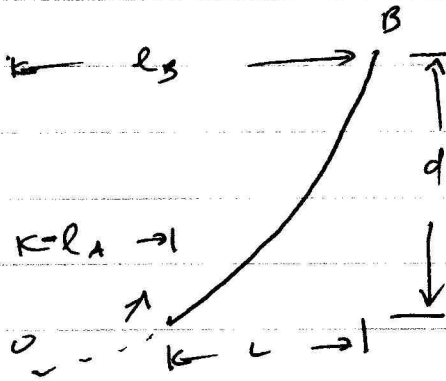


Problem 5-158



$$\mu = 19.62 \text{ N/m}, \quad S = 87 \text{ m}, \quad d = 80 \text{ m}, \quad L = 32 \text{ m}$$

$$\alpha = \frac{\mu L_A}{T_0}, \quad \beta = \frac{\mu L_B}{T_0}, \quad \lambda = \frac{\mu L}{2T_0}$$

Eq. (5) of handout:

$$\frac{\sinh \lambda}{\lambda} = \frac{\sqrt{S^2 - d^2}}{L} = 1.06846$$

By trial and error:  $\lambda = 0.6345$ ;  $2\lambda = 1.2690$

$$T_0 = \frac{\mu L}{2\lambda} = 495 \text{ N}$$

$$\sigma = \frac{2\lambda S/L}{1 - e^{-2\lambda}} = 4.799$$

Note:  $\beta > \alpha$

$$\rightarrow \begin{cases} e^\beta \\ e^\alpha \end{cases} = 4.799 \pm \sqrt{4.799^2 - e^{(1.269)}}$$

$$\alpha = -0.9515, \quad \beta = 2.2205$$

$$\text{Check: } \alpha + \beta = 1.2690 \checkmark$$

$$\begin{aligned} T_A &= T_0 \cosh \alpha = 736 \text{ N} \\ T_B &= T_0 \cosh \beta = 2306 \text{ N} \end{aligned}$$