SRM Institute of Science and Technology
Department of Mathematics
21MAB206T- Numerical Methods and Analysis
Unit IV: - Numerical Solution of Ordinary Differential Equations
Tutorial Sheet – III

1. Apply the fourth order Runge Kutta method to find y(0.2) given that

   $y' = x + y$, y(0)=1. **Ans : y(0.1) = 1.11034,   y(0.2) = 1.2428**

2. Apply the fourth order Runge Kutta method to find y(0.3) given that

   $y' = y + xy^2$, y(0)=1, by taking h=0.1 correct to four decimal places.

   Ans : y(0.1) = 0.9006,   y(0.2) = 0.8046,   y(0.3) = 0.7144

3. Write Milne's Predictor and Corrector Formula

4. Write Adam – Bashforth Predictor and Corrector Formula.

5. Determine the value of y(0.4) using Milne's method given that $y' = xy + y^2$,

   y(0) = 1. Use Taylor series to get the values of y(0.1), y(0.2) and y(0.3).

   Ans. Y(0.4) = 1.83698

6. Using Adam's method find y(0.4) given that $\dfrac{dy}{dx} = \dfrac{xy}{2}$, y(0)=1,

   y(0.1)=1.01, y(0.2)=1.022, y(0.3)=1.023. **Ans: 1.0410**

7. Given $y' = 1 - y$, and y (0) = 0 find

   (i) y (0.1) by Euler's method.

   (ii) y (0.2) by Modified Euler's method.

   (iii) y (0.3) by Improved Euler's method.

   (iv) y (0.4) by Milne's method.

   Ans: 0.1, 0.1855, 0.2629, $y_{4,p}$= 0.3280, $y_{4,c}$=0.3333.