**Computational Physics**

**Assignment 1** C1331824



Let and solve differential equation to find lambda :-

Therefore the equation becomes :-

Subbing values into y and to find A and B :-

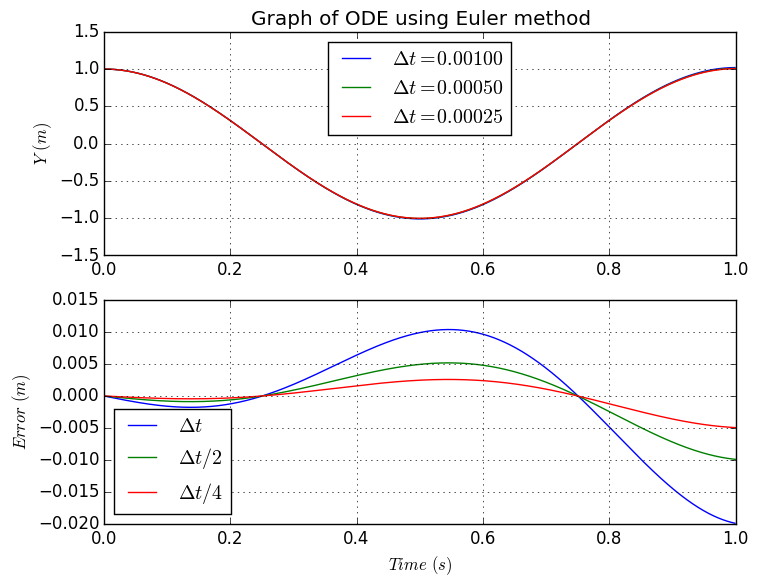
As and

Therefore A = 0.5 and B = 0.5

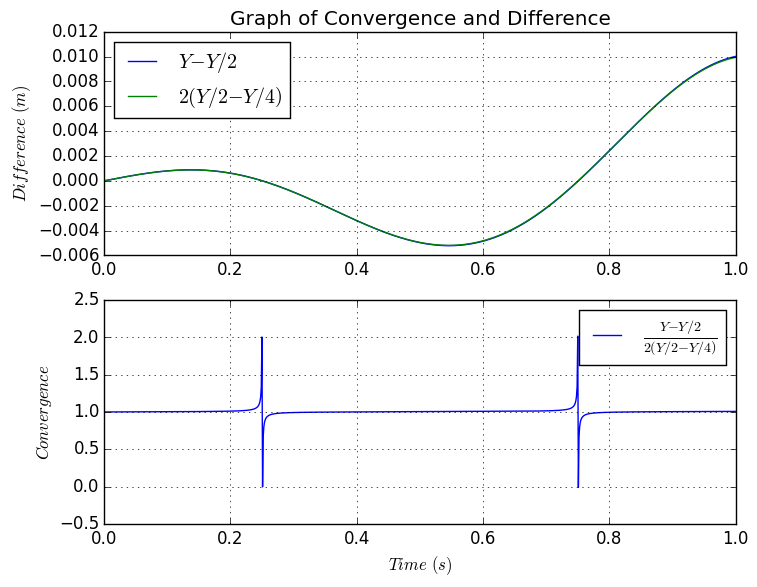
Which can be reduced into its sine and cosine :-

As

Which leads to the final solution of :-

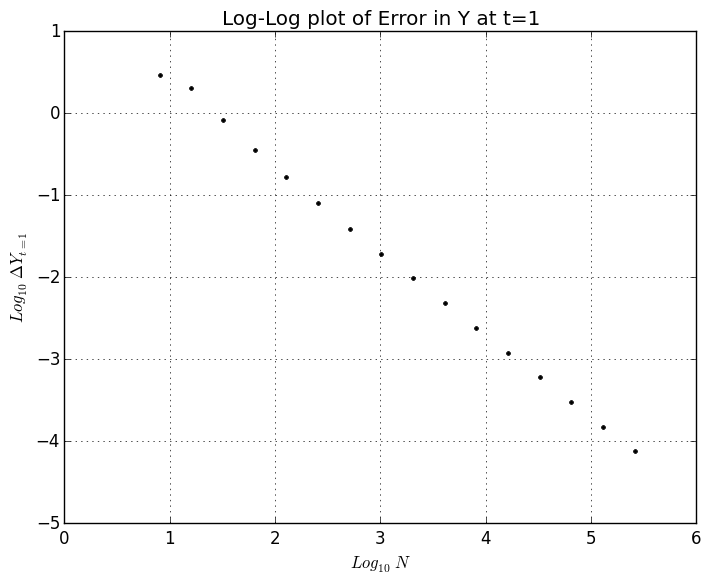
2.

**Figure 1** The above graphs show the solution to the second order differential equation along with difference between the numerical solution and the analytical solution.



**Figure 2** The above graphs show that the error converges at first order as the line overlaps and that the ratio of the two differences equals one.

The plot of the ratio behaves badly because the Euler method is first order convergent and that the [IM NOT SURE]

 3.

**Figure 3** The above graphs show the error in the Y value at for 18 different time steps, where

4.