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.