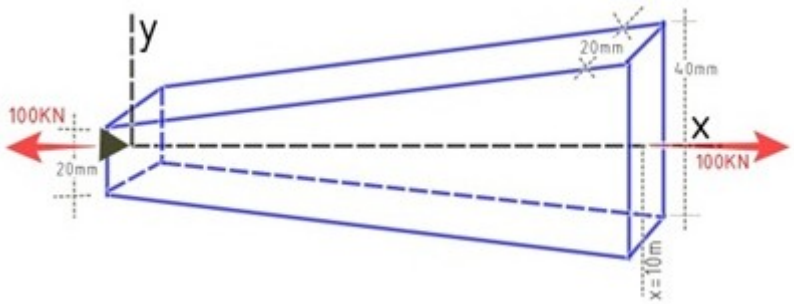


Encuentre los esfuerzos y deformaciones axiales (eje x) en todo el elemento

Módulo de elasticidad E=200x10^9 Pa

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

Módulo de elasticidad en KN/mm2:

$$\#2: \quad E := 200 \cdot 10^{9} \cdot \frac{1}{1000} \cdot \frac{1}{1000^{2}}$$

$$\#3: \quad E := 200$$

Altura del elemento y(x):

#4: y :=

$$\#5: \quad \frac{\frac{40}{2} - \frac{20}{2}}{10 \cdot 1000} = \frac{y - \frac{20}{2}}{x}$$

$$\#6: \quad y = \frac{x}{1000} + 10$$

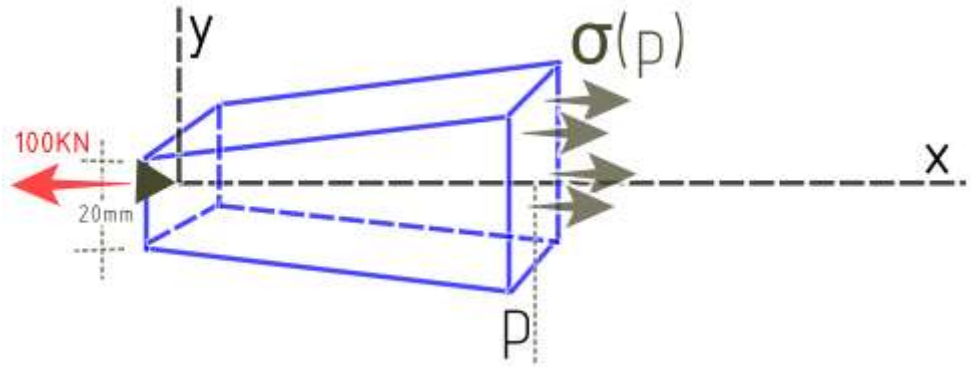
Área del elemento en el punto y(x):

#7: A := (2·y)·20

$$\#8: \quad A := \left(2 \cdot \left(\frac{x}{1000} + 10\right)\right) \cdot 20$$

$$\#9: \quad A := \frac{x}{25} + 400$$

Esfuerzo σ(p) y deformación u(p) del elemento en el punto p:



Equilibrio:

#10: $\sigma \cdot A = 100$

#11: $\left[\frac{\partial(u)}{\partial(x)} = \varepsilon,\ \partial(u) = \varepsilon \cdot \partial(x),\ \sigma = E \cdot \varepsilon,\ \frac{100}{A} = E \cdot \varepsilon,\ \varepsilon = \frac{100}{A \cdot E} \right]$

#12: $\left[\frac{\partial(u)}{\partial(x)} = \frac{100}{A \cdot E},\ \partial(u) = \frac{100}{A \cdot E} \cdot \partial(x) \right]$

#13: $\int_0^p u\ du = \int_0^p \frac{100}{A \cdot E}\ dx$

#14: $\left[u_p - u_0 = \frac{100}{E} \cdot \int_0^p \frac{1}{A}\ dx,\ u_0 = 0 \right]$

#15: $$u_p = \frac{100}{E} \cdot \int_0^p \frac{1}{\frac{x}{25} + 400}\ dx$$

#16: $$u_p = \frac{100 \cdot 25}{E} \cdot \int_0^p \frac{1}{x + 10000}\ dx$$

#17: $$u_p = \frac{25 \cdot LN\left(\frac{p + 10000}{10000} \right)}{2}$$

Deformación en mm en el punto extremo, p=10m:

#18: $u_{10 \cdot 1000} = \frac{25 \cdot LN(2)}{2}$

#19: $u_{10 \cdot 1000} = 8.664339756$