

# Homework 1

Due Thursday September 6

1. Download the code `euler.py` off the homework web page. Save it to **My Documents** (file on this drive are not local but exist on a backed up central drive) . Fire up IDLE and load the code into the Python editor. Run it. The code simulates the 1D motion of a ball experiencing a force proportional to its displacement from the origin. What is the mass of the ball ? What is the coefficient of proportionality in the force law ? Draw or make a screen capture of the motion. What type of motion is this ?
2. Consult your lecture notes and add code to simulate a drag force  $F = -kv$ . Describe the motion for  $k = 0.1$ ,  $k = 3.0$ . Can you locate the value of  $k$  (approximately) where the character of the motion changes ? Include a copy of your edited python program in your writeup. (Bonus points: Can you give an analytic argument for this critical value of  $k$  ?)
3. Edit the code to implement a drag force that varies as the square of the velocity (in one dimension).