

Lab 02 – Hooke’s Law & Simple Harmonic Motion

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1 Results

We designed two different experiments to measure the k value a given spring. Both experiments made use of the

$$F_s = -k \cdot x \quad (1)$$

where F_s is the spring force acting on an object, k is the spring constant, and x is the displacement from the equilibrium point of the spring. In our first experiment, we used five different masses and statically analyzed the system to find a k value of $9.49 \pm 0.1 \left[\frac{N}{m} \right]$. (see Figure ??) In our second experiment, we dynamically analyzed the system while it was in simple harmonic motion (SHM). We found the $k = 9.3 \pm 0.1 \left[\frac{N}{m} \right]$. (see Figure ??)

While each of the measurements were equally uncertain, we decided that the measurement using both of the Lab Quest sensors was more precise, and had less variability than Experiment 1 did. We also decided the system in Experiment 2 was able to stay more stable and constant, while everything done in Experiment 1 had some variability from things shaking due to the movement of the lab group.