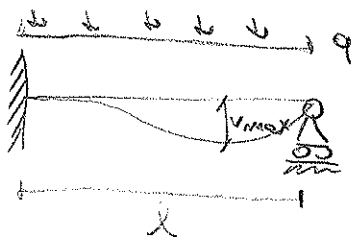


ESERCITAZIONE LINE ELASTICA



$$\begin{cases} N' + q_1 = 0 \\ T' + q_2 = 0 \\ M' + T = 0 \end{cases} \quad \begin{cases} \epsilon = u \\ v' = p \\ \chi = p' \end{cases} \quad \begin{cases} N = EA \epsilon \\ M = EI \chi \end{cases}$$

OP di Bilancio CONTIGUENZA Legame costitutivo

$$\begin{cases} \frac{dN}{ds} + q_1 = 0 \\ N = EA \epsilon \\ \epsilon = \frac{du}{ds} \end{cases}$$

$$\begin{cases} \frac{dT}{ds} + q_2 \\ \frac{dM}{ds} + T \\ M = EI \chi \\ \chi = \frac{dp}{ds} \\ p = \frac{dv}{ds} \end{cases}$$

$$\begin{aligned} \frac{dT}{ds} + q_2 &= 0 \Rightarrow T = -\frac{dq_2 M}{ds} \\ \frac{d}{ds} \left(-\frac{dq_2 M}{ds} \right) + q_2 &= 0 \Rightarrow -\frac{d^2 M}{ds^2} + q_2 = 0 \end{aligned}$$

Sostituisco p a χ

$$\chi = \frac{dp}{ds} \Rightarrow \chi = \frac{d^2 v}{ds^2}$$

$$M = EI \chi = EI \frac{d^2 v}{ds^2}$$

$$\frac{d^2 M}{ds^2} = q_2 \Rightarrow \frac{d^2}{ds^2} \left(EI \frac{d^2 v}{ds^2} \right) = q_2$$

$$EI \frac{d^4 v}{ds^4} = q_2 \Rightarrow \frac{d^4 v}{ds^4} = \frac{q_2}{EI}$$

Mi lavoro V integrando:

$$\frac{d^3 v}{ds^3} = \frac{q_2}{EI} \quad \lambda + c_1$$

$$\frac{d^2 v}{ds^2} = \frac{q_2 s^2}{2EI} + c_1 s + c_2$$

$$\frac{dv}{ds} = \frac{q_2 s^3}{6EI} + \frac{c_1 s^2}{2} + c_2 s + c_3$$

$$\left[V(s) = -\frac{q_2 s^4}{24EI} + \frac{c_1 s^3}{6} + \frac{c_2 s^2}{2} + c_3 s + c_4 \right]$$