

Math 3425 Ordinary Differential Equations, Fall 2015

Assignment #1

For Wednesday, August 26:

1. Find some examples of differential equations you care about.
Choose at least one equation that you do not know how to solve.
 - What do you know about this equation?
 - What situation does the equation model?
 - What do the terms represent?
 - Can you determine the *order* of the equation? Is it a *system*? Is the equation *autonomous*? Is the equation an *ordinary* differential equation, or a *partial* differential equation?

Be prepared to share your example with the class on Wednesday.

2. Find some information on **Euler's Method** and read up on it. This is the simplest numerical scheme for finding approximate solutions to a differential equation. To ground your reading, it will help to try to do something simple with it. Here are two simple tasks to work on.
 - A. Do you see the geometry behind Euler's method? Can you draw a schematic representing what the method does?
 - B. Try to use Euler's method **by hand** to find a simple approximation to a solution to this *initial value problem*:

$$y' - y + 1 = 0, \quad y(0) = 1.$$

Use only three or four steps, and try to find an approximate solution which exists on the interval $[0, 1]$.