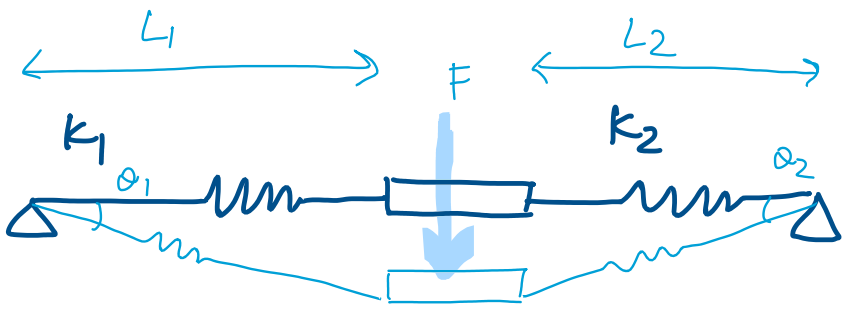
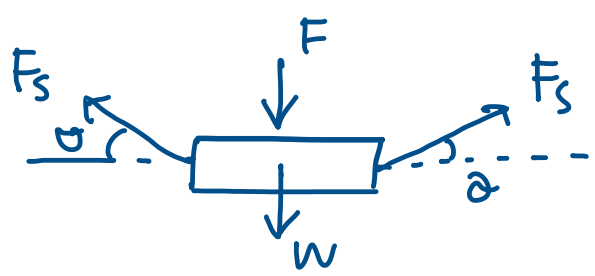
Dynamics

Tuesday, 26 October 2021 9:45 PM



Assuming $k_1 = k_2 = k$, $\theta_1 = \theta_2 = \theta$, $L_1 = L_2 = L$

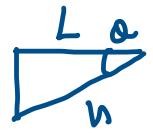


$\Sigma F_x = F_s \cos\theta - F_s \cos\theta = 0$

$F_s = k\Delta x$

$= k(h - L)$

$= kL\left(\frac{1}{\cos\theta} - 1\right)$



$\cos\theta = \frac{L}{h}$

$h = \frac{L}{\cos\theta}$

$\Sigma F_y = M a_Y$

$F_s \sin\theta + F_s \sin\theta - F - W = m a_y$

$2F_s \sin\theta - F - mg = m a_y$

$2\left(kL\left(\frac{1}{\cos\theta} - 1\right)\right)\sin\theta - F - mg = m a_y$

$\frac{2kL\sin\theta}{\cos\theta} - 2kL\sin\theta - F - mg = m a_y$

$2kL(\tan\theta - \sin\theta) - F - mg = m a_y$

$a_y = \frac{2kL(\tan\theta - \sin\theta) - F}{m} - g$