Two-Dimensional Plots Using MATLAB

Submitted by

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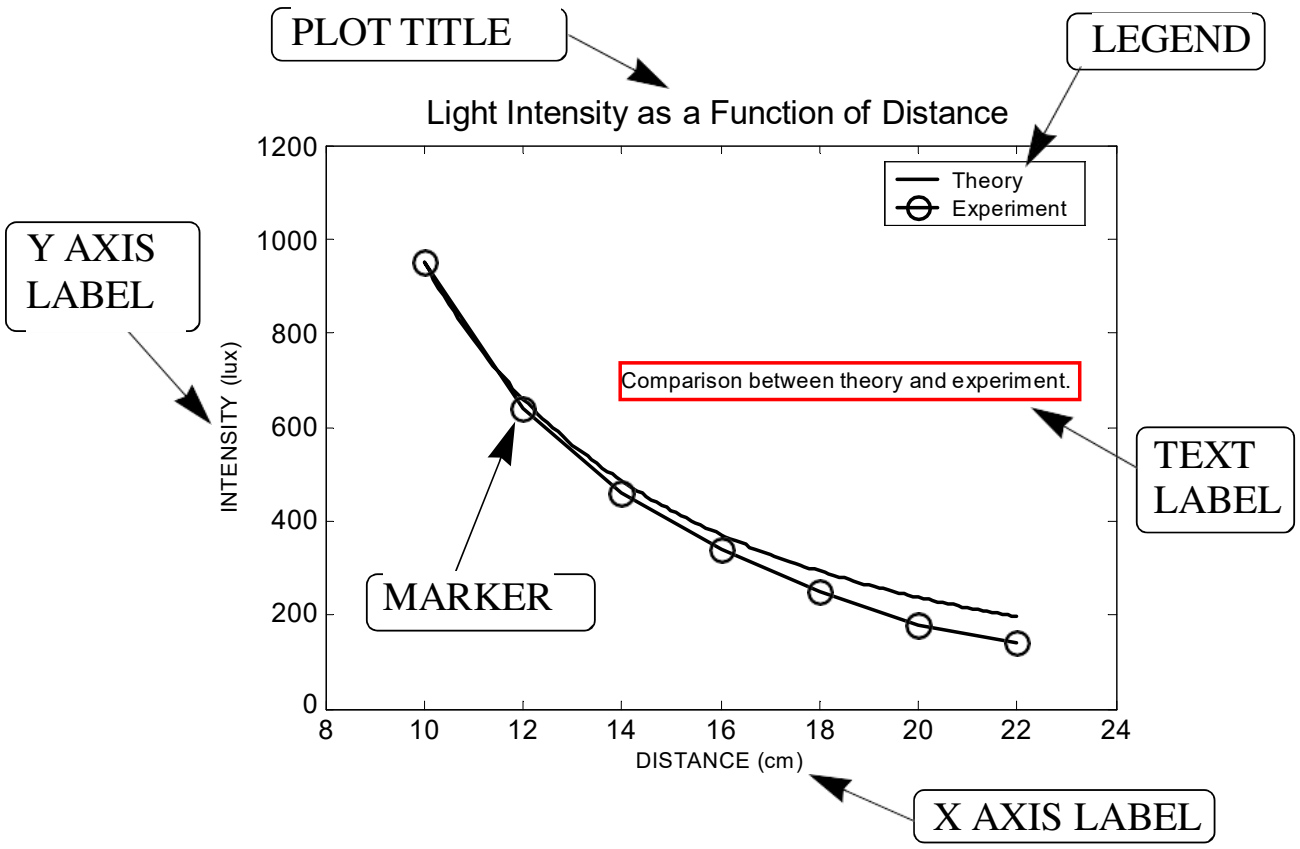
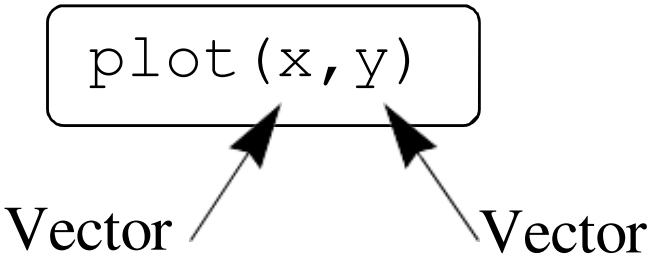
Introduction

- MATLAB has many commands that can be used for creating different types of plots. The plots classified to:
- plots with linear axes.
- plots with logarithmic and semi-logarithmic axes.
- bar and stairs plots.
- polar plots.
- three-dimensional contour surface and mesh plots.

