MATLAB: Assignment 4

Instructions

- Work in **groups of 2 students**, both contributing to coding and writing.
- Explain steps by commenting on them.
- Once you have completed the problem, generate a pdf file with the results using the **Publish** option in matlab. **Please give me a hard copy of the pdf file.**
- **Failure to follow these instructions will result in loss points (up to the full amount of the homework total).**

Due on Friday, April 12th in class

In this exercise, you will write MATALB scripts to approximate an initial value problem using the **Runge-Kutta methods**.

Problem 1

Use **modified Euler method** with $n = 20$ to approximate the solution of the following IVP:

$$\frac{dy}{dt} = t^2 - y, \quad y(0) = 1, \quad 0 \leq t \leq 2.$$

Plot the points (t_i, y_i) obtained by the Modified Euler method for each $n = 20$ value. Also in the same figure, plot the actual solution (to solve the IVP analytically, please refer your MAT 239 notes). Explain steps by commenting on them.

Problem 2

Use **4th order Runge-Kutta method** with $n = 20$ to approximate the solution of the following IVP:

$$\frac{dy}{dt} = t^2 - y, \quad y(0) = 1, \quad 0 \leq t \leq 2.$$

Plot the points (t_i, y_i) obtained by the Modified Euler method for each $n = 20$ value. Also in the same figure, plot the actual solution (to solve the IVP analytically, please refer your MAT 239 notes). Explain steps by commenting on them.