$$m_b\ddot{y}_b + c_b(\dot{y}_b - \dot{y}_j) + k_b(y_b - y_j) = 0$$

$$m_b\ddot{y}_b + c_b(\dot{y}_b - \dot{y}_j) + k_b(y_b - y_j) = 0$$

$m_b$ = mass of the ball

$y_b$ = vertical position of the ball

$y_j$ = vertical position of the string

$c_b$ = damping constant

$k_b$ = spring constant

$\dot{y}_b$ = velocity of the ball

$\dot{y}_j$ = velocity of the string

$\ddot{y}_b$ = acceleration of the ball