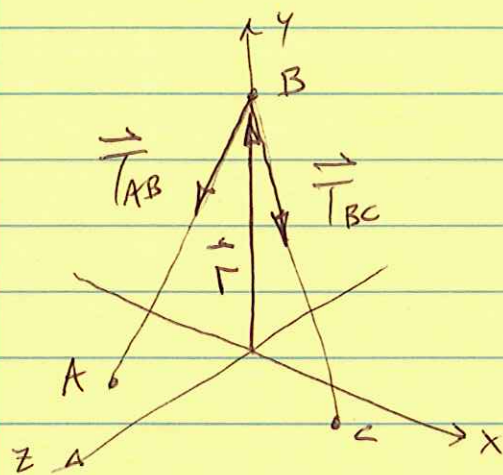


(1)

PROB. 3.21

$$T_{AB} = 555 \text{ N}, \quad T_{BC} = 660 \text{ N}, \quad \text{FIND } \vec{M}_O$$



$$A(-0.75, 0, 6) \text{ m}$$

$$B(0, 7, 0) \text{ m}$$

$$C(4.25, 0, 1) \text{ m}$$

$$\vec{T}_{AB} : dx = x_A - x_B = -0.75 - 0 = -0.75 \text{ m}$$

$$dy = y_A - y_B = 0 - 7 = -7 \text{ m}$$

$$dz = z_A - z_B = 6 - 0 = 6 \text{ m}$$

$$d = \sqrt{0.75^2 + 7^2 + 6^2} = 9.25 \text{ m}$$

$$F_x = F \frac{dx}{d} = (555) \left( \frac{-0.75}{9.25} \right) = -45 \text{ N}$$

$$F_y = F \frac{dy}{d} = (555) \left( \frac{-7}{9.25} \right) = -420 \text{ N}$$

$$F_z = F \frac{dz}{d} = (555) \left( \frac{6}{9.25} \right) = 360 \text{ N}$$

$$\vec{T}_{AB} = (-45)\hat{i} + (-420)\hat{j} + (360)\hat{k} \text{ N}$$

PROB. 3.21 CONT.

(2)

$$\vec{T}_{BC}: dx = x_c - x_B = 4.25 - 0 = 4.25^m$$

$$dy = y_c - y_B = 0 - 7 = -7^m$$

$$dz = z_c - z_B = 1 - 0 = 1^m$$

$$d = \sqrt{4.25^2 + 7^2 + 1} = 8.25^m$$

$$F_x = F \frac{dx}{d} = (660) \left( \frac{4.25}{8.25} \right) = 340^N$$

$$F_y = F \frac{dy}{d} = (660) \left( \frac{-7}{8.25} \right) = -560^N$$

$$F_z = F \frac{dz}{d} = (660) \left( \frac{1}{8.25} \right) = 80^N$$

$$\vec{T}_{BC} = (340)\hat{i} + (-560)\hat{j} + (80)\hat{k}^N$$

$$\vec{R} = \vec{T}_{AB} + \vec{T}_{BC}$$

$$\vec{R} = (-45 + 340)\hat{i} + (-420 - 560)\hat{j} + (360 + 80)\hat{k}^N$$

$$\vec{r} = (7)\hat{j}^m$$

$$\vec{M}_O = \vec{r} \times \vec{R} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 7 & 0 \\ 295 & -980 & 440 \end{vmatrix}$$

PROB. 3.21 CONT.

3

$$\vec{M}_0 = [(7)(440)] \hat{L} + [0 - (7)(295)] \hat{K} \text{ N}\cdot\text{m}$$

$$\vec{M}_0 = (3080) \hat{L} + (-2065) \hat{K} \text{ N}\cdot\text{m}$$