Math 256, Applied Honors Calculus IV: Differential Equations, Fall 2007

Homework 2
Due Friday, September 21, 2007

Problems to Study:

- Section 2.3, # 1. *A mixing problem.*
- Section 2.2, # 37, 38. *Compare and contrast your results for these two problems. Also, review problem # 30 if necessary.*

Problems to Hand In:

- Section 2.3, # 15. *Fluctuating growth rates. Some populations don't reproduce with the same rate all the time. For example, some species have a growth rate that varies seasonally. In these circumstances differential equations with periodic coefficients naturally arise.*
- Section 2.3, # 29. *Rocket launching problem.*
- Section 2.3, # 19. *Pollutants in the Great Lakes.*
- Section 2.5, # 3, 12. *For these problems, you should also solve the differential equations to confirm your results. Make use of partial fraction expansions. I recommend dfield for the skethes.*
- Section 2.5, # 18. *Water collecting in a pond.*
- Section 2.5, # 25. *Bifurcation points.*
- Section 2.6, # 16. *Working with exact equations.*
- Section 2.7, # 16. *Euler's scheme. Compute for t=0.1,0.2 by hand. Then use a computer to compute for* $0 \leq t \leq 1$. *Plot the results. Print your code and figures. Hint: I recommend MATLAB. You can modify my m-file* `eulertest.m` *which is on the course web page. Use the command* `help plot` *to find out how to easily make plots. If you are new to MATLAB, get some help from computer savy friends.*