

UMC 202
PROBLEM SET 7

- (1) Use two step Adam-Bashforth explicit method to approximate the solutions of the following initial value problems. Compute the value of the solution at the end point of the interval and find the error

$$y' = y - t^2 + 1, \quad 0 \leq t \leq 2, \quad y(0) = 0.5, \text{ exact solution } y(t) = (t+1)^2 - 0.5e^t.$$

- (2) Redo problem 1 by the two step Adams Moulton implicit method. Compare the results with Adam-Bashforth explicit method.
- (3) Redo problem 1 by the three step Adams Bashforth explicit method and three step Adams Moulton implicit method. Compare the results.
- (4) Apply the Adams fourth order predictor corrector method with $h = 0.2$ and starting values are obtained from the Runge Kutta fourth order method to the initial value problem

$$y' = y - t^2 + 1, \quad 0 \leq t \leq 2, \quad y(0) = 0.5.$$

- (5) Transform the second order initial value problem

$$y'' - 2y' + 2y = e^{2t} \sin t \quad \text{for } 0 \leq t \leq 1$$
$$\text{with } y(0) = -0.4, \quad y'(0) = -0.6$$

into a system of first order initial value problems, and use the Runge Kutta method with $h = 0.1$ to approximate the solution.