**Assignment – 13, 14, 15**

Course: SC-374

Computational and Numerical Methods

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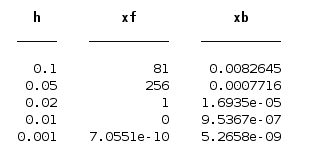
**SET - 13**

**Numerical stability and implicit methods**

**Problem - 1**

♦ **Statement:**

The initial-value problem , can be numerically sloved by euler’s method according to .Test the stability of this method at the fixed value of for Carry out similar with the backward euler method.



**SET - 14**

**Trapezoidal method**

**Problem - 1**

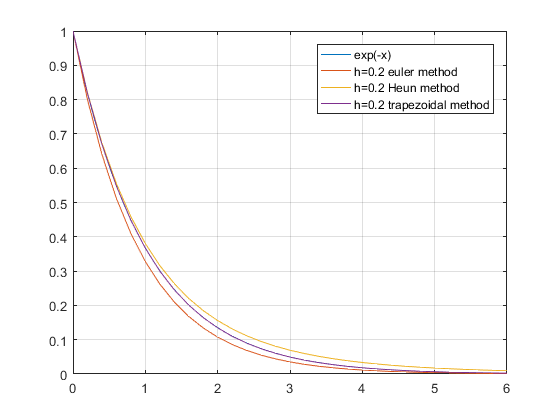
♦ **Statement:**

Consider the following initial value problems, Numerically solve both by Euler’s method and trapezoidal method, for range , separately using . For each problem, plot the numerical solutions for every value of h along with the analytical solution. Compare the graphs for errors.

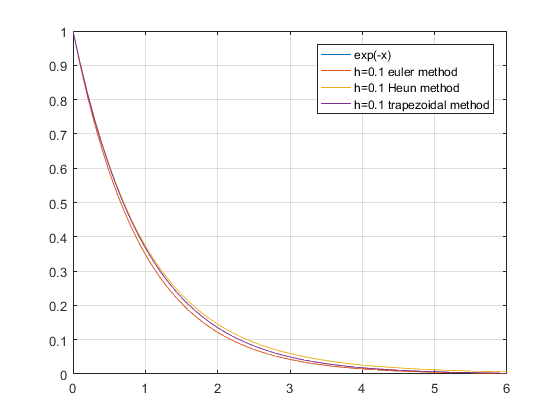
(A)

