Mass of mass 1	$m_1 := 1$	Mass of mass 2	$m_2 := 2$
Damping Coefficient damper 1	$c_1 := 0.2$	Damping Coefficient damper 3	$c_2 := 0.2$
Spring constant spring 1	$k_1 := 0.1$	Spring constant spring 3	$k_2 := 0.01$

Second-order differential equation to model the system behavior

$$m_1 \cdot x_1''(t) = -c_1 \cdot x_1'(t) - k_1 \cdot x_1(t) + k_2 (x_2 - x_1) + c_2 (x_2' - x_1')$$

$$m_2 \cdot x_2''(t) = -k_2 (x_2 - x_1) - c_2 (x_2' - x_1') + m_2 \cdot g$$

height mass 2	$h_1 := 2$
initial velocity mass 2	$v_0 := 0$
Gravity	$g := 9.81$

$v_1^{\,2} = v_0^{\,2} + 2 \cdot g \cdot (h_1)$ $\quad v_1 := \sqrt{2 \cdot g \cdot (h_1)}$ $\quad v_1 = 6.264$

$$\frac{d}{dt} x_0(t) = x_1(t)$$

$$\frac{d}{dt} x_1(t) = \frac{-c_1 \cdot x_1(t) - k_1 \cdot x_0(t) + k_2 (x_2 - x_0) + c_2 (x_3 - x_1)}{m_1}$$

$$\frac{d}{dt} x_2(t) = x_3(t)$$

$$\frac{d}{dt} x_3(t) = \frac{-k_2 (x_2 - x_0) - c_2 (x_3 - x_1) + g}{m_2}$$

$x_0(0) = 0$ $\quad x_1(0) = 0$ $\quad x_2(0) = 0$ $\quad x_3(0) = 0$

$$\begin{bmatrix} x_0 \\ x_1 \\ x_2 \\ x_3 \end{bmatrix} := \mathbf{odesolve}\left(\begin{bmatrix} x_0(t) \\ x_1(t) \\ x_2(t) \\ x_3(t) \end{bmatrix}, 30\right)$$