

Lab Assignment # 3 – Simple Harmonic Motion**Due: Thurs., April 16, 2009**

Directions: Now that you have C++ code to create a pendulum, you need to animate that pendulum and produce a short animation of it.

You can work with others and discuss the problems, but each student must write his/her own, independent solution. If you are unsure about what i mean by this, please ask!

Problem 1. Create an animation of a pendulum undergoing Simple Harmonic Motion

$$\theta'' = -\frac{g}{L}\theta, \quad \theta(0) = \theta_0, \quad \theta'(0) = \omega_0,$$

or

$$\theta(t) = A \sin(\omega t + \phi),$$

where A and ϕ depend on θ_0 and ω_0 .

The animation should be created with a collection of frames generated with a C/C++ file that uses **RenderMan** - like primitives, types and shaders. You can use the file you created for the previous assignment or download the file [pendulum_shm.cc](#).

If you use the file i provide, you will need to complete the lines that contain dots ... and / or say **COMPLETE**. If you use your own file, you should modify it so that it uses the same variables defined in the sample file.

In order to create the animation from the frames you can use a variety of image manipulation tools. In UNIX/Linux/Mac systems, the command line graphics suite **Imagemagik** allows you to create the animation easily. This [Makefile](#) contains targets for compiling the code, running it, and creating the animation (you just need to adjust the path for your **Pixie** installation).

Lab work submission instructions:

1. create a solution directory called `math496_lab3_xy`, where `x` and `y` stand for your initials
2. save/copy/move the file `pendulum_shm.cc` to the solution directory
3. save/copy/move the file `Makefile` to the solution directory
4. zip your solution directory, *i.e.*, create a file called `math496_lab3_xy.zip` that contains the solution directory
5. upload that file to the [course submission system](#)