Qn2 (10 marks)

Deadline 3 Sep (Sun), 2359 hrs

A 1st order IVP is given by $\dot{Y} - 3Y = e^t \quad , \quad Y(0) = 0$

Exact solution: $Y = -0.5e^t + 0.5e^{3t}$

CE5377 students:

- Solve the IVP using (i) Euler Explicit and (ii) the implicit Trapezoidal methods.
- Compare and contrast the accuracy and stability of the two methods.

CE6077 students:

- Solve the IVP using (i) Euler Explicit and (ii) the implicit Trapezoidal methods.
- Compare and contrast the accuracy and stability of the two methods.
- For the implicit Trapezoidal method, use Newton Raphson (NR) method when iterating.
    - Instead of analytically deriving the gradient term in the NR method, use a numerical scheme to obtain the gradient term *numerically*.
    - *Explain* clearly the strategy adopted.