

CS 105 – Introduction to Scientific Computing

Assignment 4 – Plotting and Scripts

Objectives

After completing this assignment you should be able to:

1. Plot equations of one variable for a range of input values
2. Create scripts to run a sequence of commands

Overview

In many fields, including engineering, science, and finance, we are interested in plotting data. This may be a function evaluated for several values or a set of order pairs. We would like to be able to organize our data and plot it easily and in different ways.

It is also annoying to have to re-type a sequence of commands every time you wish to execute them. More efficient would be to store the commands in a file, called a *script*, which can then be recalled and run on demand.

In this assignment you will practice plotting data as well as storing and running commands as a script.

Part I: Plotting Equations

In your submission write the commands (in the order you would run them) that will accomplish the following:

1. Plot the equation $y=3x^2+2x+5$ for $x=\{1,2,3,\dots,100\}$ in **red**
2. Label the figure 'Graphs of Equations'
3. Put on the x-axis the label 'x'
4. Put on the y-axis the label 'y'
5. Plot on the **same figure** the equation $y=x+8$ for $x=\{1,2,3,\dots,100\}$ in **blue**
6. Provide legends to indicate what each of the graphs are for

The following functions may be useful (use the Matlab help feature to assist you):

- `title('string');`
- `xlabel('string');`
- `ylabel('string');`
- `plot(x,y);`
- `plot(x,y,'color');` % see the help for valid values of 'color'
- `hold on;`
- `hold off;`
- `legend('string1', 'string2');`

Part II: Creating Scripts

Create and run a script, called *myfirstscript.m* that does the following:

1. Create a 20x2 matrix of random values (20 rows, 2 columns)
2. Use the *sortrows* function to sort the matrix according to the first column
3. Plot x vs y where x is the 1st column of the *sorted* matrix and y is the 2nd column of the sorted matrix

The following functions may be useful:

- `rand(nrows,ncols);`
- `[y, locs] = sortrows(x,2);`

Submission

Submit a *zip* file that consists of:

1. Your PDF report that includes the commands necessary to do Part I as well as the figures for both Part I and Part II.
2. The .m file created to do Part II

As usual, your document should report your findings for each part. You may include screenshots in the document if you like. This report should also state things like:

1. What you did
2. How you did it
3. Any additional things you tried or discoveries you made