTIC FIT Y X	Perform least squares quartic fit of Y on X (pred. val. => PRED, res. => 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 versus X (ideal: structureless)
FIT Y X1 X2 X3	Perform least sq. fit of Y on X1, X2, and X3 (pred. val. => PRED, res. => RES)
PLOT Y PRED VERSUS X1	Generate a plot with 2 traces: Y versus X1 and PRED versus X1
PLOT Y PRED VERSUS X2	Generate a plot with 2 traces: Y versus X2 and PRED versus X2
PLOT Y PRED VERSUS X3	Generate a plot with 2 traces: Y versus X3 and PRED versus X3
FIT Y = EXP(-ALPHA*X)/(A+B*X)	Perform least squares non-linear fit of Y on X (pred. val. => PRED, res. => 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 versus X (ideal: structureless)
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 10	Set width of smoothing window to be 10% 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
LET A = INTEGRAL Y X	Compute the (trapezoid-rule) integral of Y versus X, place result in parameA
LET Y2 = INTERPOLATE Y X X2	Perform cubic-spline interpolation of Y on X (evaluate at X2, resultant into Y2)
PLOT Y VERSUS X Y2 VERSUS X2	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 normali) vertical axis = normality measure; horizontal axis = power transformation in x
SUMMARY Y	Generate battery of location, variation, autocorrelation, & distribution statis
LET N = NUMBER Y	Create parameter N = number of elements in the variable (= vector) Y
LET S = SUM Y	Create parameter S = sum of all data in the variable Y
LET A = MEAN Y	Create parameter A = mean of all data in the variable Y
LET A = MEDIAN Y	Create parameter A = median of all data in the variable Y
LET A = MIDMEAN Y	Create parameter A = midmean of all data in the variable Y
LET S = STANDARD DEVIATION Y	Create parameter S = standard deviation of all data in the variable Y
LET V = VARIANCE Y	Create parameter V = variance of all data in the variable Y
LET SDM = STANDARD DEVIATION OF THE MEAN Y	Create parameter SDM = standard deviation of the mean of all data in variable Y
LET A = AUTOCORRELATION Y	Create parameter A = autocorrelation of all data in the variable Y
LET C = CORRELATION X Y	Create parameter A = correlation of all data in the variables X and Y
LET TARGET = 25	Create parameter TARGET (process target value) as 25
LET LSL = 22	Create parameter LSL (process lower spec limit) as 22
LET USL = 28	Create parameter USL (process upper spec limit) as 28
LET A = CPK Y	Create parameter A = Cpk (capability index) of data in variable Y
LET W = DATA 1 1 .9 .9 4 1.2 2 1.5	Create variable W consisting of 8 numbers (used to define desired weights)
LET M = WEIGHTED MEAN Y W	Create parameter M = weighted mean of data in variable Y (with weights in W)
LET S = WEIGHTED STANDARD DEVIATION Y W	Create parameter S = weighted st. dev. of data in variable Y (with weights in W)
LET V = WEIGHTED VARIANCE Y 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	Generate an autocorrelation plot of the data in the variable Y
SPECTRUM Y	Generate a spectral plot of the data in the variable Y
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)
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)

