

PHY 221 Lab 03-3: Hooke's Law


Background

You have five springs, including two “hoop” springs. For each spring, stretch and/or compress the spring with your hands. Observe which springs are easier or harder to stretch or compress. Rank the springs according to how much force is required to stretch or compress the spring a given amount. In other words, rank them on a scale from “easy” to “hard” to stretch or compress. Do not overstretch a “loose” spring or you may damage it.

rank springs (from easy to hard) to stretch or compress	spring description (color, hoop, etc.)
1	
2	
3	

rank hoop springs (from easy to hard) to stretch or compress	spring description (color, hoop, etc.)
1	
2	

Procedure

1. Attach a force sensor to Channel 1 and a motion sensor to the Dig/Sonic Channel 1 of the LabPro interface.
2. Open Logger Pro.
3. Delete all graphs but one. Go to Page→Auto Arrange to fill up the window with the graph.
4. Change the graph to plot Force vs. Position.
5. Go to Experiment→Set up Sensors. Select the interface. Click on Dig/Sonic Channel 1 and select Reverse Direction for the motion detector.
6. Attach the force sensor to a bracket and attach the bracket to the track.
7. Attach one end of a spring to the force sensor.
8. Attach a block to the other end of the force sensor. You may use a paperclip to couple the force sensor to the spring if needed.
9. Place the motion detector at least 0.5 from the block.
10. Hold the force sensor so that the spring is relaxed but just about to stretch.
11. In Logger Pro, zero the motion detector and force sensor using the  icon.
12. Click the green Collect button.
13. Holding the block, move it so that the spring stretches. After it stretches a number of centimeters, hold it steady until the data stops collecting.
14. Select the linear portion of the graph and do a linear fit to the data.

15. Record the slope of the graph.
16. Repeat for 3 more trials.
17. Calculate the average slope of the graph

In your lab notebook, record the slope of the graph and the type of spring. Then, repeat the above analysis for the four other springs. Make a data table showing the average slope of the graph and type of spring.

Analysis

1. If you rank the springs in order of slope, does the ranking of the springs agree with what you observed about how easy or hard it is to stretch or compress the spring?
2. What do you think that the slope tells you about the spring?