

MATLAB Graphics Reference

MATLAB is not only useful for producing and manipulating data but also for displaying and presenting that same material. This guide is meant to be used as a quick reference for some of the graphics functions and capabilities that MATLAB provides. It is not exhaustive and does not give a full description of each function. This handout is meant as a quick reference tool to locate the command that you need. To implement and use a function, you should type *help function name* at the MATLAB command prompt line. This will provide you with a complete description of what the function does and how to use it. If you need more information, a good resource is the MATLAB Help Desk at <http://www-ccs.ucsd.edu/matlab/>. *Using MATLAB Graphics* is one of the more useful links on this page.

Basic Plotting: These are the functions that are used time and time again when working with plots in MATLAB and are worth committing to memory.

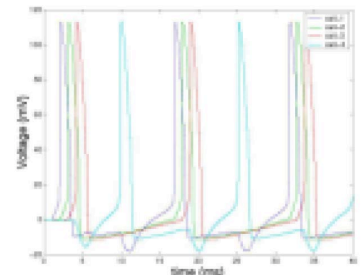
plot - Creates a plot of points on a Cartesian coordinate system. This is probably the most useful command for graphing. IF YOU LEARN NOTHING ELSE, LEARN THIS FUNCTION. It will prove to be invaluable in most of your undergraduate CENG courses for use on problem sets, projects, etc.

xlabel, ylabel, zlabel - Label your x-, y-, or z-axes, respectively.

title - Places a title on your plot.

legend - Adds a legend to your plot and allows you to manipulate it in many different ways.

hold - This allows you to plot multiple sets of data or functions on the same graph.



*Multiple Plot Graph
with Legend*

Guiding Readers: These functions allow you to perfect the look of your plots by manipulating axes, adding “extras” (e.g. errorbars), etc.

xlim, ylim, zlim - Sets the limits of the x-, y-, and z-axes, respectively.

axis - Manipulates your axes to appear as you wish them to. You can set the domain and range seen, add tick marks or remove them, force the tick marks on the x- and y- axes to be equally spaced, and MUCH more.

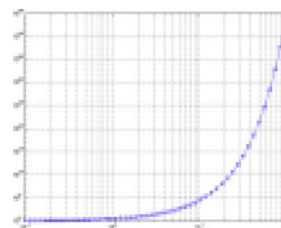
semilogx, semilogy - Makes the x- or y-axes a log scale, respectively, while leaving the other linear.

loglog - Makes both the x- and y- axes log scales.

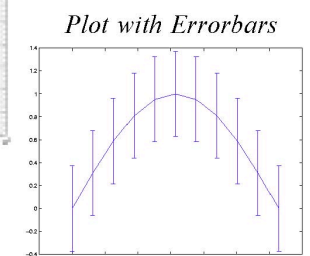
grid - Adds grid lines to your plot.

subplot - Allows you to create several plots on the same page.

errorbar - Adds errorbars to the points on your plot.



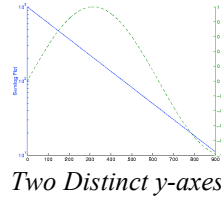
Loglog Plot with Grid



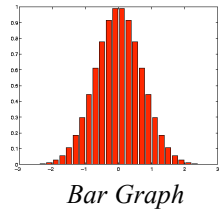
Plot with Errorbars

Other Types of 2D Plots: MATLAB is equipped to create several different types of graphs, plots, and charts that may be more appropriate for your data and purpose.

plotyy - Creates plots that have two distinct y-axes on either side of the graph each with their own scales.

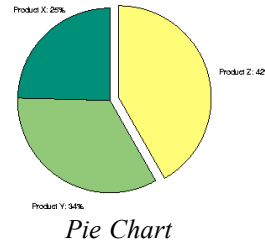


bar - Creates a typical (vertical) bar graph.

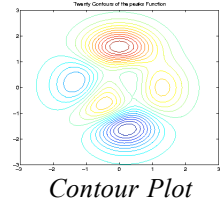


barh - Creates a horizontal bar graph.

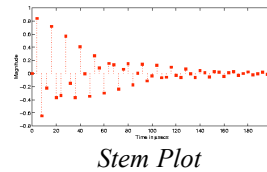
pie - Creates a normal 2D pie chart.



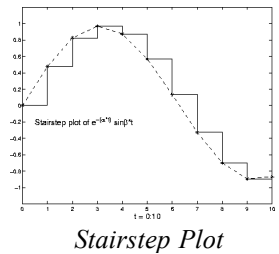
contour - Creates a 2D plot of contour lines or level curves.



contourf - Creates a 2D plot of contour lines or level curves that are filled in between with color.



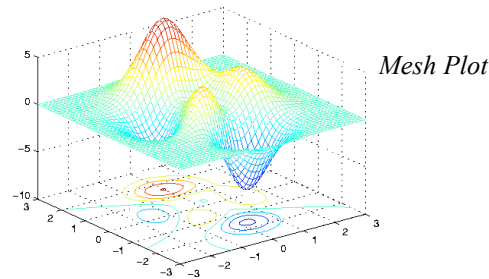
stem - Plots data points as stems from the x-axis terminating with circles at the y-value.



stairs - Plots data points and draws a stairstep graph.

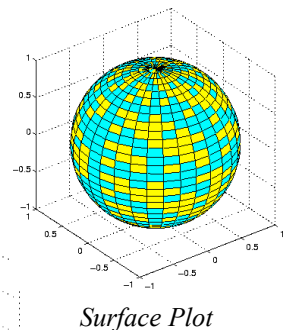
3D Plotting: MATLAB also has many functions that create various types of three dimensional plots. The commands *plot*, *bar*, *barh*, *pie*, *contour*, and *stem* all have a 3D analog. You just add a '3' to the end (e.g. *plot3*). There are also several more functions worth knowing.

mesh - Creates a 3D “mesh” plot.

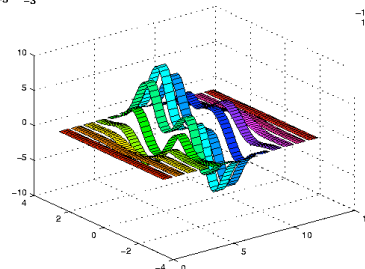


surf - Plots a 3D surface.

ribbon - Creates a 3D plot using “ribbons.”



patch - Creates small, colored “patches” (polygon faces) in your plot. Can be used to graph an area or surface within your plot.



shading - Manipulates the color shading settings used for the surf, mesh, and patch commands.

Animation: MATLAB supports a few simple functions that allow you to create a “movie” relatively easily.

getframe - Takes a “snapshot” of your current plot to be used in animation.

movie - Plays a “movie” by quickly passing through a series of “snapshots” obtained by using the command getframe.