Introduction to Matlab

The objective of this lab is to familiarize you with the Matlab. Carefully read and make sure you understand it.

General:

help <command> - specify a command and the info about it will be given
lookfor <topic> - specify a topic and all commands that have related topics will be listed
who - lists current variables
pwd - tells you which directory you are currently working in
dir - lists files in that directory
clear all - clears variables from memory
format long - lets you see more significant digits
size(x) - gives the size of the variable (matrix) x
length(x) - gives the length of the vector x
zeros(n,m) - an n x m matrix of zeros
ones(n,m) - an n x m matrix of ones
eye(n,m) - the n x m identity matrix
rand(n,m) - an n x m matrix whose entries are random numbers uniformly distributed in (0,1)
randn(n,m) - an n x m matrix whose entries are random numbers normally distributed with mean 0 and variance 1
linspace(x1,x2,n) - a linearly spaced vector whose beginning value is x1 and the last value is x2 with a total of n points

Plots:

figure - creates a new graph window
orient tall, orient portrait, orient landscape - orients the picture in the desired manner for printing (portrait is the default)

Various line types, plot symbols and colors may be obtained with PLOT(X,Y,S) where S is a character string made from one element from any or all the following 3 columns:

| y | yellow          | . | point | - | solid |
| m | magenta         | o | circle | : | dotted |
| c | cyan            | x | x-mark | -. | dashdot |
| r | red             | + | plus   | - | dashed |
| g | green           | s | square | p | pentagram |
| w | white           | d | diamond | h | hexagram |
| k | black           | v | triangle (down) | < | triangle (left) |
|   |                 | ^ | triangle (up)   | > | triangle (right) |

For example, PLOT(X,Y,’c+:’) plots a cyan dotted line with a plus at each data point; PLOT(X,Y,’bd’) plots blue diamond at each data point but does not draw any line.

Example 1: The intersection of $x^2$ and $x^3$
x=-10:.05:10; %don't forget the semicolon!
y=x.^2; %the . before the ^2 is necessary since x is a vector)
plot(x,y);
subplot(221),plot(x,y);
xlabel('x');
ylabel('x^2');
y1=x.^3;
subplot(222),plot(x,y1);
subplot(212),plot(x,y,'r');
legend('x^2','x^3')
hold on
plot(x,y1,'g')
plot(0,0,'*b')
xlabel('x')
ylabel('y')
title('x^3 vs. x^2')
axis([-8 8 -100 100])
grid
subplot(222),xlabel('x')
subplot(222),ylabel('x^3')
hold off
orient tall