भारतीय प्रौद्योगिकी संस्थान जम्मू

INDIAN INSTITUTE OF TECHNOLOGY JAMMU

विद्याधनं सर्वधन प्रधानम्

Software Tools - LaTeX Assignment
Matlab - Plots

Sonam Bharti
2021pcs2040@iitjammu.ac.in
March 31, 2022

Contents

1 Introduction

1.1 Definition

textcolorEmeraldDefinition

1. To plot the graph of a function, you need to take the following steps −
   (a) Define the function, **y = f(x)**
   (b) Call the **plot** command, as **plot(x,y)**
2. **Example:** Plot the function

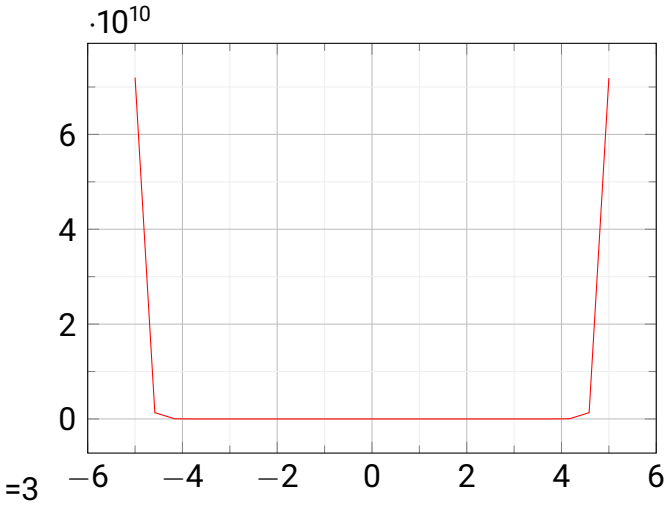
$$y = x^2 - 10x + 15$$

for the values of x between 0 and 10.
x = 0:1:10 or linspace(0,10,11)

1.2 Example

Code:

```
x = 0:1:10;
y = x.^2 − 10 ∗ x + 5
plot(x,y)
grid on
```



2 Matlab Plots

2.1 Terms

`Terms generally used in Matlab plotting are...`

1. **CLF:** clf deletes all children of the current figure that have visible handles.
2. **clf(fig):** It deletes all children of the specified figure that have visible handles.
3. **figure:** It creates a new figure window using default property values. The resulting figure is the current figure.
4. **figure(n):** It finds a figure in which the Number property is equal to n, and makes it the current figure. If no figure exists with that property value, MATLAB® creates a new figure and sets its Number property to n.
5. **figure(Name, Value):** It modifies properties of the figure using one or more name-value pair arguments. For example, figure('Color','white') sets the background color to white.
6. **hold on:** It retains plots in the current axes so that new plots added to the axes do not delete existing plots.
7. **hold off:** It sets the hold state to off so that new plots added to the axes clear existing plots and reset all axes properties.
8. **grid on:** This command allows us to put the grid lines on the graph.
9. **grid off:** This command allows us to remove the grid lines on the graph.
10. **title:** This command allows us to put a title on the graph.
11. **xlabel** and **ylabel:** These commands generate labels along x-axis and y-axis.
12. **axis equal:** This command allows generating the plot with the same scale factors and the spaces on both axes.
13. **axis square:** This command generates a square plot.
14. **legend:** Legend function is used to add descriptive labels to our plots.

15. **plot:** It plots the curve defined by the function y = f(x) over the default interval [-5 5] for x.
16. **bar:** It creates a bar graph with one bar for each element in y. If y is an m-by-n matrix, then bar creates m groups of n bars.
17. **scatter:** It creates a scatter plot with circular markers at the locations specified by the vectors x and y.

2.2 Plot Types

There are many types of plots[1] in Matlab. Some of them are....

Figure 1: Plot Types in Matlab

[1]Reference of plot types are taken from https://in.mathworks.com/help/matlab/creating_plots/types-of-matlab-plots.html Mathworks.