(a) Graph of function for

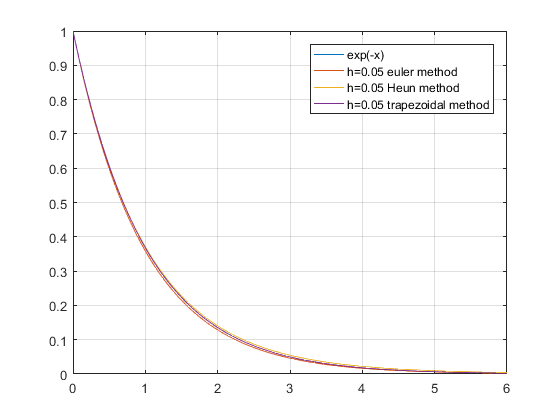
(1) for



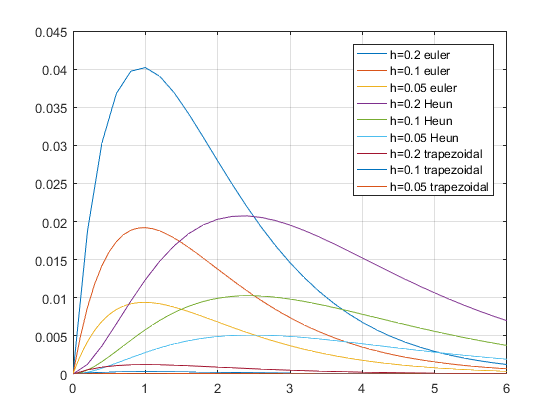
(2) for



(3) for



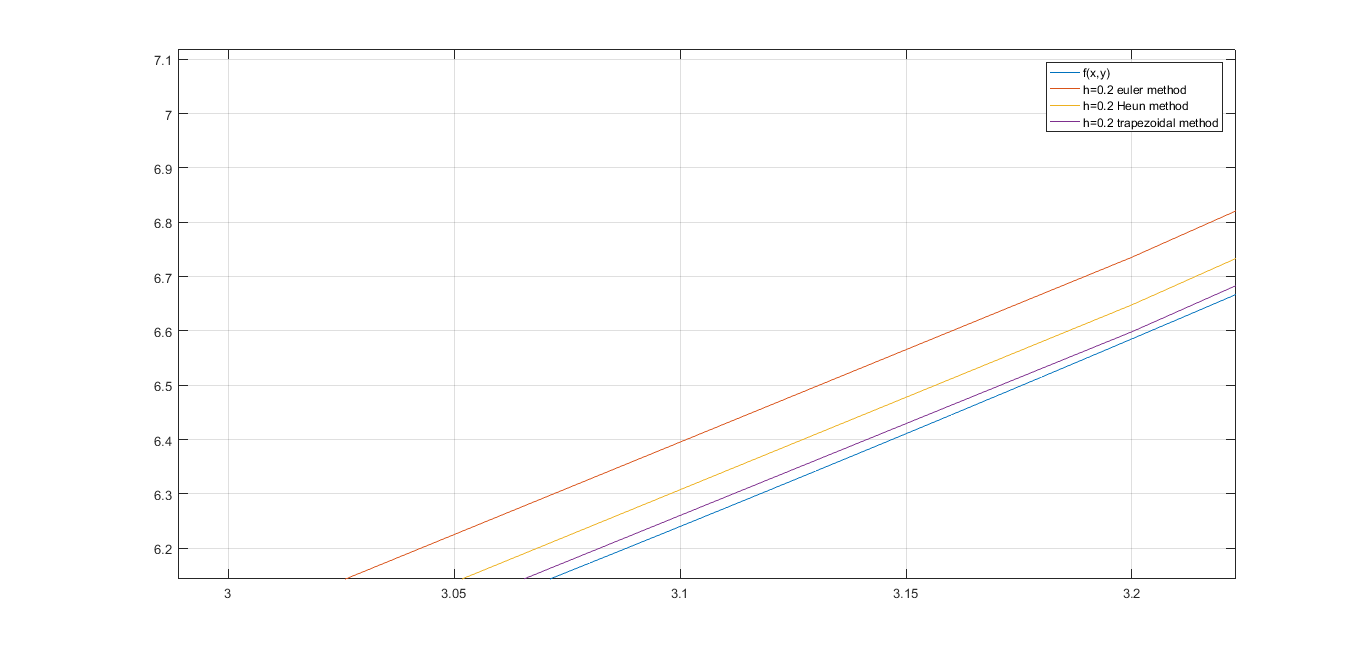
(b) Error function for



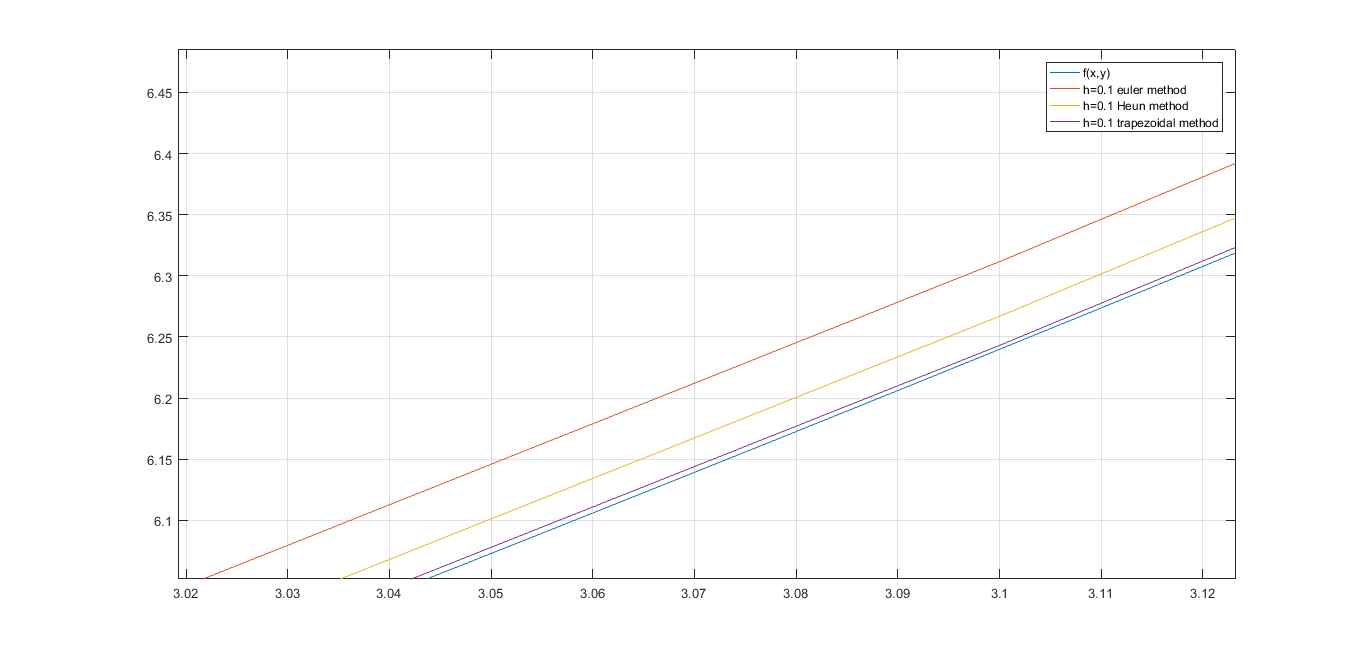
(B) .

