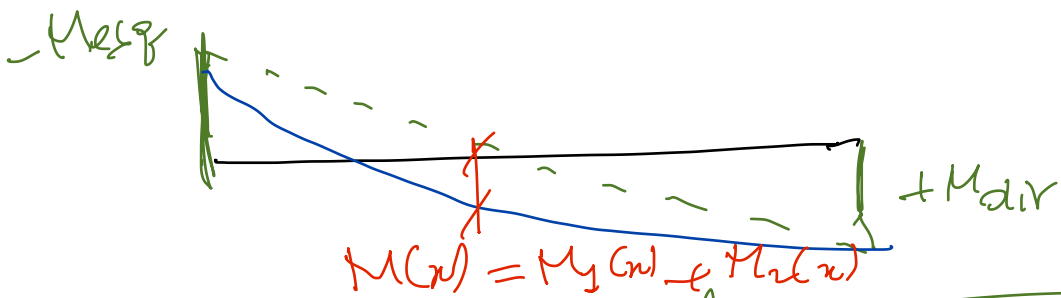


Convenções de treçado

Diagrama de momentos flectores



$$M(x) = M_1(x) + M_2(x)$$

$$M_1(x) = -M_{essg} \frac{l-x}{l} + M_{dir} \frac{x}{l}$$



$$\left(\frac{d^2 M}{dx^2} = 0 \right)$$

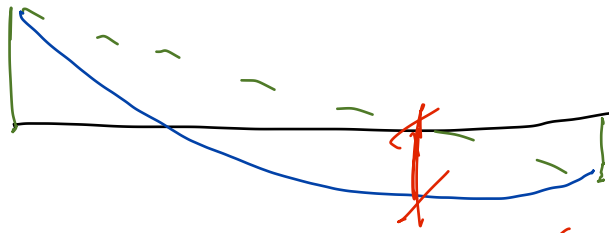
$$\frac{d^2 M}{dx^2} = -q(x) \text{ (equil.)}$$

$$q(x) = \text{const.}$$

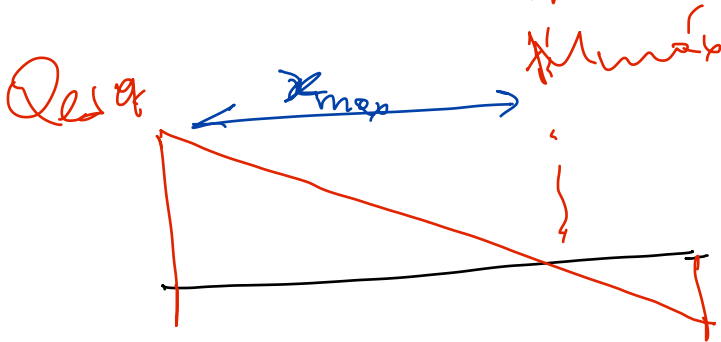
$$M(x) = ax^2 + bx + c$$

$$M_2(x) = \frac{q}{2} x^2 - \frac{q}{2} x^2$$

Momento flector máximo en los



$$M = M_1 + M_2$$



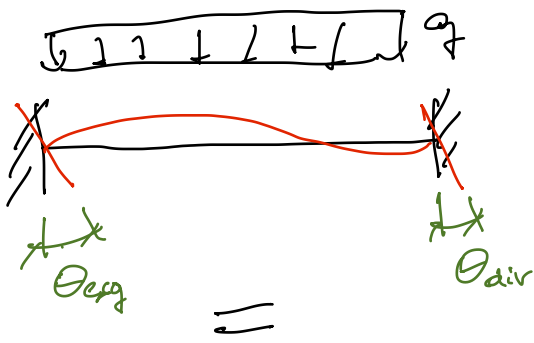
$$Q = Q_{esq} - q \cdot x$$

$$Q_{esq} = \frac{M_{esq} + M_{dir}}{l} + \frac{q \cdot l}{2}$$

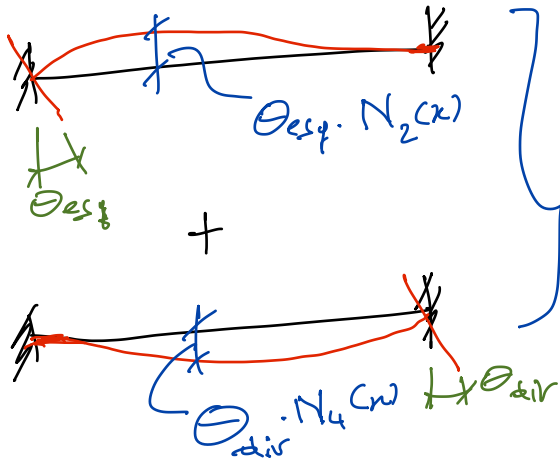
$$x_{max} \rightarrow Q(x) = 0$$

$$x_{max} = \frac{Q_{esq}}{q}$$

Configurações de forma (elástica em cada vez)

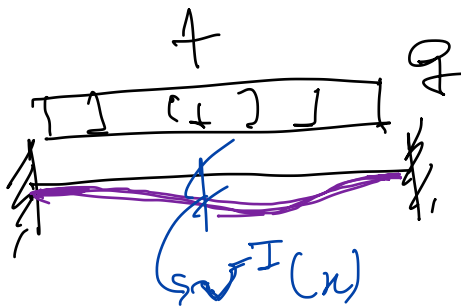


$$v(x) = v^I(x) + v^{II}(x)$$



$$v^{II}(x) = \theta_{esq} \cdot N_2(x) + \theta_{dir} \cdot N_4(x)$$

($q=0 \Rightarrow N_2(x)$ e $N_4(x)$ são polinômios do 3º grau)



$v^I(x) \rightarrow$ soluções de engastamento perfeito

Eqn. de compatibilidade:

$$\left[\frac{d^2 v}{dx^2} = \frac{M}{EI} \right] + \left[\frac{dM}{dx} = -q \right] \Rightarrow (EI = \text{const.})$$

equilíbrio

Módulo Elástico
 $I \rightarrow$ mom. inércia das seções transversais

$$\Rightarrow \left[\frac{d^4 v}{dx^4} = -\frac{q}{EI} \right]$$

$q = \text{const.} \Rightarrow v(x) \rightarrow$ polinômio do 4º grau