

Matlab/Freemat: Plotting Graphs

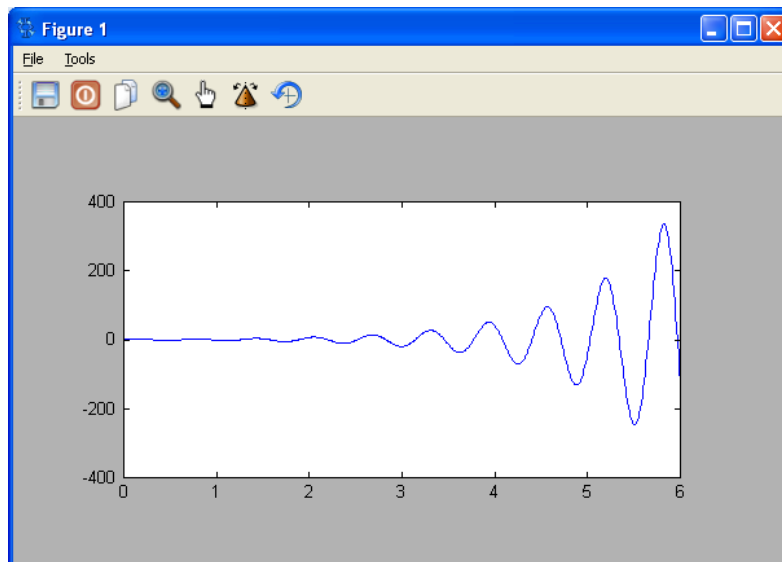
Matlab/Freemat have various means of plotting graphs. Some of the available functionality is outlined in this document.

Graph of a function of a single variable

We wish to plot the function $x(t) = e^t \sin(10t)$ for $0 < t < 6$.

```
-->t=0:0.01:6;  
-->x=exp(t).*sin(10*t);  
-->plot(t,x)
```

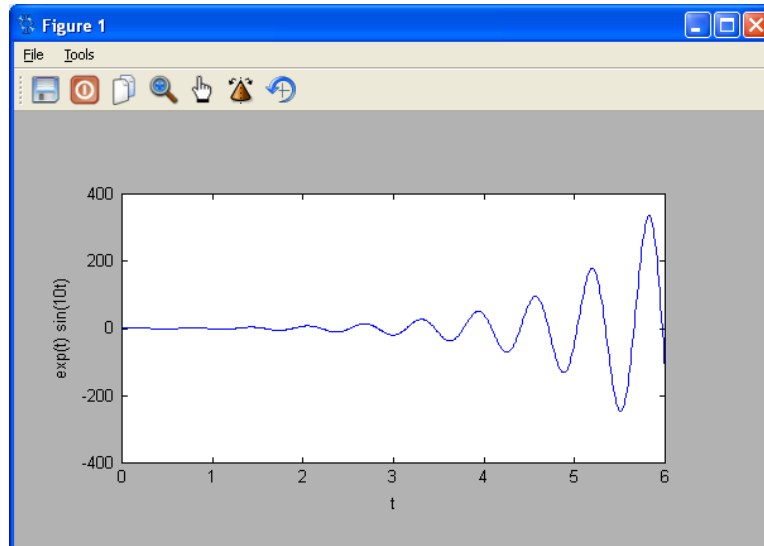
The first line of code sets the t-values; ranging from 0 to 6 in steps of 0.01 in a line array. The second line sets the x-values in a line array. Note that `exp(t)` and `sin(t)` are line arrays and to find the product of all the individual element to find x, the `.*` operator is appropriate¹. The third line plots the following graph.



The graph can be given labels using the following commands.

```
--> xlabel('t');  
--> ylabel('exp(t) sin(10t)');
```

¹ [Matlab/Freemat: Array Operations - Matrix and Vector Arithmetic](#)



Graph of functions of two variables

The following commands produce a graph of the function

$$z = x^2 + y^2 .$$

```
--> x=-10:0.1:10;  
--> y=x;  
--> [X,Y]=meshgrid(x,y);  
--> z=X.^2+Y.^2;  
--> surf(X,Y,z)
```

The first line `x=-10:0.1:10;` sets the x-range as $[-10,10]$ with the step length as 0.1. The second line `y=x;` sets the y-range to be the same, with the same step length. The third line `[X,Y]=meshgrid(x,y);` sets the x-y grid. The fourth line `z=X.^2+Y.^2;` evaluates the values of z at all points of the x-y grid. The final line `surf(X,Y,z)` produces a surface plot.

