CPS 5310   Spring 2014
Shirley Moore, Instructor
February 13 Class

Introduction to Mechanistic Modeling with ODEs

Terminology/Concepts:

differential equation –

exponential function –

ordinary differential equation (ODE) –

partial differential equation (PDE) –

order of an ODE –

autonomous ODE --

initial value problem –

boundary value problem --

closed form solution –

Questions:

1. Under what conditions does an ODE have a unique solution?

2. Does a boundary value problem necessarily have a unique solution? Please justify your answer.

3. What is the general form of an ODE?

4. What does the Fundamental Theorem of Calculus tell us about the solution of an ODE of the form $T'(x) = f(x)$?   (Book software: ODEEx1.mac, ODEEx2.mac, ODEEx3.mac, ODEEx4.mac, ODEEx5.mac)

5. What method can be used to solve an ODE of the form $y' = f(x) \cdot g(y)$? (ODEEx7.mac, ODEEx8.mac, ODEEx10.mac)