The main types of plot which we generally talk about are:

1. Line Plots
2. Bar Graph
3. Histogram
4. 2D Scatter
5. Pie Chart
6. Area
7. Sinusoidal
8. Log, Exponential
9. Geo-plot
10. Geo-scatter

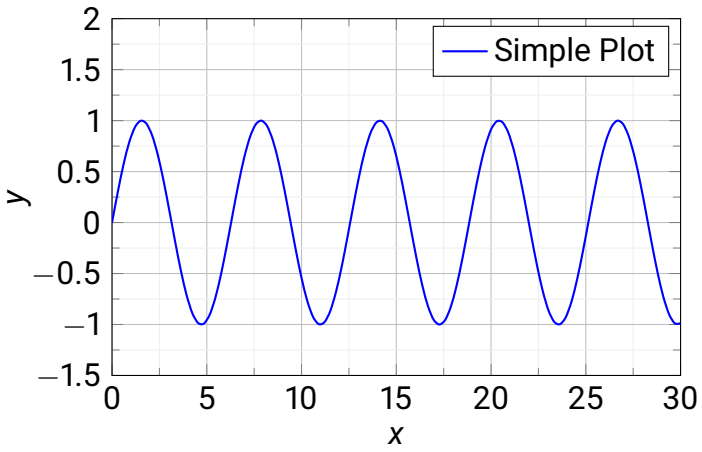
3 Plot Types Example

3.1 Single Plot

3.1.1 Sinudoidal

Code:

```
x = 0 : pi/100 : 2 * pi
y = sin(x)
plot(x,y)
grid on
legend('simple plot')
```

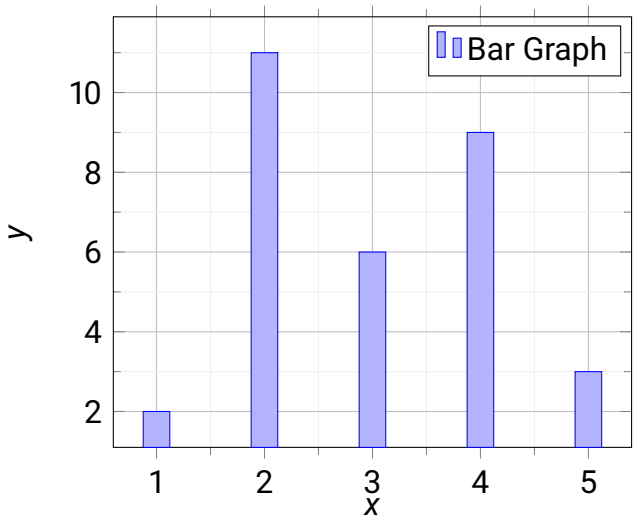


Graph: Simple plot

3.1.2 Bar Graph

Code:

```
clf
x = 1:5
y = [2 11 6 9 3]
figure(1)
bar(x,y)
grid on
legend('bar graph')
```



