ENSC 2113
Engineering Mechanics: Statics

Lecture 18
Sections 5.3-5.4

College of Engineering, Architecture & Technology

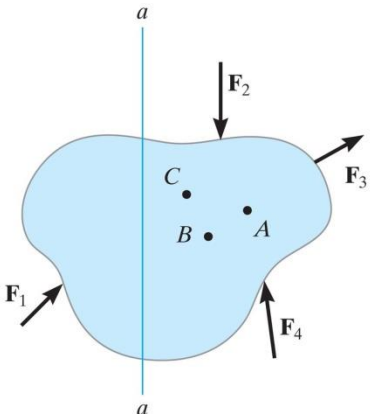
5.3: Equations of Equilibrium

For coplanar (**2-D**) systems, the equilibrium equations are:

$$\rightarrow \sum F_x = 0$$

$$\uparrow \sum F_y = 0$$

$$\circlearrowleft \sum M_z = 0$$



Note: If there are more 3 unknowns, additional equations by way of new **FBD**'s or by special conditions, will be needed to solve for the unknowns.

Procedures for Analysis

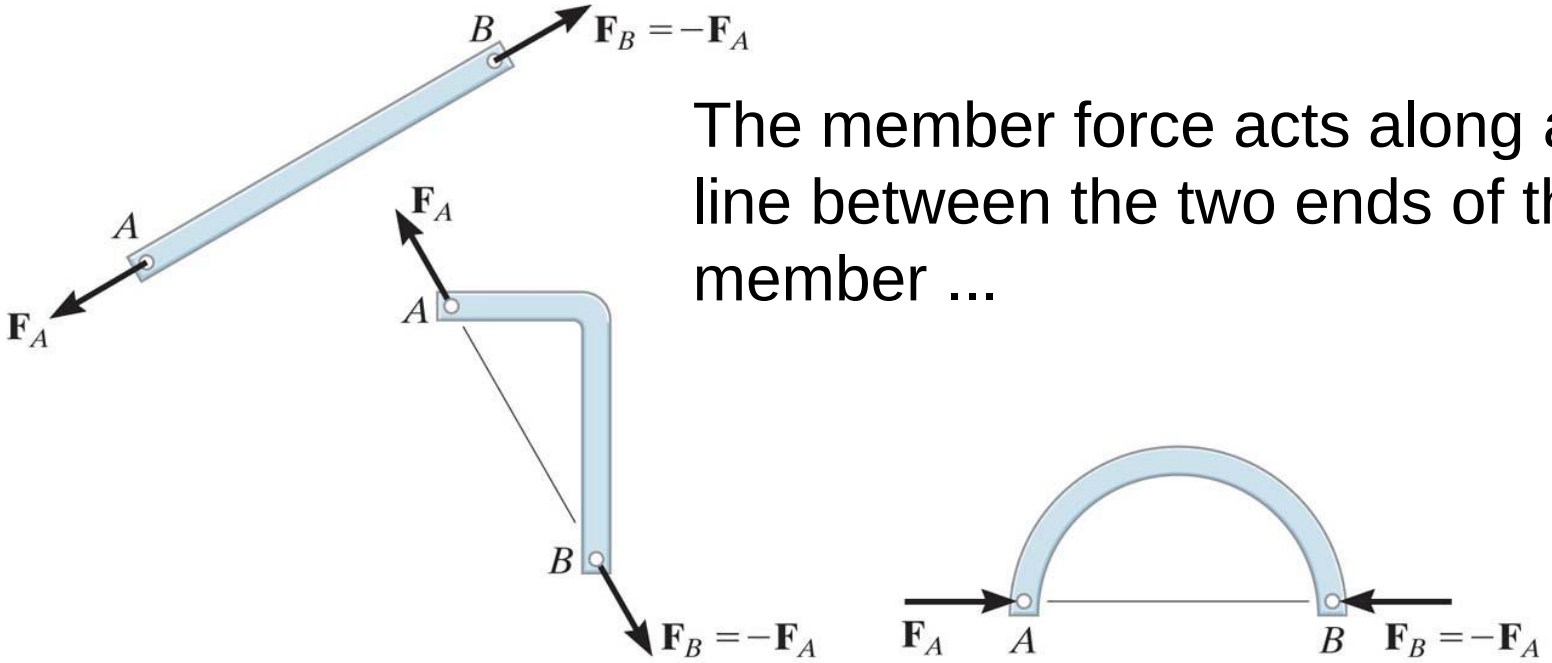
Steps for determining support reactions include:

1) Draw **FBD** for the rigid body, assuming a direction for each unknown support reaction.
2) Apply **ΣM** =0 at a point in which two of the unknown forces pass through, & solve for the remaining unknown.
3) Use eqns. $\Sigma F_X = 0$ or $\Sigma F_Y = 0$ to solve for the remaining unknown support forces.
4) If the solution for an unknown force is negative, then the actual sense of direction is opposite from the assumed direction.

5.4: Two - Force Members

Recognizing these type of members can greatly simplify a problem ...

Two - Force Member: A member with pinned ends in which load is applied only at its ends. Examples:



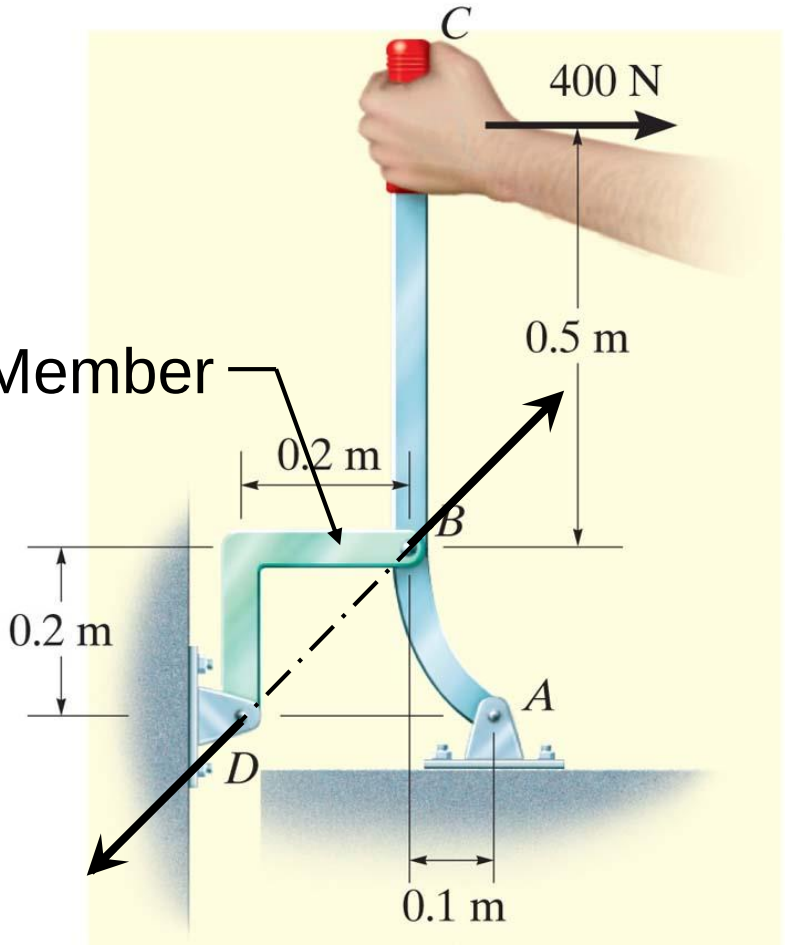
The member force acts along a line between the two ends of the member ...

Two-force members

5.4: Two - Force Members

Two - Force Member:

Two-Force Member



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