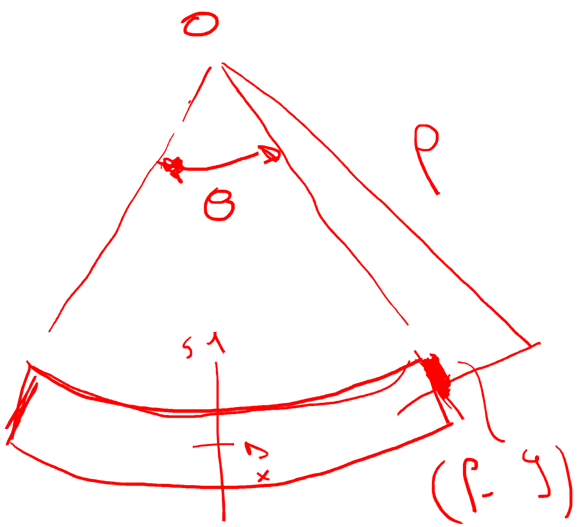


$$\varepsilon = \frac{\delta \ell}{\ell} = \frac{(\cancel{\rho} - y)\theta - \cancel{\rho\theta}}{\rho\theta} = -\frac{y}{\rho}$$

lunghezza configurazione iniziale

$$\varepsilon_{max} = \frac{c}{\rho}$$

maximum distance

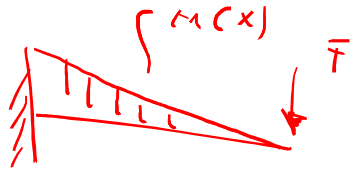
Radius of curvature

$$\varepsilon_{max} = \frac{c}{\rho} = \frac{\sigma_{max}}{E} \; ; \quad \frac{M_f}{EI} c = c/\rho$$

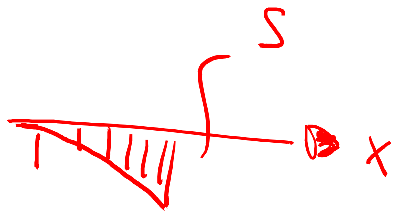
$$\Rightarrow \frac{1}{\rho} = \frac{M_f}{EI}$$

Curvature in a beam

$$\frac{1}{\rho} = \frac{M}{EI}$$



$$\Rightarrow \quad \frac{1}{\rho}(x) = \frac{M(x)}{EI}$$



$$\frac{1}{\rho} = \underset{v}{\kappa} = \frac{\frac{d^2 s}{dx^2}}{\left(1 + \underbrace{\left(\frac{ds}{dx}\right)^2}_{\to 0}\right)^{3/2}} = \frac{d^2 s}{dx^2}$$

$$\frac{ds}{dx} \to 0$$

(θ locale

$$\frac{d^2 s}{dx^2} = \frac{M(x)}{EI}$$

→ momento interno

→ rigidezza flessionale

La equazione della linea elastica

$$\frac{d^4 s}{dx^4} = -\frac{q(x)}{EI}$$

→ carico distribuito

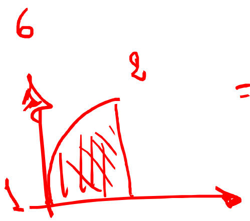
$$E = \int_0^{\varepsilon_f} \sigma \, d\varepsilon = \int_0^{\varepsilon_f} de$$

$$\Rightarrow \sigma = \frac{M}{I} z, \quad de = \frac{M}{EI}\,\frac{M}{I}\, z \, dz$$

$$\Rightarrow \varepsilon = \frac{M}{EI} z, \quad = \frac{M^2}{EI^2} z \, dz \Rightarrow$$

$$E\big|_A = \frac{1}{2}\,\frac{M^2}{EI}$$

$$E_A = \frac{1}{2}\int_A \frac{M^2}{EI^2}\, z\, z \, dA = \frac{1}{2}\,\frac{M^2}{EI^2}\underbrace{\int_A z^2 \, dA}_{I}$$



$$\Rightarrow \int_0^{\varepsilon} \sigma \, d\varepsilon$$

$$E \int_0^{\varepsilon \to \sigma} \frac{M z}{I}\,\frac{M}{EI}\, dz = \underbrace{\frac{M^2}{EI^2}\,\frac{1}{2} z^2}_{de \to \,|_{sezione}} \Rightarrow \boxed{E_A = \frac{1}{2}\,\frac{M^2}{EI}}$$

$$E\big|_{sezione} = \int_A de = \frac{1}{2}\int_A \frac{M^2}{EI^2} z^2 \, dA = \frac{1}{2}\,\frac{M^2}{EI^2}\int_A z^2 \, dA = \frac{1}{2}\,\frac{M^2}{EI}$$