

# Assignment 10: Hooke's Law

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A weight is attached to an extension spring. If it is pulled from the equilibrium position and released, it is observed to oscillate up and down. Let  $r(t)$  denote the distance of the weight below the equilibrium position  $t$  seconds later. It is known as **Hooke's Law** that the acceleration  $d^2r(t)/dt^2$  of the weight is proportional to the displacement  $r(t)$  and in the opposite direction. That is,  $d^2r(t)/dt^2 = -kr(t)$ , where  $k > 0$  is called the **spring constant**.

Using Maple find  $r(t)$  if the maximum extension is  $10\text{cm}$  below the equilibrium position and find the **period** of the oscillation (time taken for the weight to make a full oscillation).

**Value of this assignment is 4 points** (1 point is equal to 1 percent of your final mark).