

Week 6 Homework – CMSC405

1. Given a TV with a 240-Hz refresh rate, how many times will a 24 frames per second input signal be repeated in 1/24 of a second.

$$N = \text{Refresh rate}/\text{Frames per second} = 240\text{Hz}/24\text{fps} = 10$$

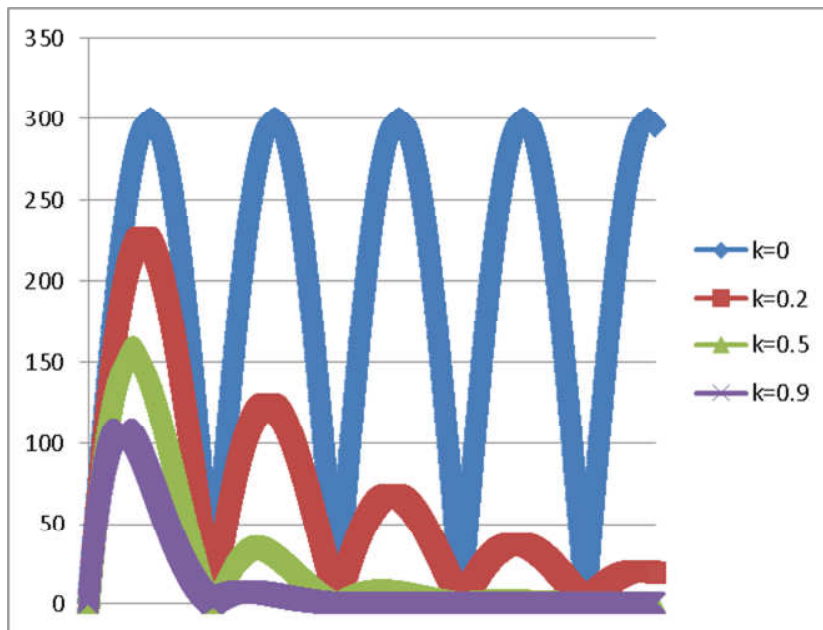
2. Plot time versus Amplitude for equation 12-10 on page 380 for an initial Amplitude of 300, a sampling frequency (f_s) of 256 Hz, a sin wave frequency (f_o) of 2 Hz, and phase of 30 degrees. Show damping values of $k=0, k=0.2, k=0.5$ and $k=0.9$. Note: You can use Excel, or any other graphing package to perform the calculation and create the plot. You should include all 4 data sets ($k=0, 0.2, 0.5$ and 0.9) on the same plot.

$$\text{If } k = 0, Y(t) = \text{abs}(300 * \text{SIN}(\text{PI} * 1/6 * 1/256 * 2 * t)) * \text{exp}(0 * 1/256 * t)$$

$$\text{if } k = 0.2, Y(t) = \text{abs}(300 * \text{SIN}(\text{PI}() * 1/6 * 1/256 * 2 * t)) * \text{exp}(-0.2 * 1/256 * t)$$

$$\text{if } k = 0.5, Y(t) = \text{abs}(300 * \text{SIN}(\text{PI}() * 1/6 * 1/256 * 2 * t)) * \text{exp}(-0.5 * 1/256 * t)$$

$$\text{if } k = 0.9, Y(t) = \text{abs}(300 * \text{SIN}(\text{PI}() * 1/6 * 1/256 * 2 * t)) * \text{exp}(-0.9 * 1/256 * t)$$



3. Using OpenGL and your programming environment, create a **unique animation of your own creation** using techniques demonstrated in this class. For example, you could animate the planet scene you created earlier. Or you could create an interesting character or set of characters or objects and animate their movements. It is up to you to determine what you want to animate. However; you do need to provide at least the following features for your animation:

- a. A list of instructions providing what the user needs to do to start and stop animation should be displayed in your animation window (or subwindow if you use multiple windows)
- b. You need to provide animation on at least 5 different objects or components. (e.g. 5 different planets rotating about the Sun, or spinning on their axis, or a character whose heads, arms, legs, body and feet move)
- c. The animations and movements need to be “somewhat” realistic. For example, planets need to use elliptical motion and be timed to move relative to one another. Or arm movements on a human may be restricted to a certain degree range of motion. So when you work out your animation paths, think about the math and physics behind these

