Wednesday warm-up: Forces I

Prof. Jordan C. Hanson

September 23, 2024

1 Memory Bank

1. $\vec{F} = -k\Delta\vec{x}$ ... The "force" exerted by a spring compressed or stretched by a displacement $\Delta\vec{x}$.

2 Force and Springs

1. Suppose we hang a weight of 10 N from the spring, and it stabilizes at a length 10 cm. If the original length is 5 cm, what is the value of k?

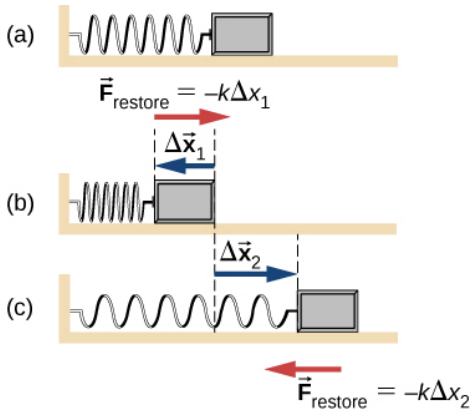

Figure 1: A spring exerts a force on a mass when compressed or stretched.

2. Using this same spring, what is the force if we stretch it by 10 cm?

3. Suppose a mass is supported by two springs. One spring has $k_1 = 2$ N/cm, and the other has $k_2 = 4$ N/cm. Each spring has an l_0 of 5 cm. If the system is at rest, what is the height of the mass?

4. (Think conceptually). Suppose a mass is supported by a spring, and is at rest. If the mass is displaced momentarily from equilibrium. (a) What will the mass do? (b) Write a function for the displacement of the mass versus time.