analogie flexion – torsion


condition aux limites :

en $x=0$

$\varphi = 0$ | $v = 0$
$\varphi' = 0$ | $v' = 0$
$M_\omega \neq 0$ $(M_\omega < 0)$ | $M \neq 0$ $(M < 0)$

en $x=L$

$\varphi \neq 0$ | $v \neq 0$
$\varphi' \neq 0$ | $v' \neq 0$
$M_\omega = 0$ | $M = 0$

→ on peut utiliser l'analogie

à l'encastrement :

$M_\omega = M_t \cdot L = -20 \cdot 1 = -20 \text{ kN} \cdot m^2$

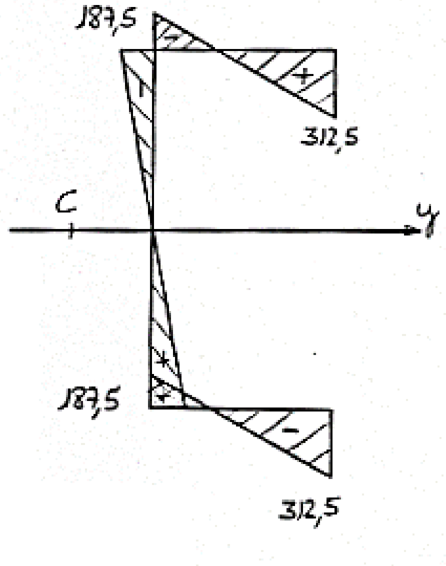
$T_\omega = M_t = 20 \text{ kN} \cdot m$

contraintes normales:

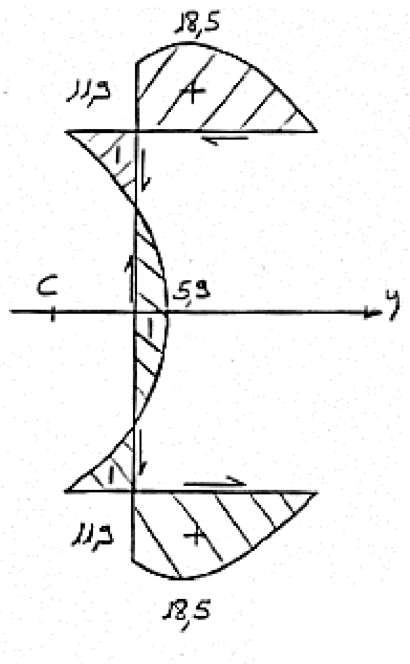
$$\sigma_\omega = \frac{M_\omega}{I_\omega} \cdot \omega = \frac{-20 \cdot 10^3}{1{,}4444 \cdot 10^6} \cdot \omega \cdot 10^{-4} = -1{,}385 \cdot 10^6 \omega \left[\frac{N}{m^2}\right]$$

contraintes tangentielles:

$$\tau_\omega = -\frac{T_\omega \tilde{S}_\omega}{t\, I_\omega} = -\frac{20 \cdot 10^3}{2 \cdot 10^{-2} \cdot 1{,}4444 \cdot 10^6} \tilde{S}_\omega \cdot 10^{-8} = -6{,}923 \cdot 10^3 \tilde{S}_\omega \left[\frac{N}{m^2}\right]$$




$\sigma_\omega \left[\frac{N}{mm^2}\right]$




$\tau_\omega \left[\frac{N}{mm^2}\right]$