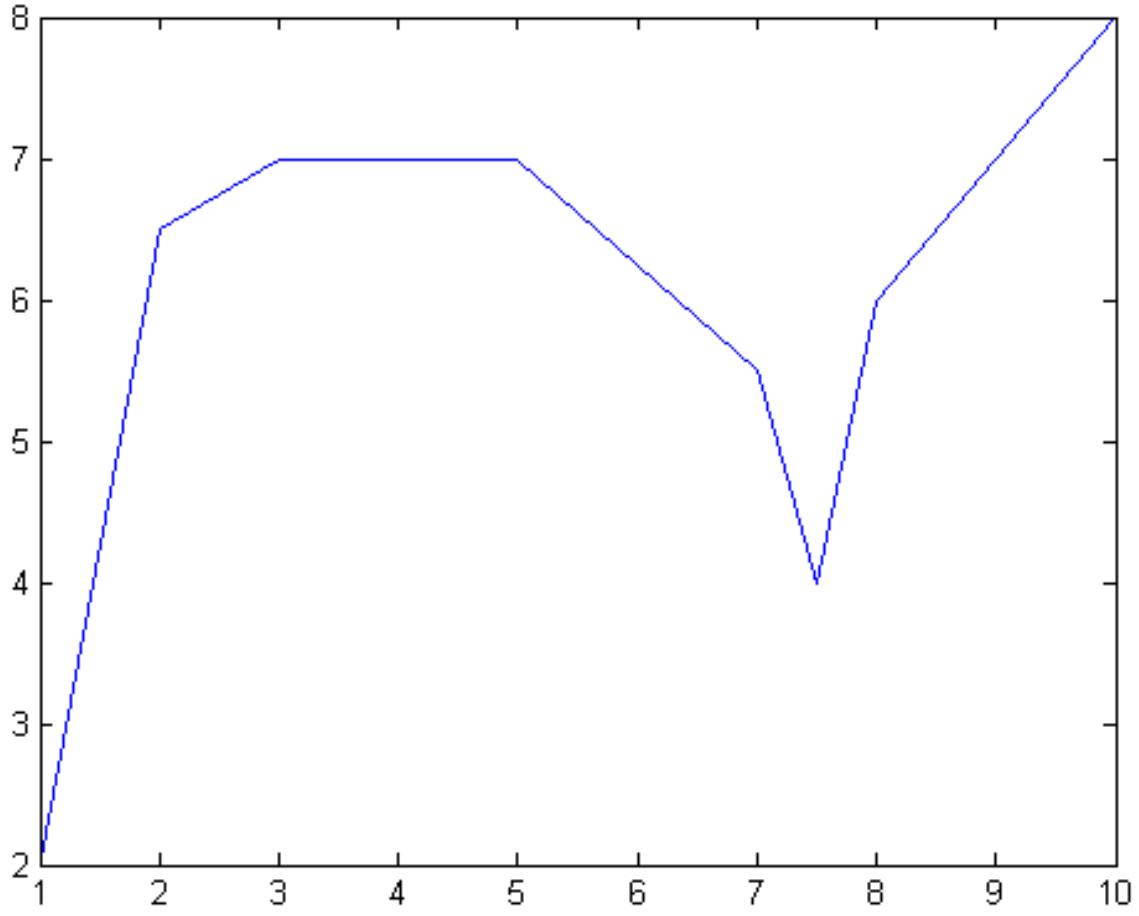
Example of two-dimensional plot



THE plot *COMMAND*




```
>> % example
>> x=[1 2 3 5 7 7.5 8 10];
>> y=[2 6.5 7 7 5.5 4 6 8];
>> plot(x,y)
```


