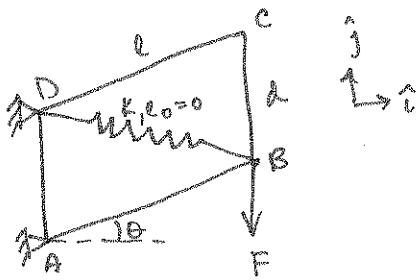


6.3.6 . SOLUTION



Find  $F$  for equilibrium.  
How does  $F$  depend on  $\theta$ ?

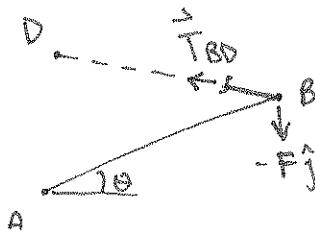
FBD of pt. C:



$$\{\sum \vec{F} = \vec{0}\} \cdot \hat{i} \Rightarrow T_{CD} = 0$$

$$\{\sum \vec{F} = \vec{0}\} \cdot \hat{j} \Rightarrow T_{CB} = 0$$

FBD of bar AB:



$$\sum \vec{M}_{/A} = \vec{0} \Rightarrow \vec{r}_{AB} \times [-F\hat{j} + \vec{T}_{BD}] = \vec{0}$$

$$\vec{T}_{BD} = k \vec{r}_{BD} = k(\vec{r}_{BA} + \vec{r}_{AD})$$

$$\text{so } \vec{r}_{AB} \times [-F\hat{j} + k\vec{r}_{BA} + k\vec{r}_{AD}] = \vec{0}$$

$$\vec{r}_{AB} \times [(kd - F)\hat{j}] = \vec{0}$$

so if  $\vec{r}_{AB}$  is  $\parallel$  to  $\hat{j}$ , then the problem is statically indeterminate. otherwise:

$$kd - F = 0$$

$$\boxed{F = kd}$$
, which does not depend on  $\theta$ .