Class 4: *Monday, September 12*

Slope Fields and Euler's Method

Reading: *H-H* Section 10.3, *Smith & Minton* Section 6.6

You've already been introduced to the idea of a *slope field* for a rate equation of the form $y'(t) = F(t, y(t))$: Draw a pair of coordinate axes. Pick a point on the plane with coordinates (t,y). At that point, draw a little line segment whose slope is $y'(t)$. (This slope is calculated from the rate equation using the values of t and y at the point you have selected.) Repeating this process many times creates a "field" of little slopes that can help you visualize the information provided by the rate equation. (Your text calls a slope field a "direction field.") Slope fields can also help you better visualize how Euler's Method produces an approximate solution to a rate equation.

Homework 2: *Smith & Minton* Section 6.6: 1, 2, 9, 39; *H-H* Section 10.3: 6. **BONUS** *Smith & Minton* Section 6.6: 42.

QUIZ 2 DUE IN CLASS: 10:30am or 1:30pm

Lab 1: Newton's Law of Cooling and Euler's Method

Be sure to bring your graphing calculator to lab.

Functions Gateway

Class 5: *Wednesday, September 14*

Successive Approximation and Euler's Method

Reading: *Smith & Minton* Section 6.6

An important feature of Euler's Method is the input stepsize. One piecewise linear function approximating the solution to the initial value problem can be computed using a given stepsize. Then the stepsize can be decreased and another approximating piecewise linear function can be obtained. The stepsize can be made even smaller and *another* approximation can be produced. This process of producing one approximation after the other is called *successive approximation*. We will discuss the advantages of successive approximation with Euler's Method over generating only one approximation.

Homework 2: *Smith & Minton* Section 6.6: 23, 24, 28.

Class 6: *Friday, September 16*

Introduction to the S-I-R Model

Reading: *Calculus in Context* pp. 9-15, Section 2.1

We will develop an initial value problem for a biological phenomenon – the spread of disease through a population. In particular, we will develop the S-I-R model of the course of a measles-like disease.

Homework 3: *Calculus in Context* Section 1.1: 1-6

HOMEWORK 2 DUE IN THE MATH 114 COURSE BOX BY 5:00 PM, FRIDAY SEPTEMBER 16.

NOTE: *Calculus in Context* refers to readings from Callahan et al., *Calculus in Context* (W. H. Freeman and Company, New York, 1995).