

CHAPTER 2 Graphics Commands

DATAPLOT supports a wide range of graphics commands.

The PLOT command is the primary command for generating 2D graphs. It supports numerous formats and options and is both flexible and powerful. In addition, DATAPLOT provides a large number of specialized graphics formats. These can be broken down into the following 9 categories.

X-Y Plots

PLOT	Generate a plot of variables and/or functions.
ERROR BAR PLOT	Generate a plot with error bars.
VECTOR PLOT	Generate a vector plot (pairs of points connected with arrows).

3-D Plots

3D-PLOT	Generate a 3-dimensional plot of variables and/or functions.
CONTOUR PLOT	Generate a contour plot.

Distributional Plots

... HISTOGRAM	Generate a histogram (absolute or relative frequencies, cumulative frequencies).
... BIHISTOGRAM	Generate a bihistogram (absolute or relative frequencies).
... FREQUENCY PLOT	Generate a frequency plot (absolute or relative frequencies, cumulative frequencies).
... ROOTOGRAM	Generate a rootogram.
STEM AND LEAF PLOT	Generate a stem and leaf plot.
PIE CHART	Generate a pie chart.
... PROBABILITY PLOT	Generate a probability plot (24 distributions).
... PPCC PLOT	Generate a probability plot correlation coefficient plot (9 distributions).
NORMAL PLOT	Generate a Normal plot (a variation of the normal probability plot).
BOX-COX NORMALITY PLOT	Generate a Box-Cox normality plot.
BOX-COX LINEARITY PLOT	Generate a Box-Cox linearity plot.
BOX-COX HOMO PLOT	Generate a Box-Cox homoscedasticity plot.
PERCENT POINT PLOT	Generate a percent point plot (also known as a quantile plot).
QUANTILE-QUANTILE PLOT	Generate a quantile-quantile plot.
SYMMETRY PLOT	Generate a symmetry plot.
4 PLOT	Generate a 4 plot (run sequence plot, lag plot, histogram, normal probability plot on one page).

Time Series

RUN SEQUENCE PLOT	Generate a run sequence plot.
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LAG ... PLOT	Generate a lag plot.
... CORRELATION PLOT	Generate an auto-, cross-, or partial auto-correlation plot.
... SPECTRAL PLOT	Generate various types of spectral plots.
... PERIODOGRAM	Generate a periodogram plot.
AV PLOT	Generate an Allan variance plot.
ASD PLOT	Generate an Allan standard deviation plot.
COMPLEX DEMODULATION PLOT	Generate a complex demodulation plot.
Multivariate Plots	
ANDREWS PLOT	Generate Andrews curves.
PROFILE PLOT	Generate a profile plot.
STAR PLOT	Generate a star plot.
SYMBOL PLOT	Generate a symbol plot (plot character attributes such as size and color set by other variables).
Analysis of Variance, Design of Experiments	
... BLOCK PLOT	Generate a block plot.
BOX PLOT	Generate a box plot.
DEX ... PLOT	Generate design of experiment plots (15 different plot formats).
I PLOT	Generate an I plot.
YOUDEN PLOT	Generate a Youden plot.
Statistics Plots	
ANOP PLOT	Generate an Analysis of proportions plot.
BOOTSTRAP ... STATISTIC PLOT	Generate a bootstrap plot for a given statistic (for over 30 statistics).
JACKKNIFE ... STATISTIC PLOT	Generate a jackknife plot for a given statistic (for over 30 statistics).
HOMOSCEDASTICITY PLOT	Generate a homoscedasticity plot.
PHASE PLANE DIAGRAM	Generate a phase plane diagram.
FRACTAL PLOT	Generate a fractal plot.
PARETO PLOT	Generate a Pareto plot.
... STATISTIC PLOT	Generate a statistic (versus data subset) plot (for over 30 statistics). These plots are documented individually as the AUTOCORRELATION STATISTIC PLOT, AUTOCOVARIANCE PLOT, COUNTS PLOT, CP PLOT, CPK PLOT, DECILE PLOT, EXPECTED LOSS PLOT, EXTREME PLOT, HINGE PLOT, KURTOSIS PLOT, LINEAR CORRELATION PLOT, LINEAR INTERCEPT PLOT, LINEAR RESSD PLOT, LINEAR SLOPE PLOT, MAXIMUM PLOT, MEAN PLOT, MEDIAN PLOT, MIDMEAN PLOT, MIDRANGE PLOT, MINIMUM PLOT, NORMAL PPCC PLOT, PERCENT DEFECTIVE PLOT, PRODUCT PLOT, QUARTILE PLOT, RANGE PLOT, RELATIVE STANDARD DEVIATION PLOT, RELATIVE VARIANCE PLOT, SINE AMPLITUDE PLOT, SINE FREQUENCY PLOT, SKEWNESS PLOT, STANDARD DEVIATION PLOT, STANDARD DEVIATION OF MEAN PLOT, SUM PLOT, TAGUCHI SN0, TAGUCHI SN+, TAGUCHI SN-, TAGUCHI SN00, TRIMMED MEAN