8
7
6
5
4
3
2
1
2
3
4
5
6
7
8
9
10

Plot of given data

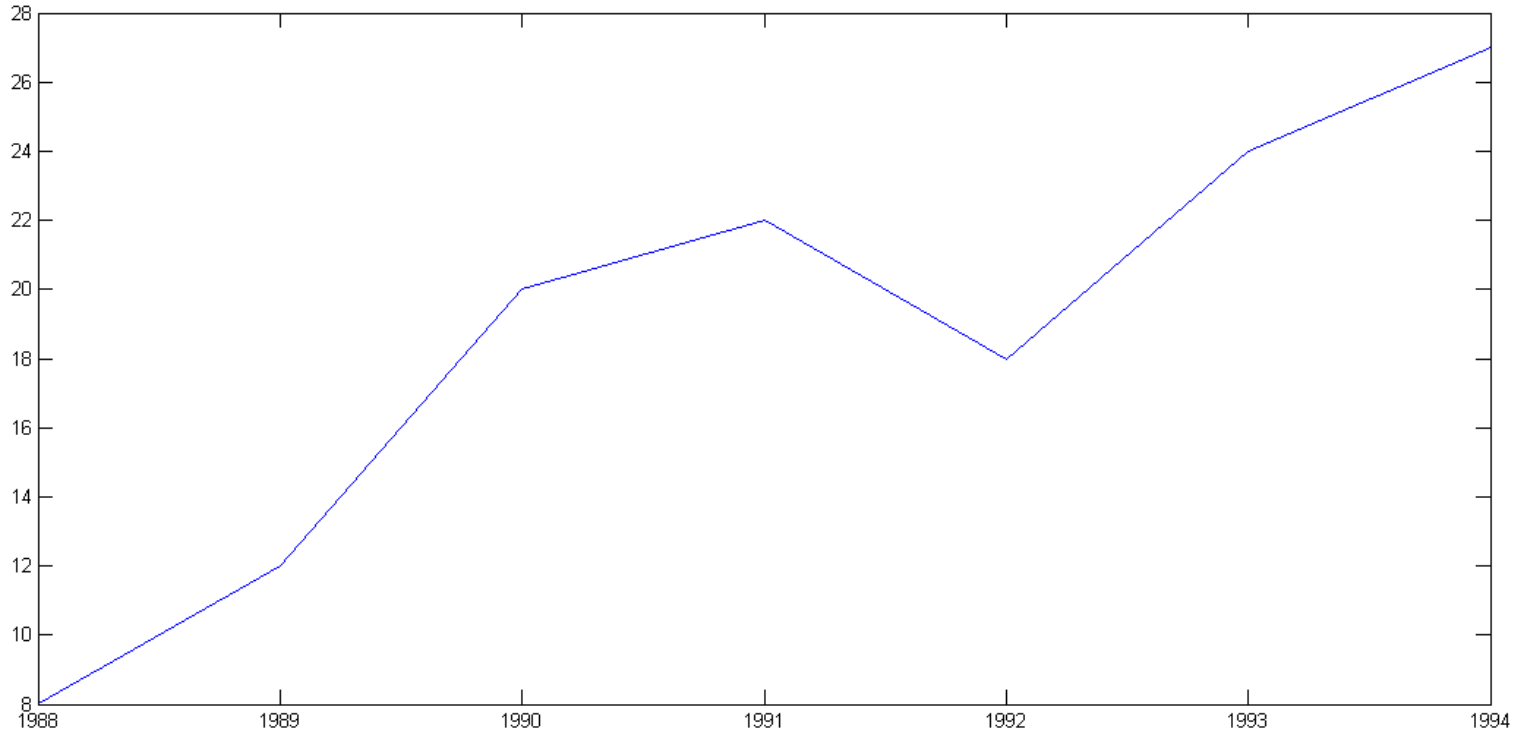
- Given data is used to create vectors that are then used in the plot command.

Example: The following table contains sales data of a company from 1988 to 1994.

Year	1988	1989	1990	1991	1992	1993	1994
Sales (millions)	8	12	20	22	18	24	27

```
>> yr=[1988:1:1994];
>> sle=[8  12  20  22  18  24  27];
>> plot(yr,sle)
```

- The figure below will display in figure window.



