Mechanical Vibrations:
$$mu''(t) + \gamma u'(t) + ku(t) = F_{external}, \quad m, \gamma, k \geq 0$$
$$mg - kL = 0, \qquad F_{viscous}(t) = \gamma u'(t)$$

$m=$ mass,

$k =$ spring force proportionality constant,

$\gamma =$ damping force proportionality constant

g $= 9.8$ m/sec