Numerical Analysis and Visualization

Homework 3

October 10, 2016

We have a system of linear differential equations as follows:

$$\frac{d\mathbf{x}}{dt} = \mathbf{A}\mathbf{x}, \mathbf{A} = \begin{bmatrix} 1 & 3 \\ 5 & -2 \end{bmatrix}, \mathbf{x}(0) = \begin{bmatrix} -1 \\ 3 \end{bmatrix}. \tag{1}$$

1. Find the analytic solution to the given ODEs under its initial conditions.
2. Solve the ODEs using the following methods and compare the results with the analytical solution.
   - Euler's method
   - Taylor series method of order 2
   - Forth order Runge-Kutta method
   - Predictor-Corrector Method