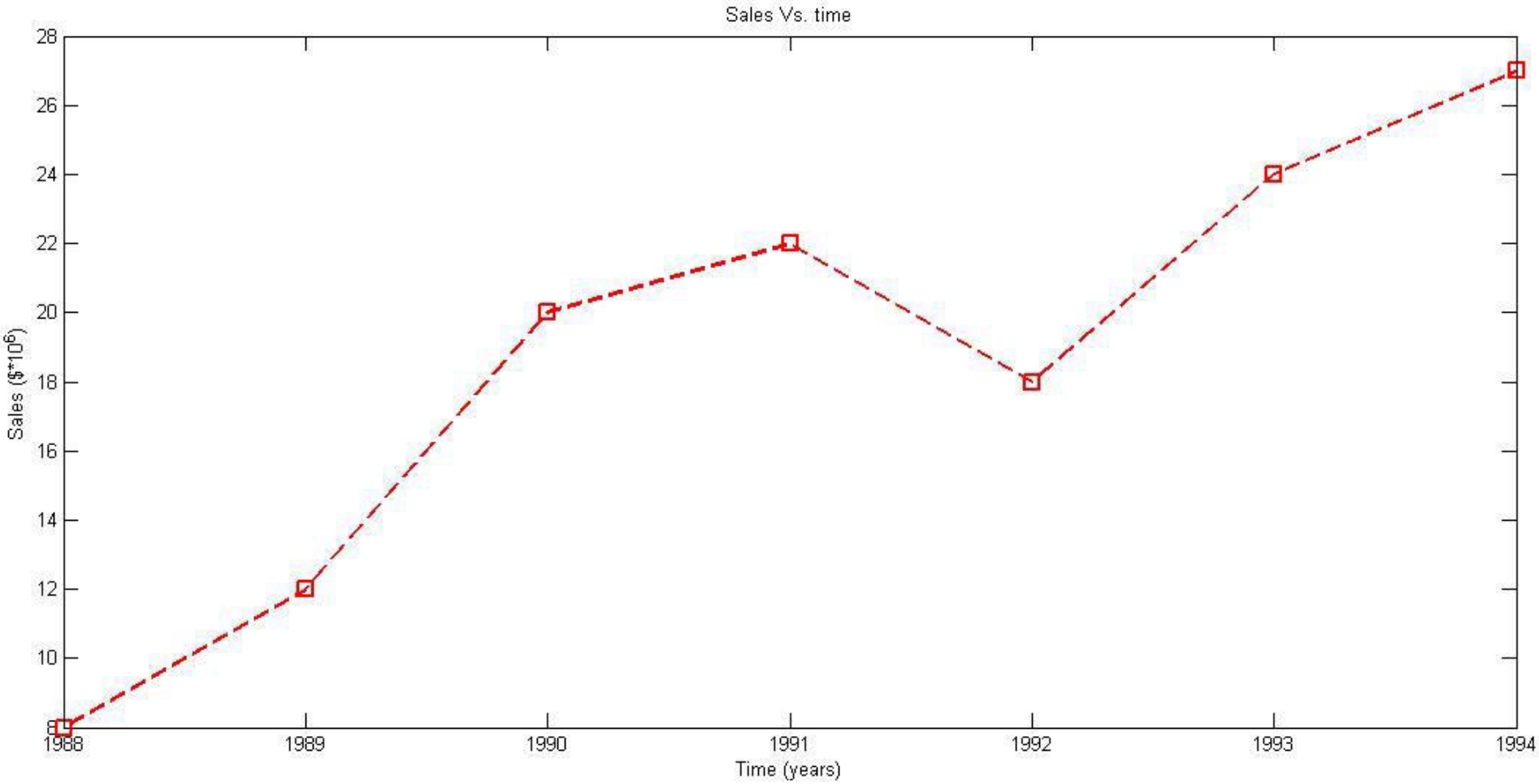
Formatting a Plot Using the Plot Editor

- Left click **insert** bottom of menu bar in figure window, the following options will appear:
  - X Label
  - Y Label
  - Title
  - Legend

- Left click the curve then right click the mouse, the following options will display,
  - Color
  - Line style
  - Line width
  - Marker
  - Marker size
  - Property editor

- The figure is saved as JBEG image (.jpg) or TIFF image (.tif).

