

# Math 2214

## *Introduction to Differential Equations*



### Homework 4

I. **Practice Problems:** Solutions to these odd-numbered problems appear in the back of the book. You do not need to hand in these problems.

- p. 87, #17
- p. 98, #1, #3

II. **Exercises:** Prepare solutions to these problems to hand in. Be sure to show the steps necessary to solve the problem.

- (This problem is based on p. 53, #10:) We know that  $y(t) = \sqrt{4+t}$  is a solution to the autonomous differential equation  $y'(t) = f(y)$ . Find a solution to the same differential equation that satisfies the initial condition  $y(0) = 3$ .
- p. 85, #4
- p. 86, #8
- p. 98, #2b
- p. 99, #12 (don't do this by hand; see below!)

Note: Exercise #12 would require over 100 calculations to perform by hand.

My goal for assigning this problem is to verify that you're able to use some computational method to derive an approximate solution to a differential equation. If you wish to use Matlab or Mathematica, I've posted an m-file and a notebook which should simplify the programming.

Also, the direction field applet on the course website will now graph approximate solutions using Euler's Method.