6-PLOT	PLOT, VARIANCE PLOT, VARIANCE OF THE MEAN PLOT, and WINDSORIZED MEAN PLOT. Generate 6 plots useful for analyzing fits.
Reliability, Extreme Value Analysis	
TAIL AREA PLOT	Generate a tail area plot.
WEIBULL PLOT	Generate a Weibull plot.
CME PLOT	Generate a conditional mean exceedance plot.
Quality Control	
XBAR CHART	Generate a mean control chart.
R CHART	Generate a range control chart.
S CHART	Generate a standard deviation control chart.
C CONTROL CHART	Generate a C control chart.
U CONTROL CHART	Generate a U control chart.
P CONTROL CHART	Generate an P control chart.
NP CONTROL CHART	Generate an NP control chart.
Q ... CONTROL CHART	Generate Quesenberry type control charts.

The ... in some of the commands indicates user-defined options for the command, as in

NORMAL PROBABILITY PLOT, UNIFORM PROBABILITY PLOT, etc.
AUTOCORRELATION PLOT, CROSS-CORRELATION PLOT
MEAN CONTROL CHART, RANGE CONTROL CHART, etc.

DATAPLOT provides a great deal of flexibility in controlling the elements of a plot. For example, each plot trace can be drawn as a line, a character, a bar, or a spike. The settings for each of these is independent of the others. The chapter on Plot Control documents the commands for controlling the plot features.

The flexibility in controlling the plot attributes and features means that it is possible to create specialized chart formats not listed above. For example, various types of bar charts can be created from the standard PLOT command (and setting the LINE and BAR attributes appropriately). Check the various LINE, CHARACTER, BAR, and SPIKE attribute setting commands in the Plot Control chapter. It is also straightforward to change the default appearance of the supported charts with these attribute setting commands.

There are separate chapters that discuss topics such as available line styles and plot characters.

Multiple curves per plot

DATAPLOT can generate multiple curves per plot. For example,

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LINES SOLID BLANK  
CHARACTER BLANK O  
PLOT Y1 Y2 VS X  
PLOT Y1 VS X1 AND  
PLOT Y2 VS X2
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The first plot command draws two curves (Y1 and Y2) against a common x coordinate while the second PLOT command plots two curves with different x coordinates.

When drawing multiple curves, DATAPLOT uses the concept of "traces." A trace is a connected set of points. Points in the same trace are plotted with the same attributes. In the above example, Y1 is trace 1 and Y2 is trace 2. This is used when setting the attributes for a curve. For example, Y1 is drawn as a solid line with no character while Y2 is drawn as an O with no connected line.

The attribute setting commands (LINE, CHARACTER, LINE COLOR, LINE THICKNESS, etc.) specify the attributes for up to 100 traces. When a plot is generated, the first trace uses the first entry from each of the attribute setting commands, the second trace uses the second entries, and so on.

The ability to define traces is also useful in creating specialized chart formats. For example, it is easy to create a curve that is solid, then dashed for a certain number of points, and then solid again. This is done by creating a “tag” variable and then entering a command like PLOT Y X TAG. The variable TAG identifies those points in Y and X which are plotted with common attributes. The documentation for the PLOT command discusses the use of tag variables in more detail.

Overlaying plots

By default, DATAPLOT erases the screen at the beginning of a plot. The PRE-ERASE OFF command suppresses this initial screen erase and can be used to overlay plots on the same frame. If you do this, be sure to use the XLIMITS and YLIMITS command to set constant scales. The command LIMITS FREEZE (after the first plot) can be used if you do not know what your data limits are (this assumes the scales set for the first plot will contain the data for subsequent plots which may or may not be true). You may also want to suppress certain plot elements for subsequent plots (e.g., FRAME OFF, TIC MARKS OFF, TIC LABELS OFF) to avoid redrawing significant portions of a plot. However, this step is not required (it just saves plotting time).

Multiple plots per page

DATAPLOT provides two methods for positioning multiple plots on a page. The MULTILOT command allows you to specify an arbitrary number of rows and columns. It splits the page up into these rows and columns and each subsequent command that generates a plot simply moves to the next row and column position on the page. There is no restriction on the type of plot command that you can use. See the MULTILOT command in the Plot Control chapter for details.

The WINDOW CORNER COORDINATES and the FRAME CORNER COORDINATES commands let you specify the portion of the page to use for the next plot. These can be used in conjunction with the PRE-ERASE OFF command to generate multiple plots per page. These commands are documented in the Plot Control chapter.

Using the WINDOW CORNER COORDINATES (or the FRAME CORNER COORDINATES) command is not as easy as using the MULTILOT command, but it is more flexible in that you can position the plot anywhere. This allows you to do some things that the MULTILOT command does not. For example, you can draw a small plot inside the frame of regular size plot.

Plotting data subsets

DATAPLOT allows data subsets to be plotted by using the keywords SUBSET, EXCEPT, or FOR. The SUBSET and EXCEPT keywords selects subsets based on the values of one or more variables. The variable defining the subset need not be one of the variables being plotted. The FOR keyword selects subsets based on the row number (e.g., plot the first 10 rows or plot every fifth row). The use of these keywords is documented in detail in the Keywords chapter of this volume.