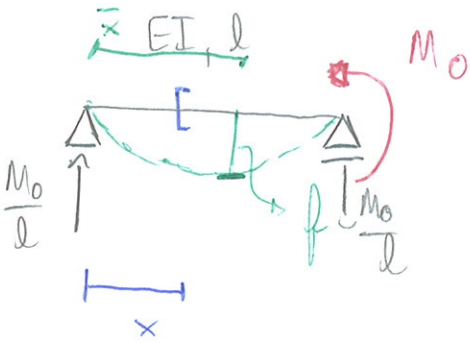
Isabela Adel V. K de Almeida nUSP: 9838498

Exercício - 27/10/17



$$M = \frac{M_0 \cdot x}{l}, \quad 0 \le x \le l$$

$$v'' = -\frac{M}{EI} = -\frac{M_0 \cdot x}{EI \cdot l} \Rightarrow v' = -\frac{M_0}{EIl} \cdot \left(\frac{x^2}{2} + C_1\right) \Rightarrow$$

$$\Rightarrow \boxed{v = -\frac{M_0}{EI \cdot l} \cdot \left(\frac{x^3}{6} + C_1 x + C_2\right)}$$

* Condições de contorno

$$\begin{cases} v(0) = 0 \Rightarrow \boxed{C_2 = 0} \\ v(l) = 0 \Rightarrow \frac{l^3}{6} + C_1 \cdot l = 0 \Rightarrow \boxed{C_1 = -\frac{l^2}{6}} \end{cases}$$

$$* \; v'(\bar{x}) = 0 \Rightarrow \frac{\bar{x}^2}{2} - \frac{l^2}{6} = 0 \Rightarrow \bar{x}^2 = \frac{l^2}{3} \Rightarrow \boxed{\bar{x} = \frac{l\sqrt{3}}{3}}$$

$$* \; f = v(\bar{x}) \Rightarrow f = -\frac{M_0}{EI \cdot l} \cdot \left(\frac{l^3\sqrt{3}}{54} - \frac{l^3\sqrt{3}}{18}\right) \Rightarrow \boxed{f = \frac{\sqrt{3} \cdot M_0 \cdot l^2}{27 EI}}$$