

Math 3280 Worksheet 22: first-order systems

Group members (2 to 4): _____

(1) Solve the initial value problem

$$x_1' = x_1 + 2x_2$$

$$x_2' = -2x_1 + x_2$$

$$x_1(0) = 1$$

$$x_2(0) = 2.$$

- (2) Approximate the value of $x_1(0.5)$ and $x_2(0.5)$ for the system $x_1' = x_1 + 2x_2$, $x_2' = -2x_1 + x_2$ if $x_1(0) = 1$ and $x_2(0) = 2$ using Euler's method with 2 steps.

- (3) Compare your answer above to the exact solution from (1), and indicate on the vector field plot both the approximate and exact points.

