

PROBLEM AP-14**GIVEN:**

If cable AB is subjected to a tension of 700 N, determine the tension in cables AC and AD and the magnitude of the vertical force F .

REQUIRED:

$$F_{AC}, F_{AD}, F$$

SOLUTION:

$$\vec{F}_{AB} = \{200\hat{i} + 300\hat{j} - 600\hat{k}\} \text{ N}$$

$$\vec{F}_{AC} = \{-0.231F_{AC}\hat{i} + 0.308F_{AC}\hat{j} - 0.923F_{AC}\hat{k}\}$$

$$\vec{F}_{AD} = \{-0.333F_{AD}\hat{i} - 0.667F_{AD}\hat{j} - 0.667F_{AD}\hat{k}\}$$

$$\vec{F} = F\hat{k}$$

$$\begin{aligned} \sum \vec{F} = 0 & \quad (200 - 0.231F_{AC} - 0.333F_{AD})\hat{i} \\ & + (300 + 0.308F_{AC} - 0.667F_{AD})\hat{j} \\ & + (-600 - 0.923F_{AC} - 0.667F_{AD} + F)\hat{k} \\ & = 0 \end{aligned}$$

Solving:

$$\begin{aligned} F_{AC} &= 130 \text{ N} \\ F_{AD} &= 510 \text{ N} \\ F &= 1060 \text{ N} \end{aligned}$$

$\begin{aligned} F_{AC} &= 130 \text{ N} \\ F_{AD} &= 510 \text{ N} \\ F &= 1.06 \text{ kN} \end{aligned}$
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