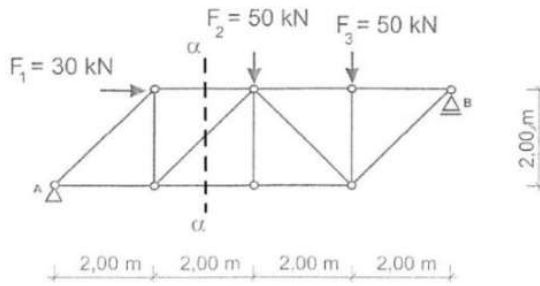
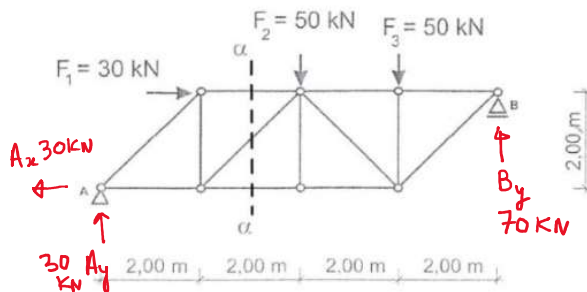


Ritter Method Truss Analysis

2. Please find the forces in members in $\alpha - \alpha$ section using Ritter method.



Step-1: Find the support Reactions:



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$$\sum F_x = 0 : A_x - 30 = 0 \Rightarrow A_x = 30 \text{ kN}$$

$$\sum M_B = 0 : (A_y \times 8) + (30 \times 2) - (50 \times 4) - (50 \times 2) = 0$$

$$\Rightarrow A_y = 30 \text{ kN}$$

$$\sum M_A = 0 :$$

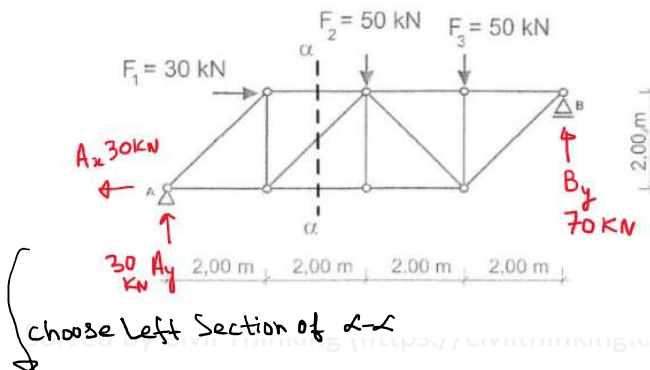
$$(30 \times 2) + (50 \times 4) + (50 \times 6) - (B_y \times 8) = 0$$

$$\Rightarrow B_y = 70 \text{ kN}$$

Check:

$$\sum F_y = 30 - 50 - 50 + 70 = 0 \quad \text{OK}$$

Step-2: Apply Ritter's Method:

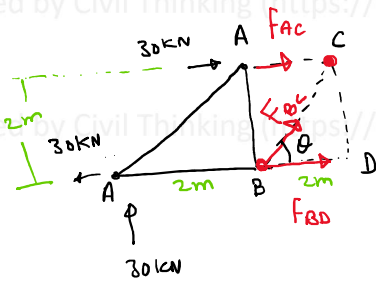


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$$\theta = \tan^{-1}\left(\frac{2}{2}\right) = 45^\circ$$

$$\sum M_B = 0:$$

$$(30 \times 2) + (30 \times 2) + (F_{AC} \times 2) = 0$$

$$\Rightarrow F_{AC} = -60 \text{ kN}$$

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$$\sum M_C = 0:$$

$$(30 \times 4) + (30 \times 2) - (F_{BD} \times 2) = 0$$

$$\Rightarrow F_{BD} = 90 \text{ kN}$$

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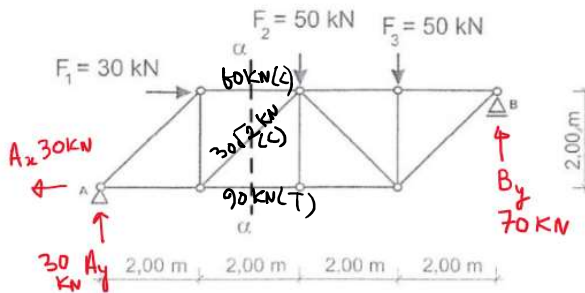
$$\sum F_x = 0:$$

$$-30 + 30 + (-60) + 90 + F_{BC} \cos 45^\circ = 0$$

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$$\Rightarrow F_{BC} = \frac{-30}{\cos 45^\circ} = -30\sqrt{2} \text{ kN}$$

$$\text{check! } \sum F_y = 30 + (-30\sqrt{2} \sin 45^\circ) = 0 \text{ o.k.}$$




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