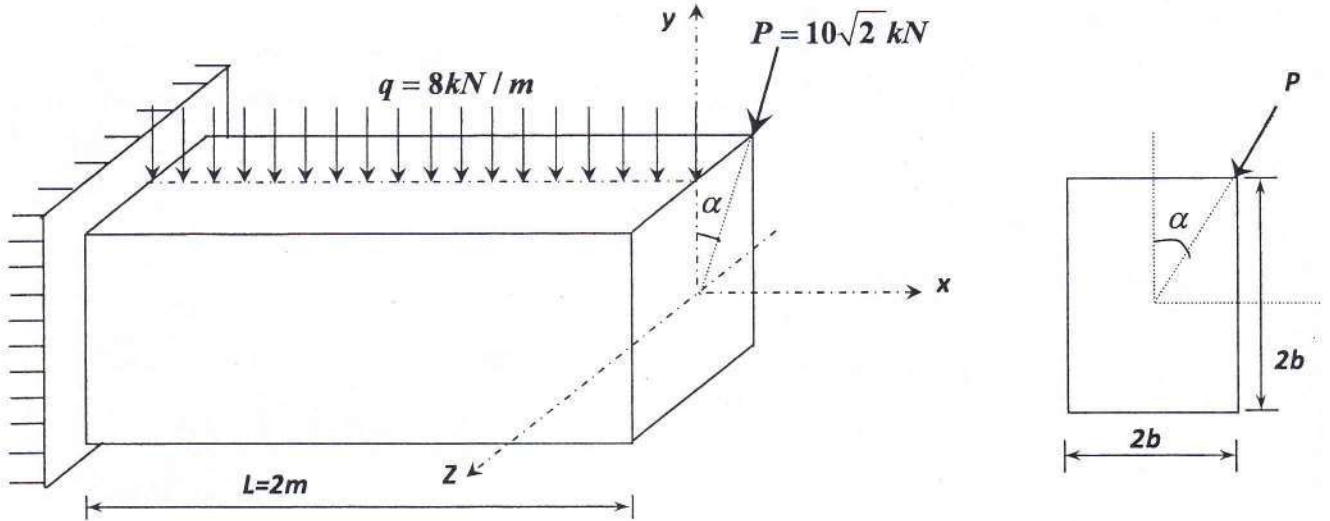


83

EMD

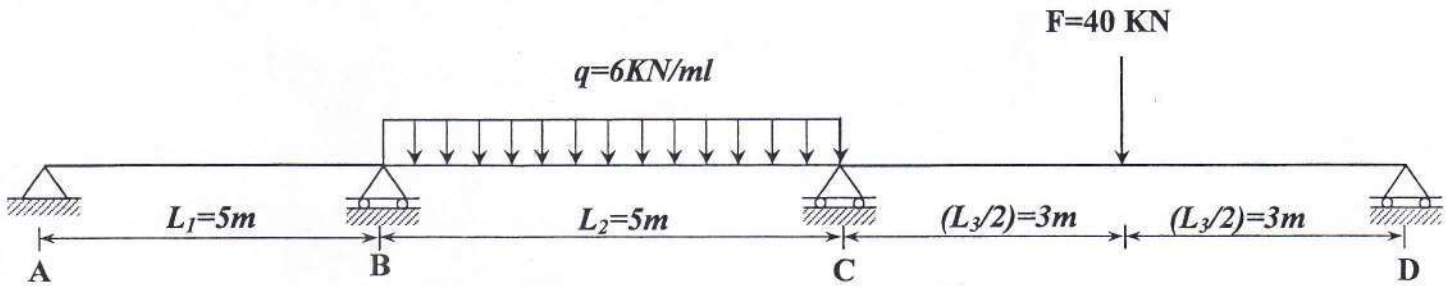
Exercice 01 : (6points)

- 1) Tracer les diagrammes M_y, T_y, M_z, T_z ?
- 2) Trouver les dimensions de la section transversale ci-après selon la condition de la résistance ? où $[\sigma] = 16 \text{ KN/cm}^2$
- 3) Trouver l'expression de l'équation d'axe neutre ?



Exercice 02 : (8points)

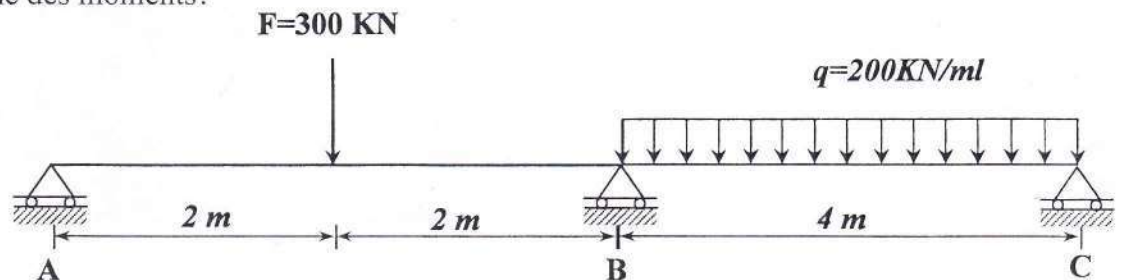
En utilisant la méthode des trois moments, déterminés les moments en appuis seul.



