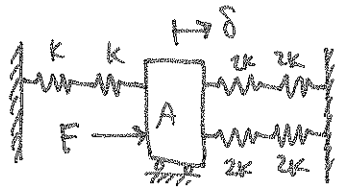


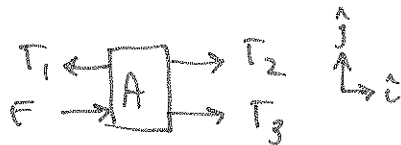
6.1.7. SOLUTION



$F = 50\text{ N}, \delta = 1\text{ cm}$

Find K for equilibrium

FBD of A:



$$\{\sum \vec{F} = \vec{0}\} \cdot \hat{i} \Rightarrow F - T_1 + T_2 + T_3 = 0$$

$\rightarrow T_1 = K_{eq1} \Delta l_1$

$$K_{eq1} = \frac{1}{\frac{1}{K} + \frac{1}{K}} = \frac{K}{2}$$

(compliances add for springs in series: see pg. 329)

$\Delta l_1 = \delta$

$T_1 = \frac{K}{2} \delta$

$\rightarrow T_2 = K_{eq2} \Delta l_2$

$$K_{eq2} = \frac{1}{\frac{1}{2K} + \frac{1}{2K}} = K, \quad \Delta l_2 = -\delta$$

$T_2 = -K\delta$

$\rightarrow T_3 = T_2 = -K\delta$

So: $F - \frac{K}{2}\delta - K\delta - K\delta = 0$

$F = \frac{5}{2} K\delta$

$50\text{ N} = \frac{5}{2} (.01\text{ m}) K$

$K = 2000 \frac{\text{N}}{\text{m}}$