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

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| --- | --- | --- |
| Mass | Force | Position |
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  | 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.
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