The Previous plot after formatting



Plot of a function

- The function is plotted using ***plot*** or ***fplot*** *command.*

1. ***Plot*** command

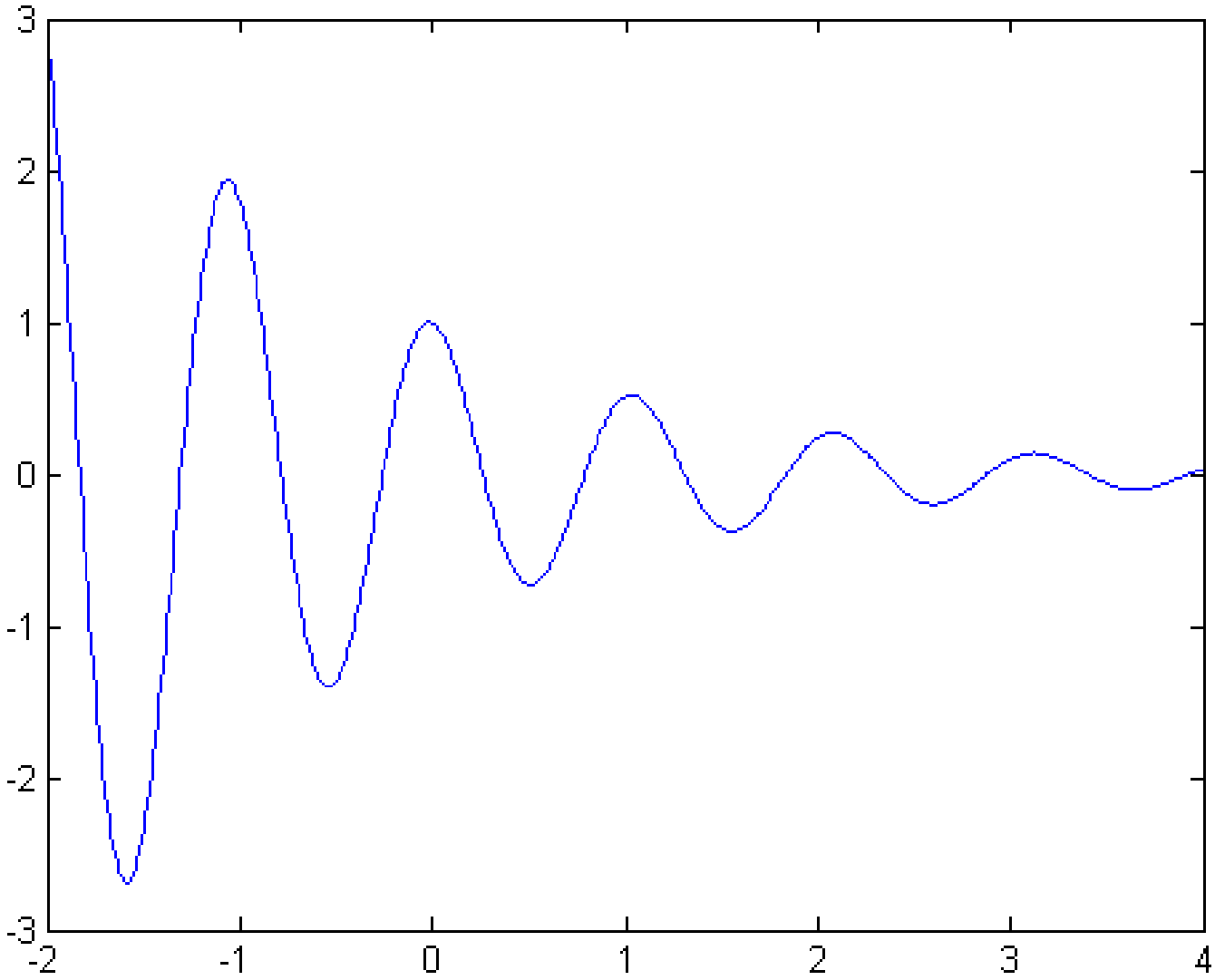
- *Example: plot the function,* $y = 3.5^{-0.5x}$ *cos(6*x),* $-2 \leq x \leq 4$

Solution:

>>x=[-2:0.01:4];

>>y=3.5.^(-0.5*x).*cos(6*x);

>>plot(x,y)