Exercice 01 : (6points)

Si le moment au appui B égal : $M_B = - 312.5 \text{ KN.m}$,

- 1) Trouver les moments en travées ?
- 2) Tracer le diagramme des moments?



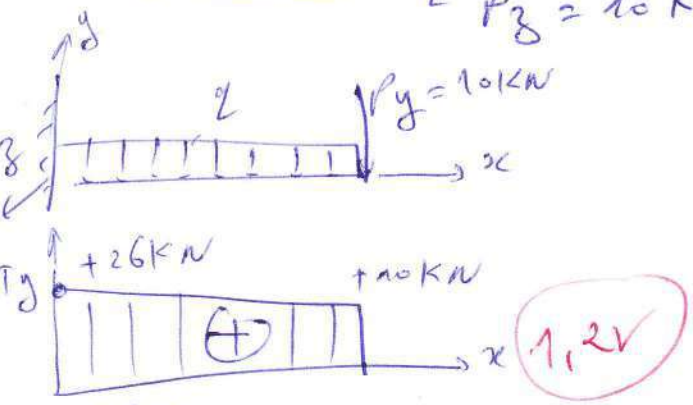
Bonne chance

Model: poutres et treillis

correction EMD

EX01: $\alpha = 45^\circ$

$P_y = 10 \text{ kN}$
 $P_z = 10 \text{ kN}$



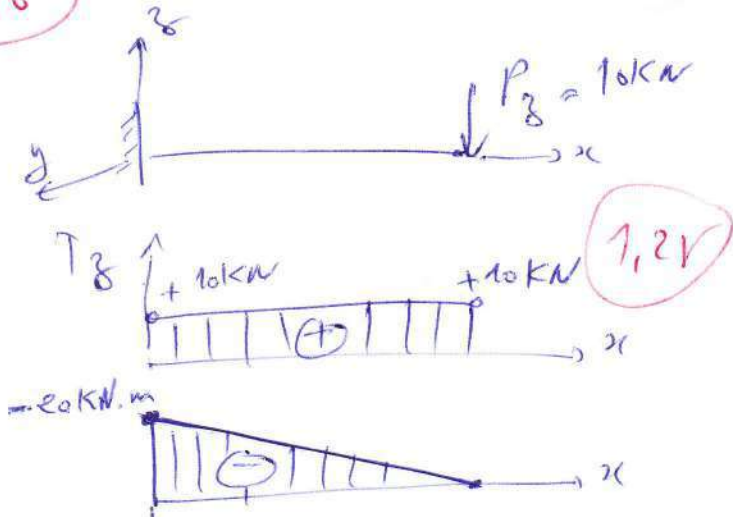
$M_z(x) = -10x - 4x^2$

$M_z(0) = 0$
 $M_z(l) = -36 \text{ kN.m}$

$T_y(x) = 10 + 8x$
 $T_y(0) = 10 \text{ kN}$
 $T_y(l) = 10 \text{ kN}$

$\sigma_{max} = \frac{|M_{zmax}|}{W_z} + \frac{|M_{ymax}|}{W_y} \leq [\sigma] \Rightarrow$
 $\Rightarrow b \geq 6,403 \text{ cm} \Rightarrow e b \geq 6,5 \text{ cm}$

$y = -\frac{5}{3} z$



$M_y(x') = -10x'$
 $M_y(0) = 0$
 $M_y(l) = -20 \text{ kN.m}$

$T_z(x') = 10 \text{ kN}$
 $T_z(0) = +10 \text{ kN}$
 $T_z(l) = +10 \text{ kN}$

$M_{zmax} = -36 \text{ kN.m}$
 $M_{ymax} = -20 \text{ kN.m}$

EX02:

$i=1 \Rightarrow \left(\frac{5}{3EI} + \frac{5}{3EI}\right) M_1 + \frac{5}{6EI} M_2 = -|w_2| - (1) - 1,00$

