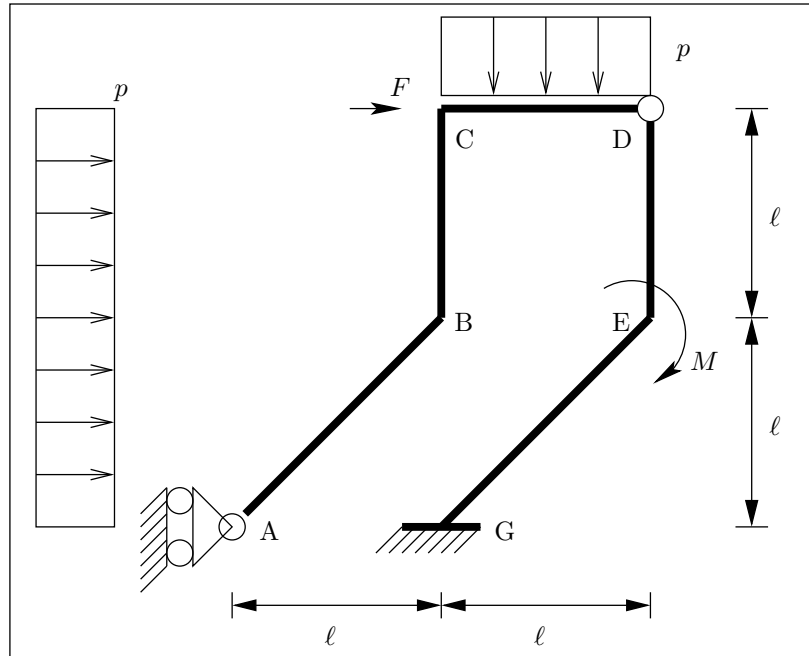


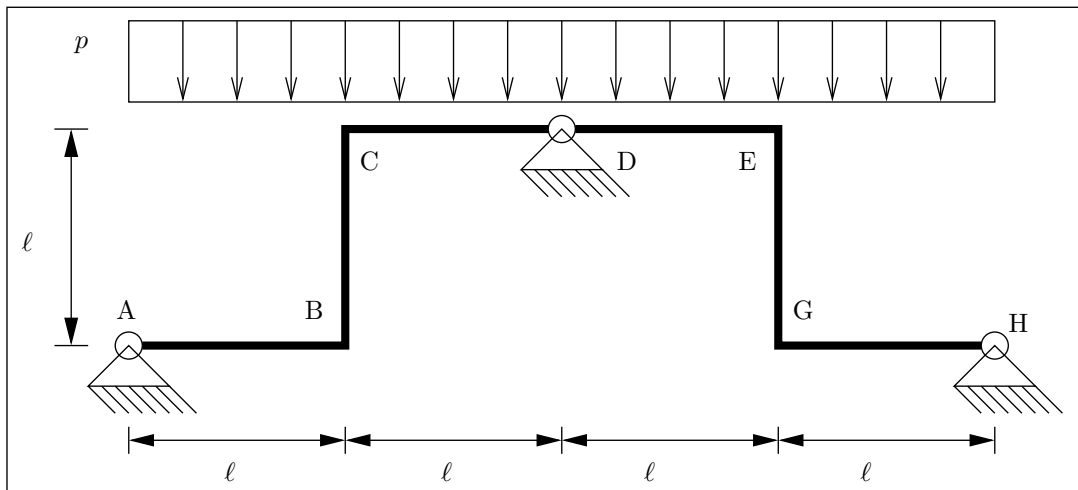
Statica - Ingegneria Civile e Ambientale - Prof. Daniele Zulli

APPELLO DEL 14/7/2025 - DURATA 3 ORE

Esercizio 1: Scrivere e diagrammare le leggi di variazione delle caratteristiche di sollecitazione per la struttura in figura, nel caso in cui sia $F = p\ell$ e $M = p\ell^2$. Calcolare la rotazione della sezione in E, noto EI e per $EA \rightarrow +\infty$.

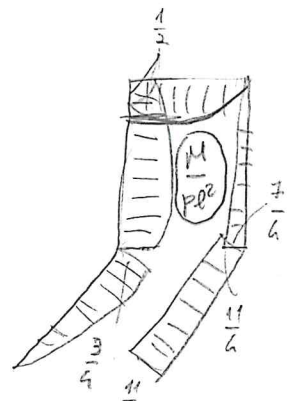
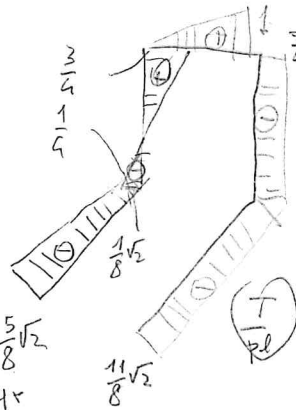
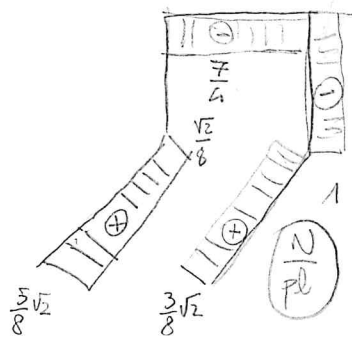
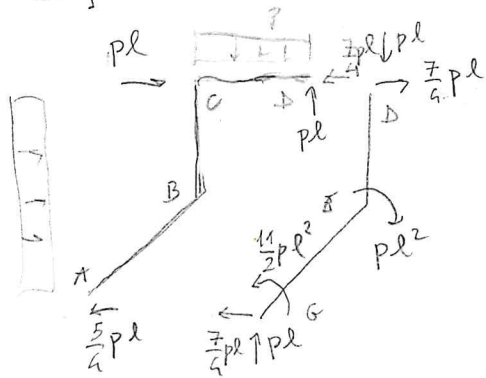


Esercizio 2: Diagrammare le caratteristiche di sollecitazione per la struttura in figura nel caso in cui sia $EA \rightarrow +\infty$.