5.2 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	Perform least squares linear fit of Y on X (prec. val. => PRED, res. => RES)
CHARACTERS X BLANK; LINES BLANK SOLID	Set plot characters for next plots to X and blank; set plot lines to blank ad
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 versus X (ideal: structureless)
NORMAL PROBABILITY PLOT RES	Generate a normal probability plot of the residuals (ideal: linear)
PRINT A0 A1 RESSD	Print intercept, slope, and residuals standard deviation (ideal: near-zero)
QUARTIC FIT Y X	Perform least squares quartic fit of Y on X (pred. val. => PRED, res. => 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 versus X (ideal: structureless)
FIT Y X1 X2 X3	Perform least squares fit of Y on X1, X2, & X3 (pred. val. => PRED, res. => RES)
PLOT Y PRED VERSUS X1	Generate a plot with 2 traces: Y versus X1 and PRED versus X1
PLOT Y PRED VERSUS X2	Generate a plot with 2 traces: Y versus X2 and PRED versus X2
PLOT Y PRED VERSUS X3	Generate a plot with 2 traces: Y versus X3 and PRED versus X3
FIT Y = EXP(-ALPHA*X)/(A+B*X)	Perform least squares non-linear fit of Y on X (pred. val. => PRED, res. =>RES)
PLOT Y PRED VERSUS X	Generate a plot with 2 traces: Y versus X and PRED versus X
WEIGHTS W	Specify W as the variable containing desired weights for the upcoming fit
FIT Y = EXP(-ALPHA*X)/(A+B*X)	Perf. weighted lst. sq. non-lin. fit of Y on X (pred. val. => PRED, res. => RES)
FIT Y = EXP(-ALPHA*X)/(A+B*X)	Perf. (unweighted) lst. sq. non-lin. fit of Y on X (pred. val. => PRED, res. => RES)
LET W = BIWEIGHT RES	Create variable W = (Tukey robust) biweights based on previous unweighted fit
WEIGHTS W	Specify W as the variable containing desired weights for the upcoming fit
FIT Y = EXP(-ALPHA*X)/(A+B*X)	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	Create a variable KNOTS consisting of 3 values: 10, 30, and 80
CUBIC SPLINE FIT Y X KNOTS	Carry out a cubic spline fit of the data in Y and X with partition points inS
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	**Generate a median plot of Y on X**
SD PLOT Y X	**Generate a standard deviation plot of Y on X**
TABULATE COUNTS Y X	**Tabulate (= display a table of) number of Y values at each distinct value in X**
TABULATE MEAN Y X	**Tabulate (= display a table of) mean of Y values at each distinct value in X**
TABULATE STANDARD DEVIATION Y X	**Tabulate (= display a table of) stsn. dev. of Y values at each distinct value in X**
TABULATE RANGE Y 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)**
MULTIPLOT 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**
MULTIPLOT 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**
MULTIPLOT 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	**Carry out a (balanced) Analysis of Variance of Y on X1, X2, X3, X4, X5**
MEDIAN POLISH Y 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

MULTIPLOT 2 2	Have next 2 x 2 = 4 plots automatically appear on the same page
PLOT Y1	Generate the 1st plot: Y1 versus the dummy index 1, 2, 3, ...
PLOT Y2	Generate the 2nd plot: Y2 versus the dummy index 1, 2, 3, ...
PLOT Y1 Y2	Generate the 3rd plot: Y1 versus Y2
MULTIPLOT OFF	Revert back to 1 plot per page
BIHISTOGRAM Y1 Y2	Generate a bihistogram of the data in Y1 and Y2
QUANTILE-QUANTILE PLOT Y1 Y2	Generate a quantile-quantile plot of the data in Y1 and Y2
CROSS-TAB Y1 Y2	Tabulate (= display a table of) distinct values & counts of the variables Y1 & Y2
T TEST Y1 Y2	Carry out a t-test for the 2 variables Y1 and Y2
LET N = NUMBER Y1	Create parameter N = number of elements in the variable (= vector) Y
LET X = SEQUENCE 1 1 N	Create variable X with elements 1, 2, 3, 4, ..., N
PLOT Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 VERSUS X	Generate multi-trace plot of Y1, Y2, ..., Y8 versus X
MULTIPLOT 2 4	Have next 2 x 4 = 8 plots automatically appear on the same page
LOOP FOR K = 1 1 8	Initiate a loop with dummy parameter K taking on the values 1, 2, ..., 8
HISTOGRAM Y^K	Generate a series of 8 plots: histogram of Y1, histogram of Y2, ..., histogram Y8
END LOOP	Terminate the loop
MULTIPLOT 2 4	Have next 2 x 4 = 8 plots automatically appear on the same page
LOOP FOR K = 1 1 8	Initiate a loop with dummy parameter K taking on the values 1, 2, ..., 8
PLOT Y^K	Generate a series of 8 plots: Y1 versus i, Y2 versus i, ..., Y8 versus i
END LOOP	Terminate the loop
STAR PLOT Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8	Generate a star plot for the 8 variables Y1 to Y8
PROFILE PLOT Y1 Y2 Y3 Y4 Y5 Y6 Y7 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	Create the 8-element variable V1 = the 1st prin. comp. for the 8 variables
LET V2 = SECOND PRIN COMP Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8	Create the 8-element variable V2 = the 2nd prin. comp. for the 8 variables
PLOT V1 V2	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	Create the 8-element variable V1 = the 1st prin. eigenvalue for the 8 variables
LET V2 = SECOND PRIN EIGEN Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8	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

