

Equation of Equilibrium (2-D)

$$\sum F_x = 0$$

$$\sum F_y = 0$$

$$\sum M_o = 0$$

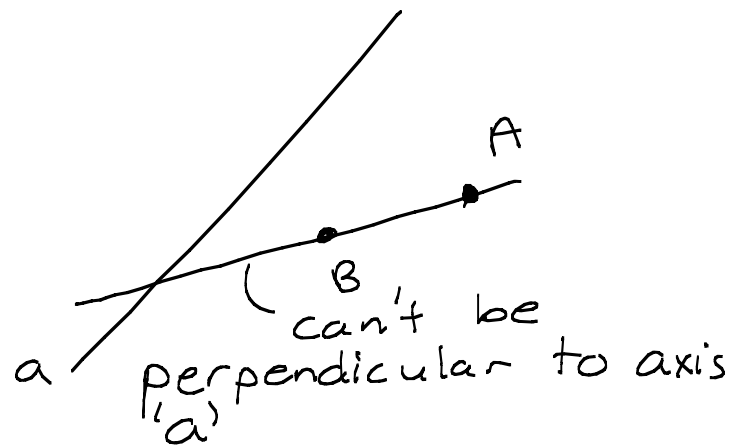
arbitrary
point

Alternate sets

$$\sum F_a = 0$$

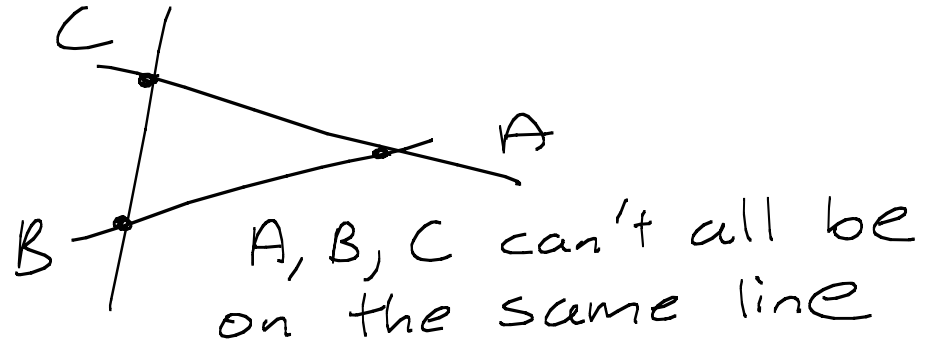
$$\sum M_A = 0$$

$$\sum M_B = 0$$



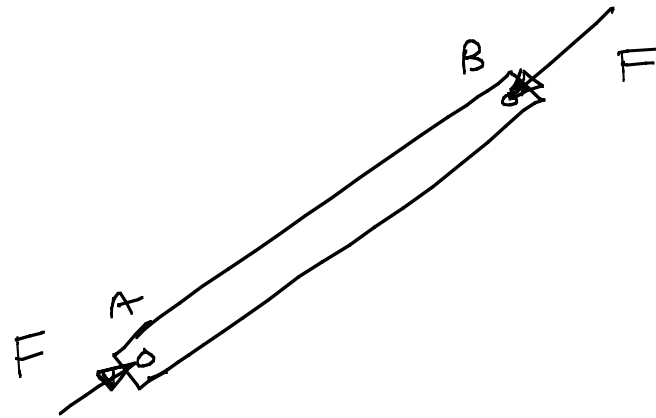
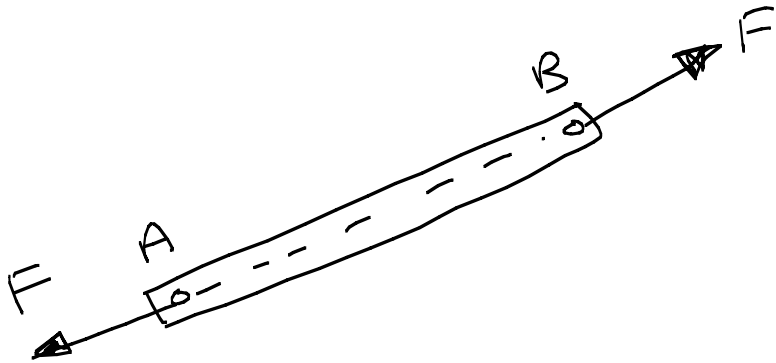
or

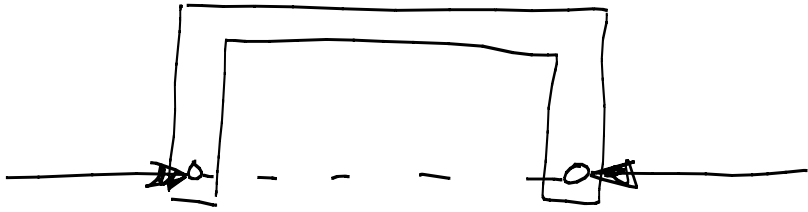
$$\begin{aligned} \sum M_A &= 0 \\ \sum M_B &= 0 \\ \sum M_C &= 0 \end{aligned}$$



Two-Force members

\Rightarrow Forces are applied at only two points
 \Rightarrow No couple moment is produced





Equilibrium in 3-D

Have additional translations & rotations

\Rightarrow Translate in 3-D (x, y, z)

\Rightarrow Rotate in 3-D (Rotate about the x, y, z axes)

Equilibrium

$$\sum \vec{F} = 0$$

$$\sum \vec{M}_O = 0$$

$$\sum F_x = 0$$

$$\sum F_y = 0$$

$$\sum F_z = 0$$

$$\sum M_x = 0$$

$$\sum M_y = 0$$

$$\sum M_z = 0$$

Support Conditions \Rightarrow Table 5-2