Graph: Bar Graph

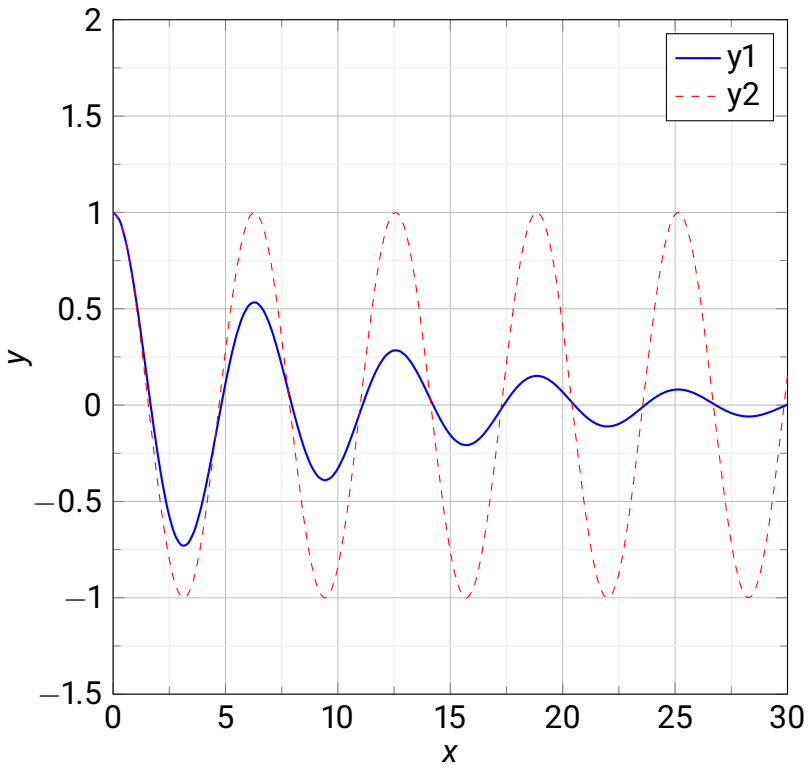
3.2 Multiple Plot

Code:

```
clf
x = linspace(−2 ∗ pi, 2 ∗ pi)
y1 = (−x/10) ∗ cos(x) + sin(x)/10
y2 = cos(x)

figure(2)
plot(x,y1,'-')

hold on
plot(x,y2,'−')
grid on
legend('y1','y2')
```



Graph: Multiple plot Graph

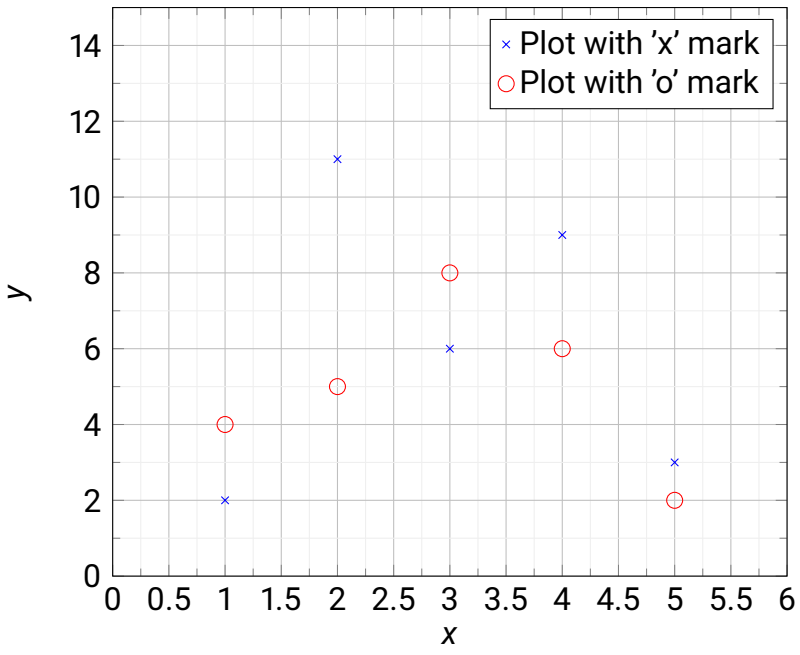
3.3 Scatter Plot

Code:

```
clf
x = 1:5
y1 = [2 11 6 9 3]
y2 = [4 5 8 6 2]

figure(2)
plot(x,y1,'x')

hold on
plot(x,y2,'o')
grid on
legend('y1','y2')
```



Graph: Scatter plot Graph

4 References

Reference

1. Tutorialspoint MATLAB Tutorial
   https://www.tutorialspoint.com/matlab/index.htm
2. MathWorks Documentation
   https://in.mathworks.com/help/matlab/ref/plot.html