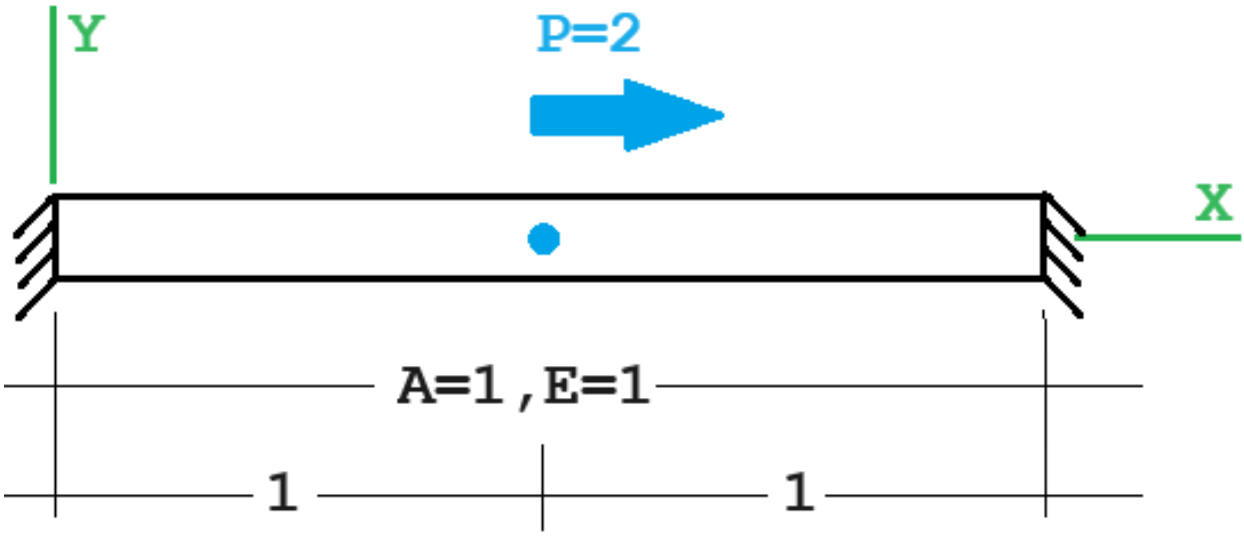


Resolver la deformación y esfuerzo del ejercicio con aproximación cuadrática:

#1: [CaseMode := Sensitive, InputMode := Word]

#2: $u(x) := a1 + a2 \cdot x + a3 \cdot x^2$

#3: $\begin{bmatrix} u(0) = 0 \\ u(2) = 0 \end{bmatrix}$

#4: $\begin{bmatrix} a1 = 0 \\ a1 + 2 \cdot a2 + 4 \cdot a3 = 0 \end{bmatrix}$

#5: $\text{SOLVE}\left(\begin{bmatrix} a1 = 0 \\ a1 + 2 \cdot a2 + 4 \cdot a3 = 0 \end{bmatrix}, [a1, a2]\right)$

#6: $[a1 = 0 \wedge a2 = -2 \cdot a3]$

#7: $u(x) := 0 + (-2 \cdot a3) \cdot x + a3 \cdot x^2$

#8: $u(x) := a3 \cdot x^2 - 2 \cdot a3 \cdot x$

Energía potencial total:

#9: $\Pi = \frac{1}{2} \cdot \int_0^2 A \cdot E \cdot \left(\frac{d}{dx} u(x)\right)^2 dx - 2 \cdot u(1)$

#10: $\Pi = \frac{1}{2} \cdot \int_0^2 \left(\frac{d}{dx} u(x) \right)^2 dx - 2 \cdot u(1)$

#11: $\Pi = \frac{4 \cdot a3^2}{3} + 2 \cdot a3$

Minimización de la energía potencial:

#12: $\frac{d}{d\ a3} \left(\frac{4 \cdot a3^2}{3} + 2 \cdot a3 \right) = 0$

#13: $\text{SOLVE}\left(\frac{d}{d\ a3} \left(\frac{4 \cdot a3^2}{3} + 2 \cdot a3 \right) = 0,\ a3 \right)$

#14: $a3 = -\frac{3}{4}$

#15: $u(x) := 0 + \left(-2 \cdot \left(-\frac{3}{4} \right) \right) \cdot x + \left(-\frac{3}{4} \right) \cdot x^2$

#16: $u(x) := \frac{3 \cdot x}{2} - \frac{3 \cdot x^2}{4}$

#17: $u1 = u(1)$

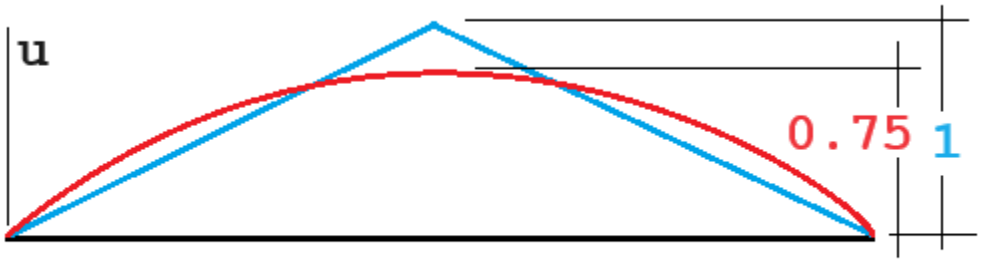
#18: $u1 = \frac{3}{4}$

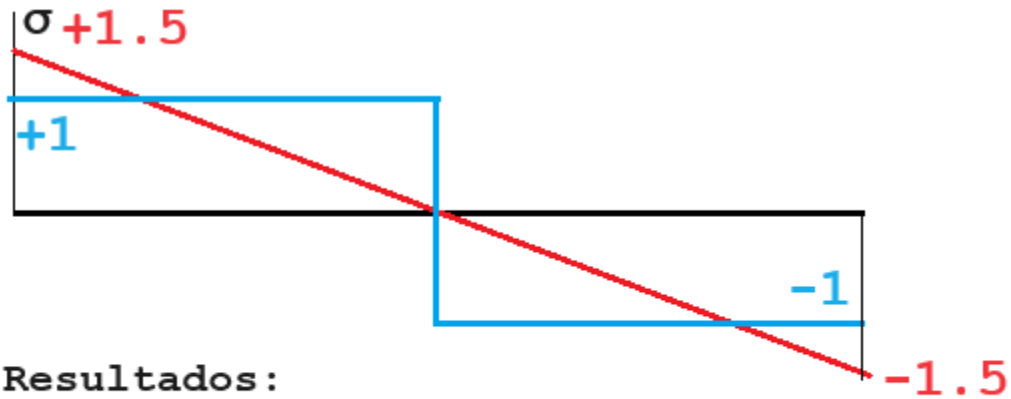
Esfuerzo axial puro:

#19: $\sigma(x) := E \cdot \frac{d}{dx} u(x)$

#20: $\sigma(x) := 1 \cdot \frac{d}{dx} u(x)$

#21: $\sigma(x) := 1.5 \cdot (1 - x)$





Resultados:

Mecánica de materiales

Aproximación polinómica