

Computer Project 1

DUE: 10/17/2022

Part A: Slope Fields

Use the provided Python code to draw a slope field for the following first order ODEs on the square $[0, 5] \times [0, 5]$. Print out a copy of your slope field and draw a reasonable sketch of the solution with initial condition $y(0) = 0$.

1.

$$\frac{dy}{dx} = x(1 - y^2) + 1$$

2.

$$\frac{dy}{dx} = 1 - \frac{1}{2}\sqrt{x^2 + y^2}$$

3.

$$\frac{dy}{dx} = (y + 1) \cos(x + y) + 1$$

Part B: Euler's Method

For each of the ODEs in Part A, use a spreadsheet to implement Euler's Method with initial condition $y(0) = 0$. Make your final x -value 5, and use a total of 100 steps. Print a graph of your numerical solution. Does it look like the sketch you made in Part A?