

Physics 4AL 3A in-lab

Ethan Wong

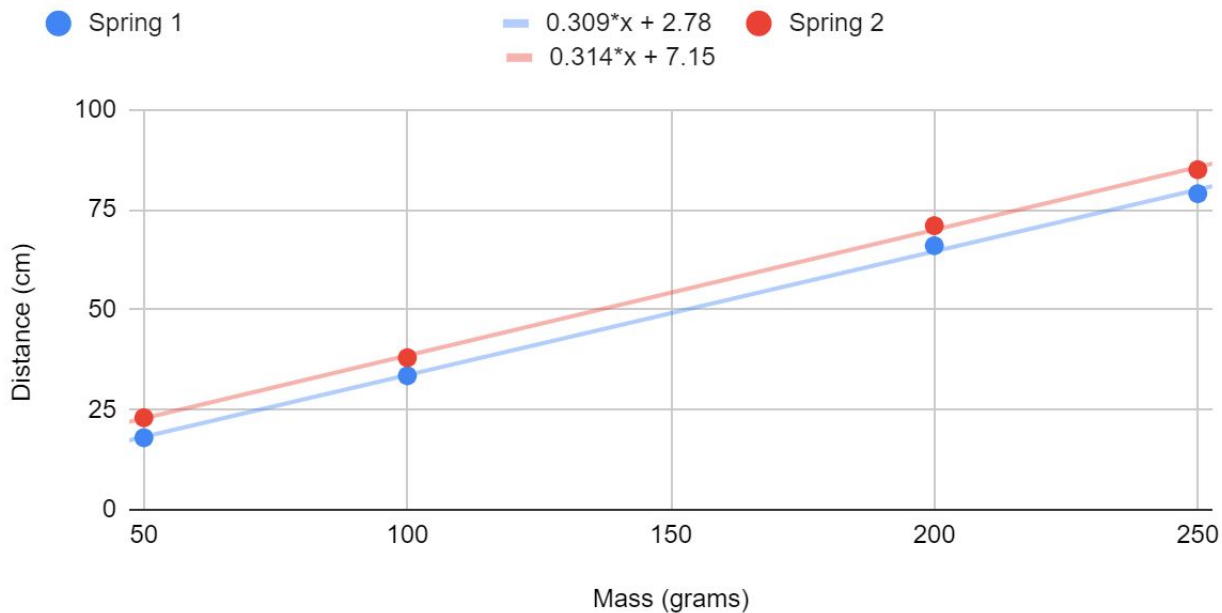
Hooke's law table

Use the right units.

Mass	Spring 1 equilibrium position	Spring 2 equilibrium position
50 grams	18 cm	23 cm
100 grams	33.5 cm	38 cm
200 grams	66 cm	71 cm
250 grams	79 cm	85 cm

Hooke's law plots

Equilibrium position of various masses on a Spring 1 and Spring 2



Harmonic oscillations table

Spring Constant	Mass	Predicted frequency	Measured Frequency	Percent Difference
Single Spring: $k = 3.0282 \text{ N/m}$	$m_1 = 50$ grams	1.239 Hz	1.229 Hz	.8071%
Single Spring $k = 3.0282 \text{ N/m}$	$m_2 = 100$ grams	.8758 Hz	.8834 Hz	.8678%
Single Spring $k = 3.0282 \text{ N/m}$	$m_3 = 200$ grams	.6193 Hz	.6227 Hz	.5490%
2 Springs in series $k = 1.526 \text{ N/m}$	$m_1 = 50$ grams	.8793 Hz	.8993 Hz	2.274 %
2 Springs in parallel $k = 6.105 \text{ N/m}$	$m_1 = 50$ grams	1.7 Hz	1.608 Hz	8.584%

Harmonic Oscillation plots (accelerometer and ultrasound) for Spring 1 and arduino setup

