Problem 3)

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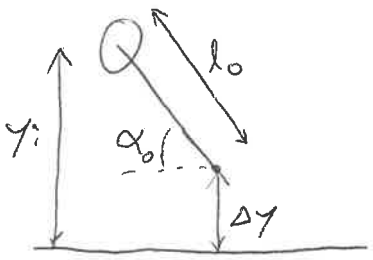

$l_0 = 1, \alpha_0 = 68°$

$l_0 \sin(\alpha_0) = 0.9272$

From minimization.

$m_k = -44808$

$c = 72500$

$$y_i = \Delta y + l_0 \sin(\alpha_0)$$

$$\Delta y = \frac{g}{2}(t - t_{apex})^2$$

$$k(y_i) = m_k y_i + c$$

$$k = m_k(\Delta y + l_0 \sin(\alpha_0)) + c$$

$$k = \frac{m_k g}{2}(t - t_{apex})^2 + m_k l_0 \sin(\alpha_0) + c$$

$$k = 3.0973 \cdot 10^4 - 2.1978 \cdot 10^5 (t - t_{apex})^2$$