Experiment 2: Springs and Oscillations Part 2B – Simple Harmonic Motion

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| Name | Partner | | | Date | |
| Spring ID Number: | Spring Mass : | | | | Spring Length :  0.18 m |
| Measurements for characterizing spring   |  |  |  | | --- | --- | --- | | Mass | Force | Position | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |  |  |  | | | Results  Equilibrium position: \_\_\_\_\_\_\_\_\_\_\_\_  Spring Constant: \_\_\_\_\_\_\_\_\_\_\_\_  Verification  New Trial Mass: \_\_\_\_\_\_\_\_\_\_\_\_  Predicted Position: \_\_\_\_\_\_\_\_\_\_\_\_  Measured Position: \_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| Does your predicted position of the mass agree within uncertainties with your measured position? | | | | | |
| Sonic Ranger Gain:  172.9 m/s | Sonic Ranger Offset:  -0.436 m | | | | Hanging Mass : |
| Period of oscillating mass by using cursors and counting oscillations : | | | | | |
| Fit of data to :  Equilibrium position: \_\_\_\_\_\_\_\_\_\_\_\_  Amplitude: \_\_\_\_\_\_\_\_\_\_\_\_  Angular frequency: \_\_\_\_\_\_\_\_\_\_\_\_  Phase angle: \_\_\_\_\_\_\_\_\_\_\_\_ | | | Calculation of period from best fit:  Period: \_\_\_\_\_\_\_\_\_\_\_\_ | | |
| Theoretical period based on spring characteristics: | | | | | |

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| VPython simulation of position versus time:  How does the period from the simulation compare to the theoretical period? | | |
| What additional physical factor(s), not included in the basic theoretical model we used, might affect the period of the oscillator? | | |
| What is the value of the effective mass needed to get the theory to match the measured period? | | |
| What is the ratio of the (“extra” mass) / (spring mass)? | | |
| Write a paragraph that summarizes these results and describes how the ratio you found compares to the ratio found in the energy model from your pre-lab questions? | | |
| Attachments:   * Annotated graph showing measured position vs time for simple harmonic oscillator, with best fit. * Annotated graph showing simulated position vs time for simple harmonic oscillator. | | |