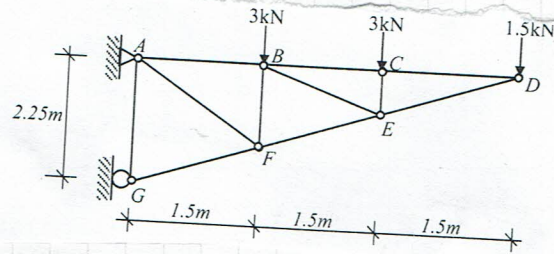


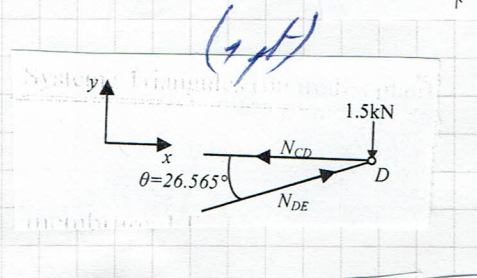
3^e année Génie Civil

CALCUL DES STRUCTURES

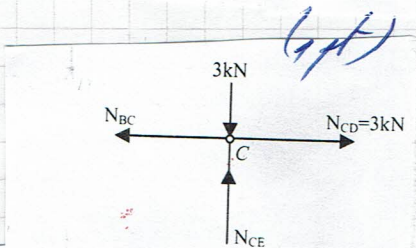
EXERCICE N°



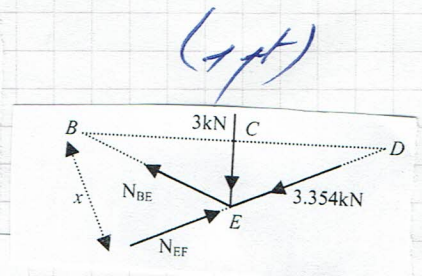
(1 pt)



(1 pt)



(1 pt)



(1 pt)

Solution

- Vérification de la structure :

$$b = 2n - 3$$

$$b = 11$$

$$n = 7 \Rightarrow 11 = 11$$

Donc le système est intérieurement isostatique.

- Equilibre du nœud (D) : deux inconnues N_{CD} & N_{DE}

$$\sum F_y = 0 \text{ Donne } N_{DE} = 3.354 \text{ kN}$$

$$\sum F_x = 0 \text{ Donne } N_{CD} = 3.0 \text{ kN}$$

- Equilibre du nœud (C) : deux inconnues N_{BC} & N_{CE}

$$\sum F_y = 0 \text{ Donne } N_{CE} = 3.0 \text{ kN}$$

$$\sum F_x = 0 \text{ Donne } N_{BC} = 3.0 \text{ kN}$$

- Equilibre du nœud (E) : deux inconnues N_{EF} & N_{BE}

$$\sum M_B = 0 \text{ Donne } N_{EF} = 6.708 \text{ kN}$$

$$\text{Avec : } 3 \cdot BC + 3.354 \cdot x - N_{EF} \cdot x = 0$$

$$\text{Et } x = 3 \cdot \sin \theta$$

(1 pt)

(1 pt)

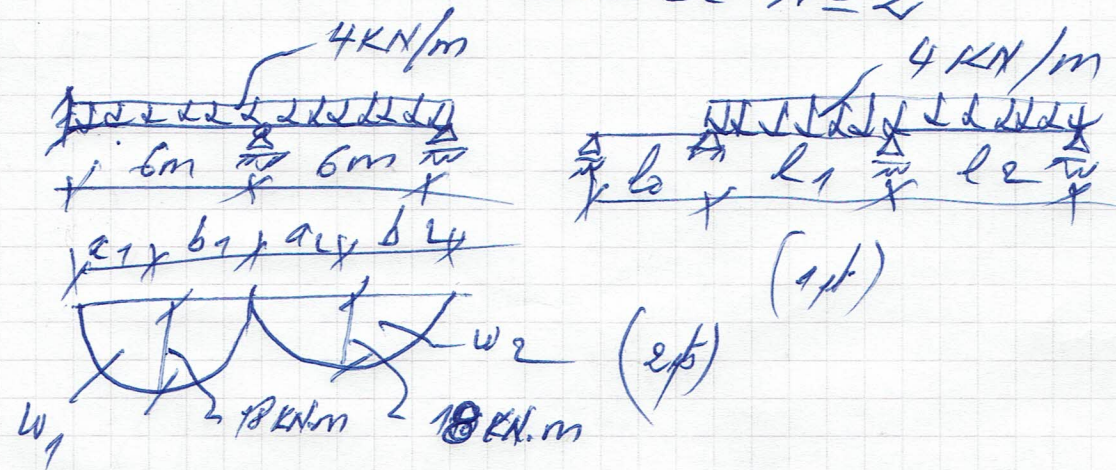
(1 pt)

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3^e Année Génie civil
Calcul des structures

EXERCICE N° 2



$$M_0 \cdot l_0 + 2M_1(l_0 + l_1) + M_2 l_1 = -6(w_0 a_0/l_0 + w_1 b_1/l_1) \quad (1 \text{ pt})$$

$$M_0 l_1 + 2M_1(l_1 + l_2) + M_2 l_2 = -6(w_1 a_1/l_1 + w_2 b_2/l_2)$$

$$w_0 = 0, \quad w_1 = w_2 = \frac{4}{3} \cdot 6 \cdot 18 = 72 \text{ kN.m}^2$$

$$a_1 = b_1 = a_2 = b_2 = 3 \text{ m} \quad (1 \text{ pt})$$

$$(1 \text{ pt}) \quad (1 \text{ pt}) \quad M_1 = 0, \quad M_2 = 0, \quad l_0 = 0$$

$$12 M_0 + 6 M_1 = -6 \cdot 72 \cdot \frac{3}{6} = -216$$

$$2 M_0 + M_1 = -36 \quad (1 \text{ pt})$$

$$6 M_0 + 24 M_1 = -6 \left(72 \cdot \frac{3}{6} + 72 \cdot \frac{3}{6} \right) = -432$$

$$M_0 + 4 M_1 = -72$$

$$M_0 = -10,3 \text{ kN.m} \quad (0,5 \text{ pt})$$

$$M_1 = -15,4 \text{ kN.m} \quad (0,5 \text{ pt})$$