JACKNIFE MEAN PLOT Y	Generate a jacknife mean plot for the data in the variable Y vert. axis = mean for i-th jacknife sample; hor. axis = bootstrap)
JACKNIFE MEDIAN PLOT Y	Generate a jacknife median plot for the data in the variable Y vert. axis = median for i-th jacknife sample; hor. axis = bootstrap)
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)
BOOTSTRAP MEDIAN PLOT Y	Generate a bootstrap median plot for the data in the variable Y vert. axis = median for i-th bootstrap sample; hor. axis = bootstrap)
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 (vectorT
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	List the Exp. Design Summary Sheet file DEXSUMSH.TEX to the screen
DOS PRINT DEXSUMSH.TEX	Send the Exp. Design Summary Sheet file DEXSUMSH.TEX to laser printer
LIST DEXSUMS2.TEX	List the Exp. Design Summary Sheet file DEXSUMS2.TEX to the screen
DOS PRINT DEXSUMS2.TEX	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 DEXRES4.TEX	List (onto screen) the file DEXRES4.TEX containing instructions for resolution 4 designs for numbers of factors = 3, 4, 5, 6, ..., 11, 15, 2
SKIP 25; READ LATSQ4.DAT X1 X2 X3	Read the Exp. Des. 4-by-4 Latin Square design file into Dataplot
SKIP 25; READ 2TO3.DAT X1 X2 X3	Read the Exp. Des. 2**3 full factorial design file into Dataplot
SKIP 25; READ 2TO8M4.DAT X1 X2 X3 X4 X5 X6 X7 X8	Read the Exp. Des. 2**(8-4) fractional fact. design file into Dataplot
SKIP 25; READ L8.DAT X1 X2 X3 X4 X5 X6 X7	Read the Exp. Des. Taguchi L8 design file into Dataplot
SKIP 25; READ PLACBURM.DAT X1 TO X11	Read the Exp. Des. Plackett-Burman design file into Dataplot
LET X1 = PATTERN -1 +1 FOR I = 1 1 8	Create the variable X with 8 elements: -1 +1 -1 +1 -1 +1 -1 +1
LET X1 = PATTERN 1 2 FOR I = 1 1 8	Create the variable X1 with 8 elements: 1 2 1 2 1 2 1 2
LET X2 = DATA 1 1 2 2 1 1 2 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

                                                   DEXEXAMP.TEX contains a list of all experimental design data sets available
LIST BOXSPRIN.DAT                                  List onto screen the contents of Dataplot file BOXSPRIN.DAT
  SKIP 25; READ BOXSPRIN.DAT Y X1 X2 X3            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)
                                                   (Note--estimated effects automatically written out to file DPST1F.DAT)
  SKIP 0; READ DPST1F.DAT TAG COEF                 Read Yates analysis estimated effects in from file
  NORMAL PROBABILITY PLOT COEF                     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	Generate an Xbar Control Chart of the raw data in Y with tags in X
RANGE CHART Y X	Generate an Range Control Chart of the raw data in Y with tags in X
SUMMARY Y	Generate battery of location, variation, autocorrelation, & distribution statis
LET M = MEAN Y	Create parameter A = mean of all data in variable Y
LET S = STANDARD DEVIATION Y	Create parameter S = standard deviation of all data in variable Y
LET SDM = STANDARD DEVIATION OF THE MEAN 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 inY
HISTOGRAM Y	Generate a histogram of the data in the variable Y
NORMAL PROBABILITY PLOT Y	Generate a normal probability plot of the data in the variable Y (ideal: lin)
LET TARGET = 25	Create parameter TARGET (process target value) as 25
LET LSL = 22	Create parameter LSL (process lower spec limit) as 22
LET USL = 28	Create parameter USL (process upper spec limit) as 28
LET A = CPK Y	Create parameter A = Cpk (capability index) of data in variable Y

7.2 7 Old Tools

CALL ISHIKAWA.DP	Execute the Dataplot Ishikawa menu macro in file ISHIKAWA.DP
CALL PARETO.DP	Execute the Dataplot Pareto Diagram menu macro in file PARETO.DP
HISTOGRAM Y	Generate a histogram of the data in the variable Y
BIHISTOGRAM Y1 Y2	Generate a bihistogram of the data in Y1 and the data in Y2
PLOT Y X or PLOT Y VERSUS X or PLOT Y VS X	Generate a scatter plot of variable Y versus variable X
LET TARGET = 25	Create parameter TARGET (process target value) as 25
LET LSL = 22	Create parameter LSL (process lower spec limit) as 22
LET USL = 28	Create parameter USL (process upper spec limit) as 28
XBAR CONTROL CHART Y X	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