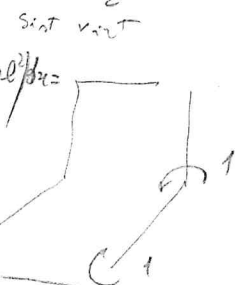
ES 1

14/7/2025

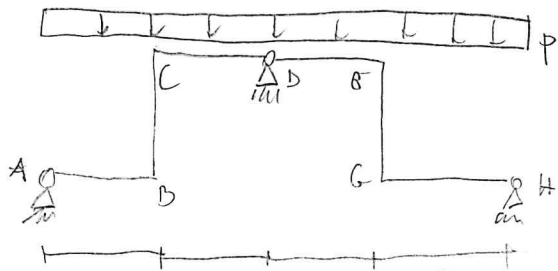


TRABE	LONG.	N	T	M
AB	$l\sqrt{2}$	$\frac{5\sqrt{2}}{8} pl - \frac{px}{2}$	$-\frac{5\sqrt{2}}{8} pl + \frac{px}{2}$	$\frac{5\sqrt{2}}{8} plx - \frac{px^2}{2}$
BC	l	0	$-\frac{pl}{4} + px$	$\frac{3}{4} pl^2 + \frac{pl}{4} x - \frac{px^2}{2}$
DC	l	$-\frac{7}{4} pl$	$pl - px$	$-plx + \frac{px^2}{2}$
DB	l	$-pl$	$-\frac{7}{4} pl$	$\frac{7}{4} plx - \frac{11}{8} pl^2$
GE	$l\sqrt{2}$	$\frac{3\sqrt{2}}{8} pl$	$-\frac{11\sqrt{2}}{8} pl$	

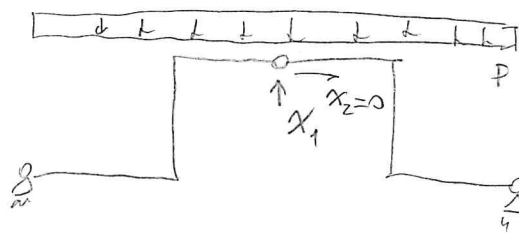
$$\phi_B = \frac{1}{8l} \int_0^{l\sqrt{2}} \left(\frac{11\sqrt{2}}{8} plx - \frac{11}{2} pl^2 \right) dx = -\frac{33\sqrt{2}}{8} \frac{pl^3}{8l}$$



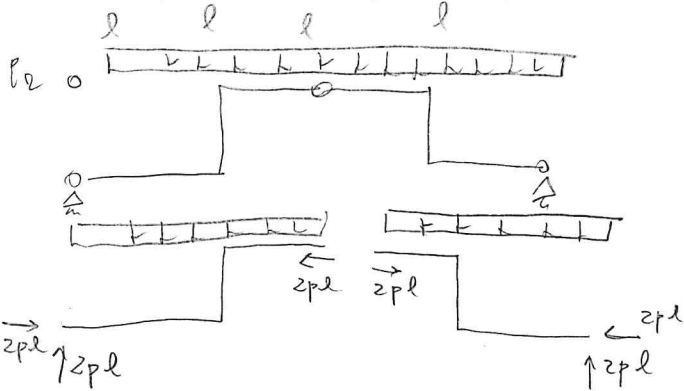
ES 2



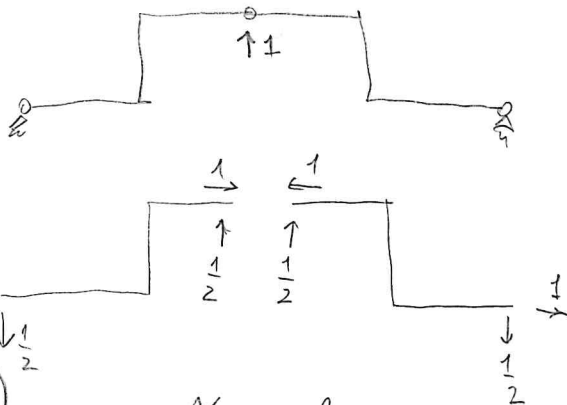
S.p.



Struttura 2 volte iperstatica.
Le reazioni orizzontali della cerniera esterne in D e nulla per simmetria.



P₁



TRABE	LONG.	M ₀	M ₁
AB	l	$2plx - \frac{px^2}{2}$	$-\frac{x}{2}$
BC	l	$\frac{3}{2} pl^2 - 2plx$	$-\frac{l}{2} + x$
CD	l	$-\frac{pl^2}{2} + plx - \frac{px^2}{2}$	$\frac{l}{2} - \frac{x}{2}$

$$\eta_{11} = 2 \left(\frac{l^3}{48EI} \right)$$

$$\eta_{10} = -2 \frac{pl^4}{24EI}$$

$$\bar{\eta}_1 = \infty$$

$$X_1 = 2pl$$

