

MATH 1310 Programming Project #9

You have the whole class period to work on the project with your group. You are required to use your own calculator and turn in your own paper. Be sure to answer all of the questions asked.

1. Write a program called EUL to find $y(1)$ where

$$\frac{dy}{dt} = t^2 \quad y(0) = 0$$

using a time step of $\Delta t = 0.1$. Write down your program.

2. Now modify your program so that it graphs an approximation of the solution function $y(t)$ from 0 to 1. Write down your program.

3. The program you have written is only useful in this specific case. Modify the program so that it prompts for the following values:

- the initial t -value t_0 (0 in the example),
- the final t -value t_1 (1 in the example),
- the initial condition $y(0)$ (0 in the example),
- the time increment Δt (0.1 in the example).

This program should graph the solution curve, as well as display the final value ($y(1)$ in the example). Write down your program.

4. Use your program to solve the same problem as above with time increments of .01 and .005.

5. Now use your program to approximate $y(3)$ if

$$\frac{dy}{dt} = (t - 2)e^t \quad y(1) = 4.$$