Plotting Tutorial

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Importance of Plotting

Plots help us convey our message succinctly. Hence, we will plot various kinds of data during this course. There are various types of plots. Bar graph, box plot, line graph, are a few examples. In this document, we will look at some examples of line graphs to see how the plots can be made more beautiful.

Plotting

Let us try to plot `sin(x)` and `cos(x)` in a single graph using MATLAB or GNU Octave. The plot obtained is depicted in Fig. 1.

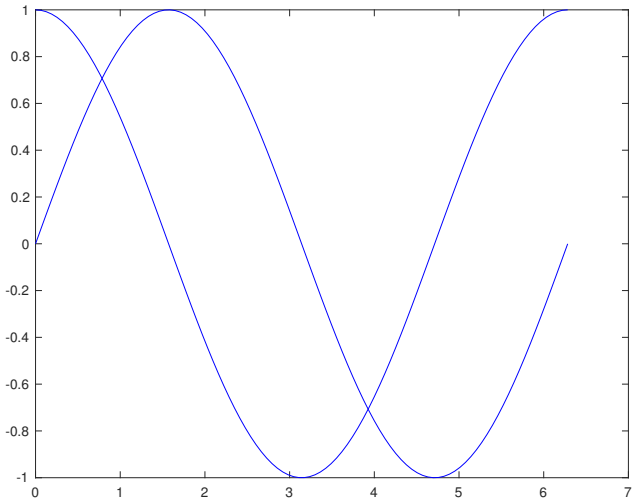


Figure 1: Plot of two trigonometric functions

The aim of the plot is to convey information, but Fig. 1 does not seem to do a good job at it. It lacks some basic etiquette of plotting. It is mandatory for a good plot to have a tile, axis title with units and a legend. The software does choose a good limit for the x and y axes but it also provides an option to change it manually. Adding these to the plot results in Fig. 2, which has a little more informative.

MATLAB or GNU Octave allows us to add colour to the plots to differentiate plots. The software provides a wide range of colours, markers to choose from. This is depicted in Fig. 3a. The default option for markers might make it too cluttered, so it is better to reduce the frequency of the markers to make it tidier as shown in Fig. 3b.

Fig. 3b would look good on a computer screen. However, during presentations, the font size would be too small to be visible from some distance. Hence, it would be better if we increase the font size of the axis labels, and make the plots thicker. Finally, we can enclose the plot in a box and add grid lines. We would end up with Fig. 4.

Though Fig. 4 is a thing of beauty, it explores only a few options and hence it is better if you experiment with the various functionalities available with the plotting software at your leisure.

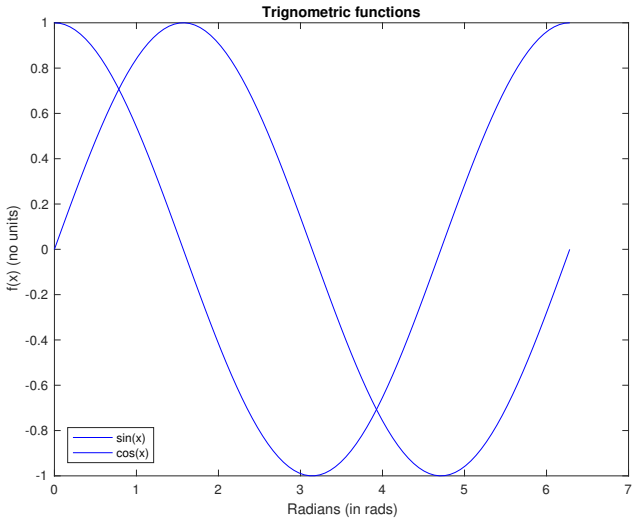
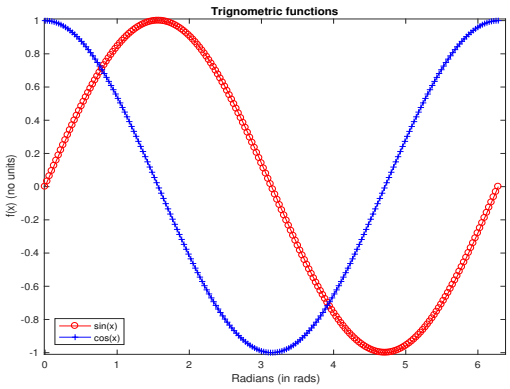
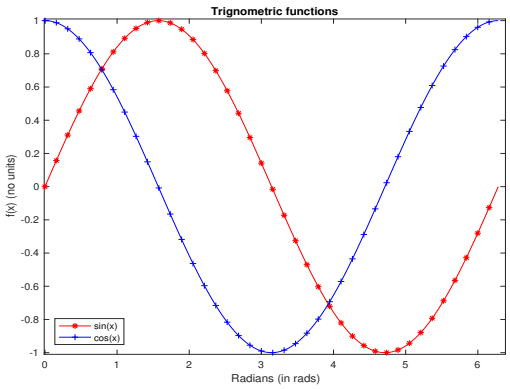


Figure 2: Addition of Title, axis labels and legend



(a) Plot with default marker frequency



(b) Plot with reduced marker frequency

Figure 3: Plot with different colours and markers

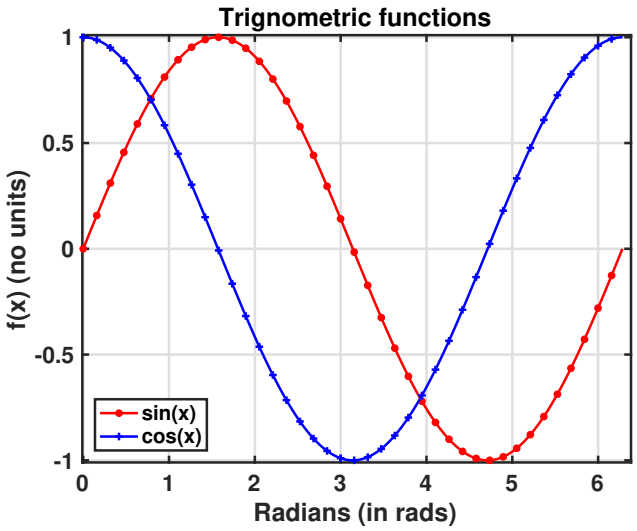


Figure 4: Final plot