(a) Graph of function for

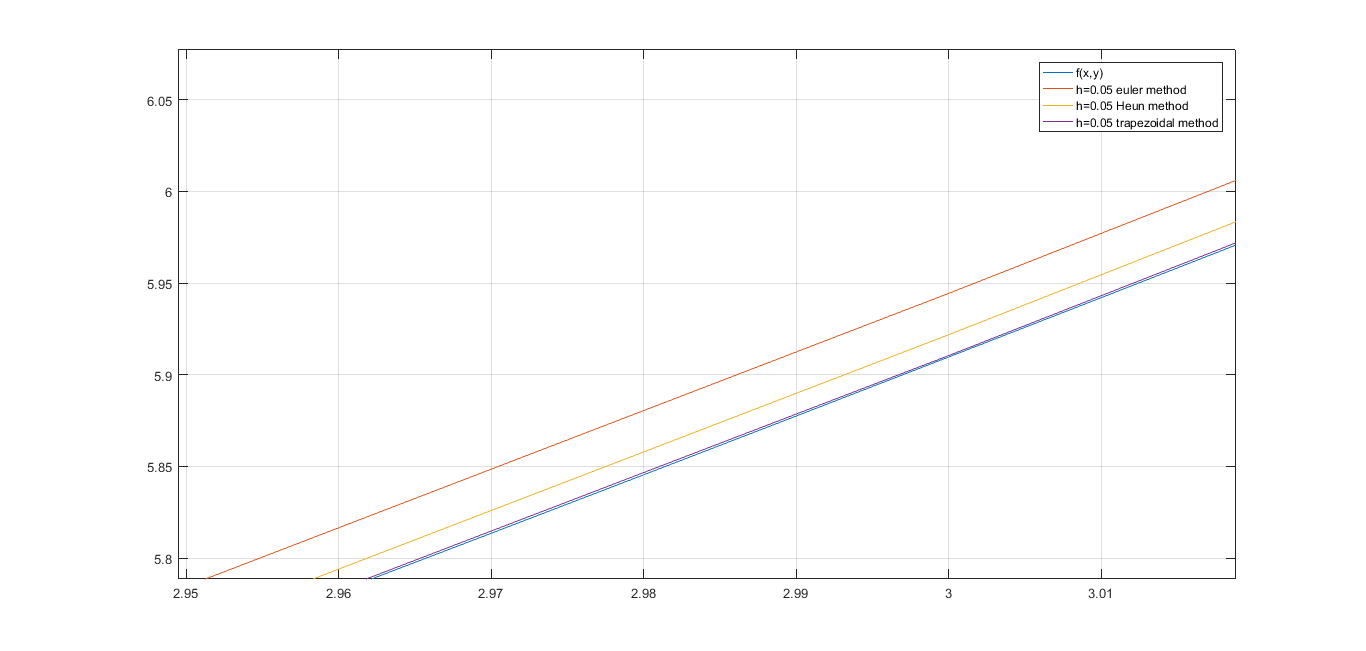
(1) for



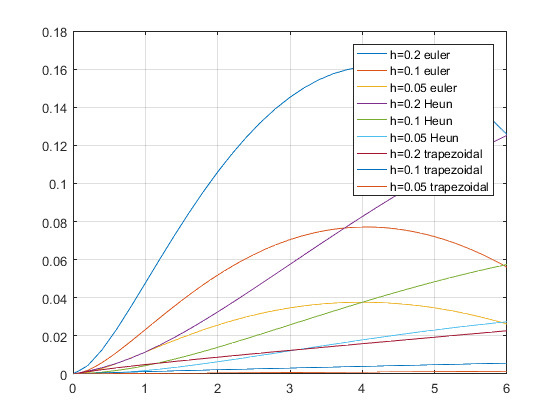
(2) for



(3) for



(b) Error function for



**SET - 15**

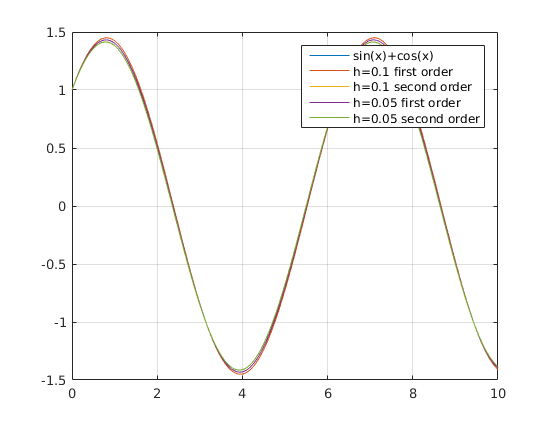
**Taylor’s method**

**Problem - 1**

♦ **Statement:**

On the initial-value problem, , apply both the first order and second order taylor method for . Use . Plot the results of both methods along with the exact integral solutions for comparison.

(a) Graph of function for both first-order and second-order



(b) Graph of error function for both first-order and second-order