3
2
1
0
-1
-2
-3
-2
-1
0
1
2
3
4

2. ***fplot*** *command*

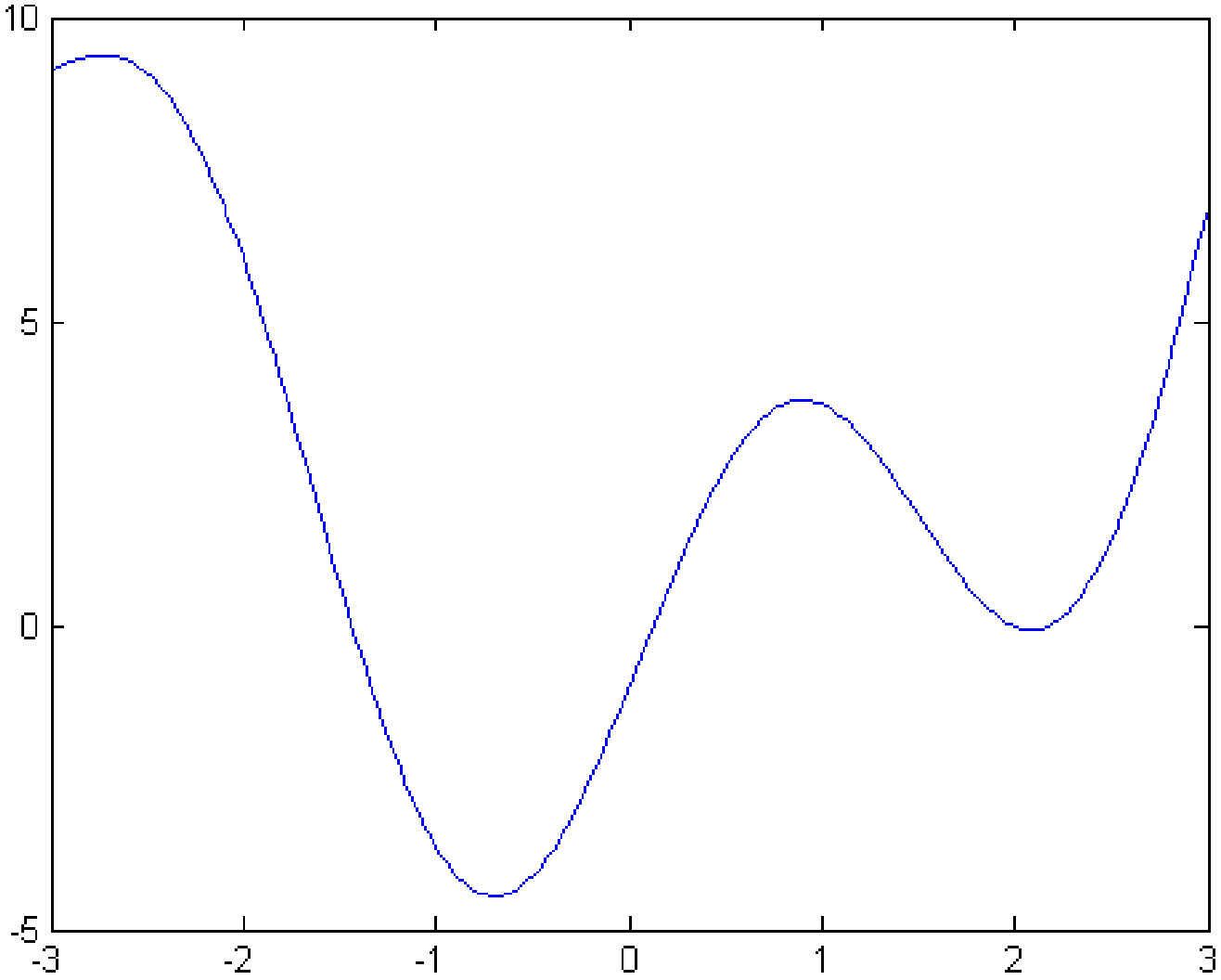
>>*fplot*(‘function’,[x limit])

Example: Plot the function: $z = t^2$+4 sin(2t)-1,

-3≤t≤3

Solution:

>> fplot(‘t^2+4*sin(2*t)-1',[-3 3])


10
5
0
-5
-3
-2
-1
0
1
2
3

PLOTTING MULTIPLE GRAPHS IN THE SAME PLOT

- The command is : plot(x,y,x,z)
- Example: Plot the function $y = 3x^3$-26x+10, and its 1st and 2nd derivatives, for -2≤x≤4, all in the same plot.