$i=2 \Rightarrow \frac{5}{6EI} M_1 + \frac{11}{3EI} M_2 = -|w_3 + w_2| - (2) - 1,00$

avec: $w_2 = \frac{9l^3}{24EI}$

$w_3 = \frac{Fl^2}{16EI}$

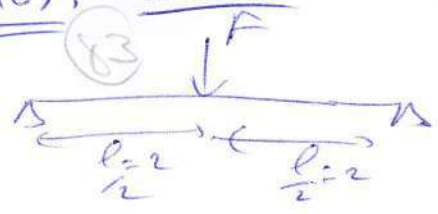
$\Rightarrow M_1 = -1,17 \text{ kN.m}$

$M_2 = -32,80 \text{ kN.m}$

Exo 3: travé AB:

$0 \leq x \leq 2 \text{ m}$

1,2V



$M_2(x) = 150x \Rightarrow M_{k2}(x) = 71,87x$

$M_{k2}(0) = 0$
 $M_{k2}(2) = 143,74$

pour $2 \leq x \leq 4 \text{ m}$:

$M_2(x) = 600 - 150x$

$M_{k2}(x) = 600 - 228,12x$

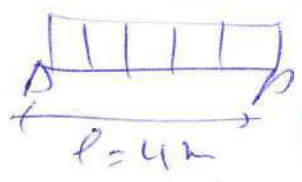
$M_{k2}(2) = 143,74 \text{ KN.m}$
 $M_{k2}(4) = -312,1 \text{ KN.m}$

$M_{k2}(x) = 0 \Rightarrow x = 2,63 \text{ m} \in [2, 4]$

0,2V

travé BC:

$0 \leq x \leq 4 \text{ m}$



0,7V

$M_3(x) = 400x - 100x^2 \Rightarrow M_{k3}(x) = 478,12x - 100x^2 - 312,1$

$M_{k3}(x) = 478,12x - 100x^2 - 312,1$

$M_{k3}(0) = -312,1 \text{ KN.m}$
 $M_{k3}(4) = 0$

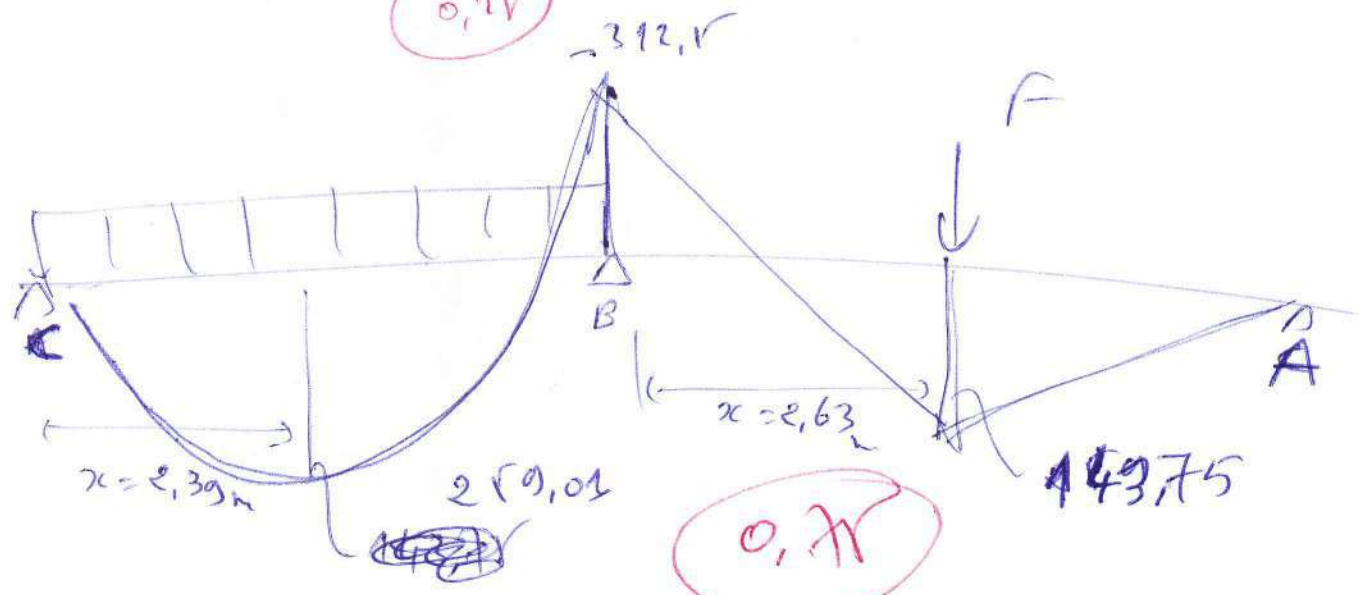
0,7V

$M_{k3}(x) = \text{max} \Rightarrow x = 2,39 \text{ m}$

$M_{k \text{ max}}(x = 2,39) = 259,01 \text{ KN.m}$

0,2V

0,2V



0,7V