

Spring 2012, MA 6646, due February 10, 2012 along with other problems.

Consider (1) textbook P 42, example 3.1, which is $y' = -5ty^2 + \frac{5}{t} - \frac{1}{t^2}$, $y(1) = 1$, (2) $y' = y \sin(2t + 3)$, $\mathbf{y}(\mathbf{0})=\mathbf{1}$. For both case you should be able to get the exact solution.

Use the following methods to compute the numerical solution for the given problem. (i) Forward Euler's method, (ii) Backward Euler's method, (iii) θ -method with at least two different θ values (one should be $\theta = \frac{1}{2}$).

Have a table showing the values at the end points, maximum error, for each different h values and each different methods. Include analysis related to the consistency, 0-stability and convergence. Analyze your results connecting with the theories learned in class.