

Physics 112 Lab: Spring Oscillations and Force

Purpose: To analyze the changes in amplitude on an object suspended by a spring on an incline.

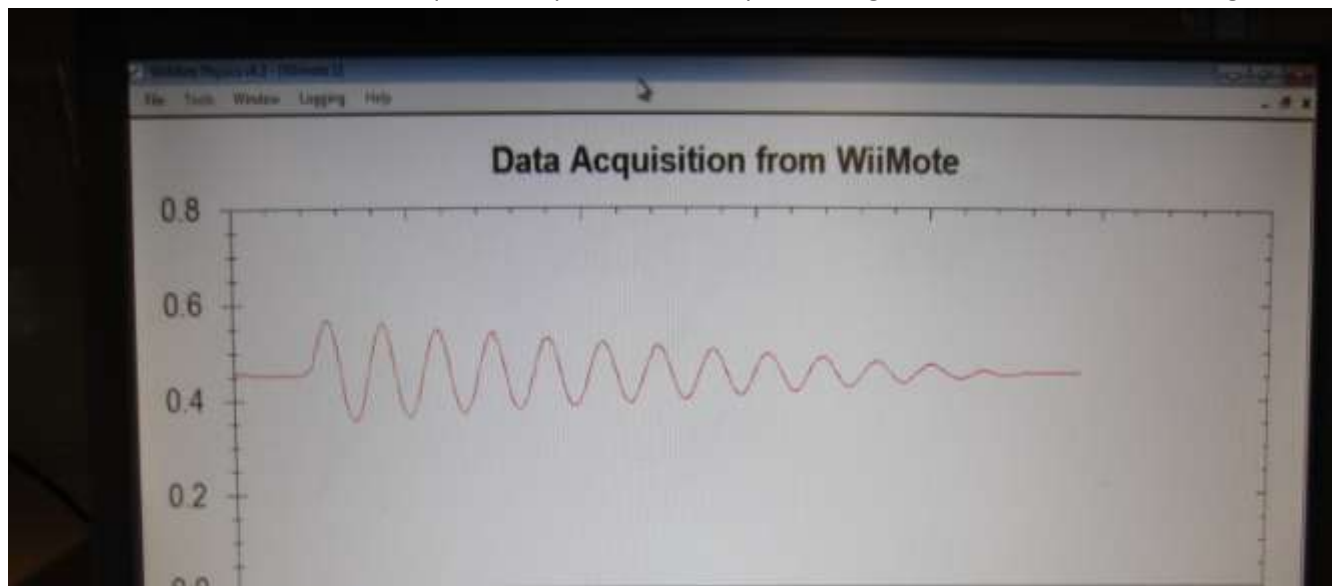
Materials: Wiimote, WiiPhysics software, track and cart. (Your own SD card or memory stick)

Procedure

- 1) Setup the lab as shown in the image below (you can copy this image into your lab report)



- 2) Connect the wiimote to the computer (see the Wii Physics Instructions), start the Wii Physics program and set the collection mode to 1-D, and only have the Distance option checked.
- 3) On the WiiPhysics screen right-click the mouse and select "show point values".
- 4) Attach the cart to the black stopper with the spring and let the cart hang there (this is its equilibrium position)
- 5) Stretch the spring about 10 - 15 cm and hold the cart in place until someone turns on data collection for the WiiPhysics program (ctrl+F5).
- 6) Let the cart oscillate until it sits at equilibrium position and stop collecting data. Should have something like this:



- 7) The red line is the distance from the sensor bar in meters.
 - a) Right click and select "Save Image As..." You will need to save it to a memory stick/SD card for use in your report.

- b) Record the initial distance from the sensor bar (in the above image it is about 0.45 m) by placing your mouse above the initial flat line.
 - c) Place the mouse over each red peak and record the distance and time ordered pair to four decimal places.
 - d) This data will be inputted into the Excel spreadsheet program provided. The program will automatically calculate the magnitude of the amplitude for the data and graph it with respect to time.
 - e) Record the total mass of the cart, wiimote, and the blue putty in kg.
- 8) Input the data from (7) into the Excel spreadsheet named Spring_Oscillations_Ramp_Lab.xlsx. Delete or add rows of data and be sure to make the appropriate changes to your graphs as well (ask if you are unsure how to do this). You will need to include your data tables and graphs into your report.
 - 9) Place the two silver masses on the cart and repeat the experiment.

Discussion/Analysis (be sure to answer the following – they do not have to be answered in the order below)

- 1) The Excel graph shows the equation of best fit for the linear relationship. What does that slope represent? What force is responsible for bringing the oscillations to a stop?
- 2) What affect did adding the masses have on the values of your results?
- 3) What affect would increasing or decreasing the angle have on the amplitude data?