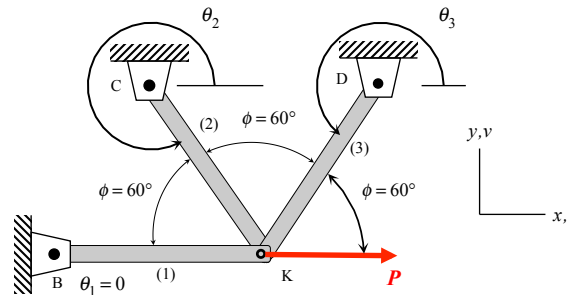


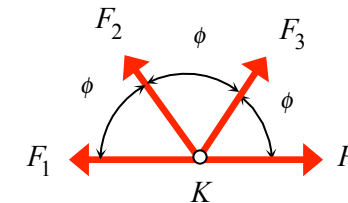
Lecture 8 summary: indeterminate trusses



1. EQUILIBRIUM: FBDs and equilibrium equations

$$(1) \quad K: \sum F_x = -F_2 \cos \phi + F_3 \cos \phi - F_1 + P = 0$$

$$(2) \quad \sum F_y = F_2 \sin \phi + F_3 \sin \phi = 0$$



2. LOAD/DEFORMATION: Recall sign conventions defined in lecture book.

$$(3),(4),(5) \quad e_1 = \frac{F_1 L_1}{E_1 A_1} ; \quad e_2 = \frac{F_2 L_2}{E_2 A_2} ; \quad e_3 = \frac{F_3 L_3}{E_3 A_3}$$

3. COMPATIBILITY*: Enforce the fixed displacement BCs at B and D:

$$(6),(7),(8) \quad e_1 = u_K \cos \theta_1 + v_K \sin \theta_1 ; \quad e_2 = u_K \cos \theta_2 + v_K \sin \theta_2 ; \quad e_3 = u_K \cos \theta_3 + v_K \sin \theta_3$$

4. SOLVE: Solve equations (1)-(8) for the internal loads F_1 , F_2 and F_3 .

* Be mindful of the definitions for the member angles shown above and defined in the lecture book.