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Hooke's Law: Spring Constants

The purpose of this experiment was to measure the force constant k of a spring using two different methods. In the first method, a mass was attached to an unstretched vertical spring and allowed to oscillate vertically. The amplitude of the oscillation was recorded for several different masses. The initial potential energy was plotted versus the square of the amplitude. The resulting plot appeared linear, and the slope was determined using the method of least squares. The force constant was calculated by doubling the slope, resulting in $k = 10.24 \pm 0.12$ N/m. In the second method, the mass was hung from the vertical spring so that it did not oscillate. The displacement of the mass was recorded for several different masses. The weight was plotted versus displacement, and the resulting plot appeared linear. The force constant was determined from the slope, resulting in $k = 9.90 \pm 0.65$ N/m. This value is consistent with the result obtained using the first method.

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