Solution: y' =9x^2-26, y'' = 18 *x*

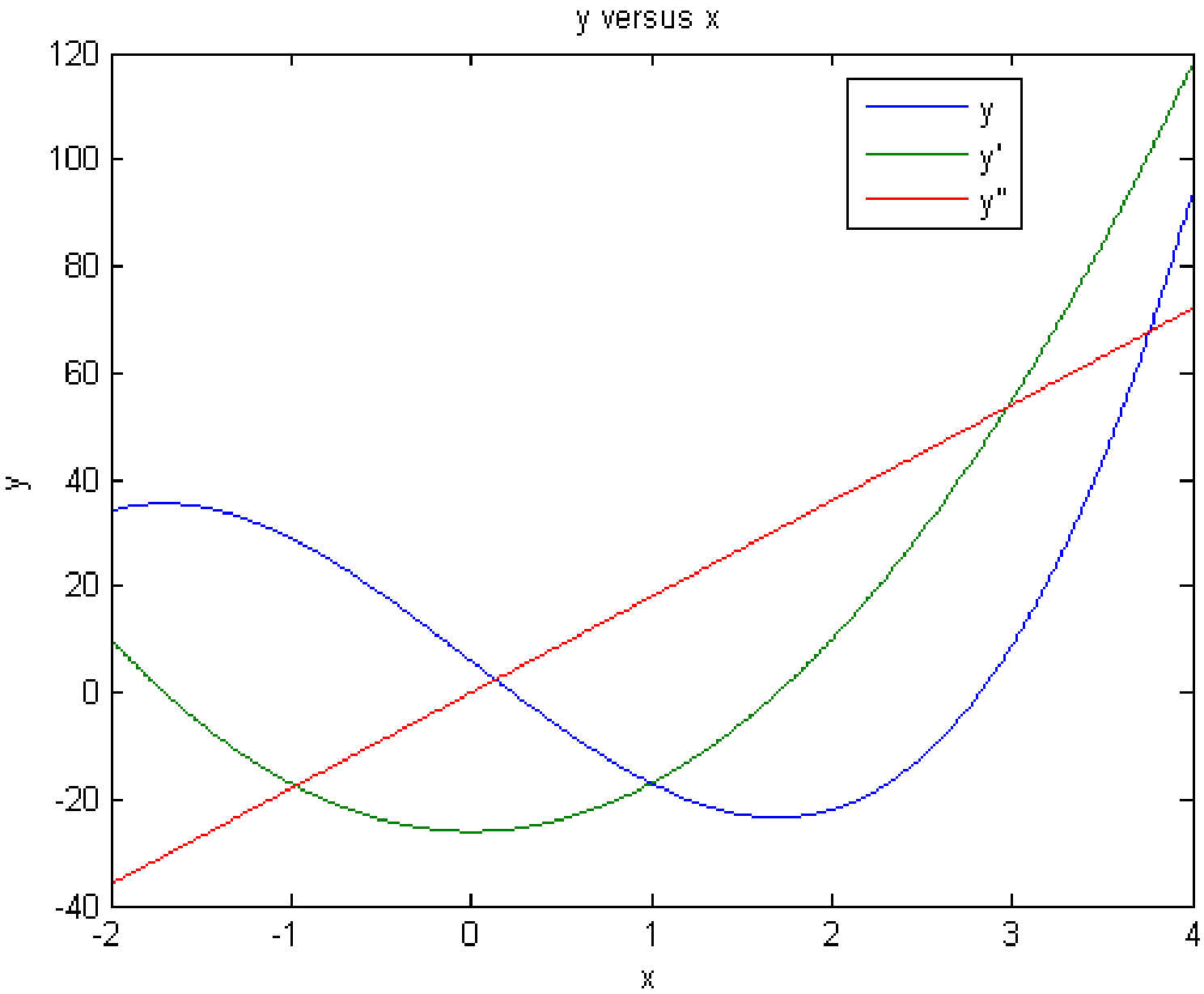
>>x=[-2:0.01:4];

>>y=3*x.^3-26*x+6;

>>yd=9*x.^2-26;

>>ydd=18*x;

>>plot(x,y,x,yd,x,ydd)


y versus x
y
y'
y''
120
100
80
60
40
20
0
-20
-40
-2
-1
0
1
2
3
4
x
y