Solving of the equation of motion numerically:

$\omega = \sqrt{\frac{k}{m}}$ $\omega := 1$ $v_0 := 1$ $\mu := .8$ $g := 9.8$ $t_0 := \frac{\mu \cdot g}{\omega^2 \cdot v_0}$ $t_0 = 7.84$

replacing $(t - t_0)$ by t, starting time at beginning of block motion:

$\Delta T := 30$

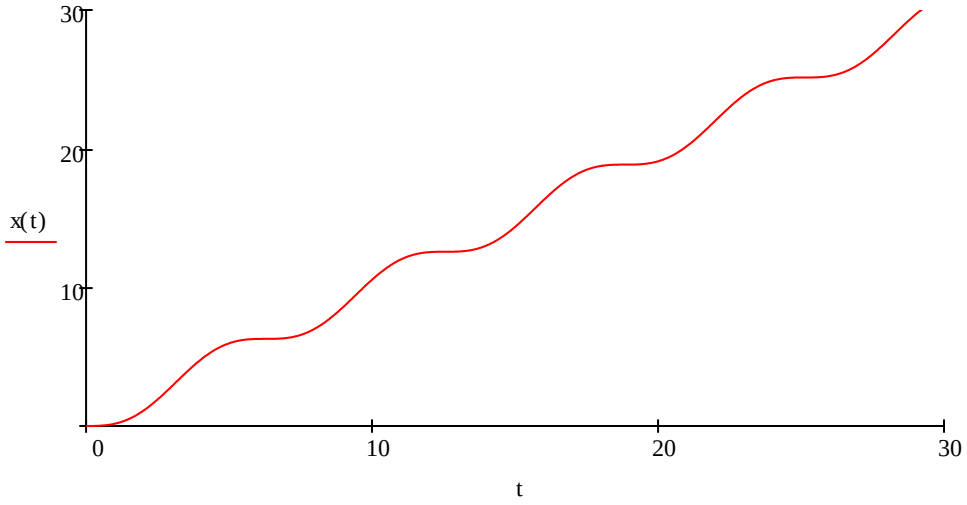
Given

$$\frac{d^2}{dt^2}x(t) + \omega^2 \cdot x(t) = \omega^2 \cdot v_0 \cdot (t + t_0) - \mu \cdot g$$

$$x(0) = 0$$

$$x'(0) = 0$$

$x := \text{Odesolve}(t, \Delta T)$



Analytical Solution:

$t := 0, .1 .. \Delta T$

$x(t) := v_0 \cdot \left[t - \frac{\sin[\omega \cdot (t)]}{\omega} \right]$ $v(t) := \frac{d}{dt}x(t)$