

Exercise 6

For the spring in Exercise 4, find the damping constant that would produce critical damping.

Solution

Critical damping occurs when

$$c^2 - 4mk = 0.$$

Solve for c .

$$c = \sqrt{4mk}$$

In Exercise 4 the spring constant is $k = 52 \text{ N/m}$, and the mass is $m = 2 \text{ kg}$.

$$c = \sqrt{4(2)(52)} = 4\sqrt{26} \frac{\text{N} \cdot \text{s}}{\text{m}} \approx 20.4 \frac{\text{N} \cdot \text{s}}{\text{m}}$$