

## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_J b + H_{CD} b + V_{CD} b = 4Fb - W + 10qb^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_J b + H_{CD} b - V_{CD} b = 2Fb - W + 7/2 qb^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD} b - 3V_{CD} b = -W - 5/2 qb^2$$

Traslazione verticale: aste DC

$$V_{CD} = qb$$

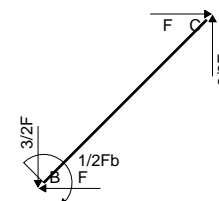
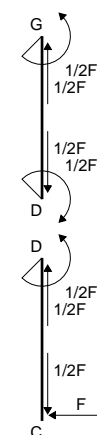
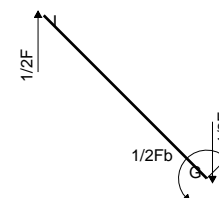
## Matrice di equilibrio

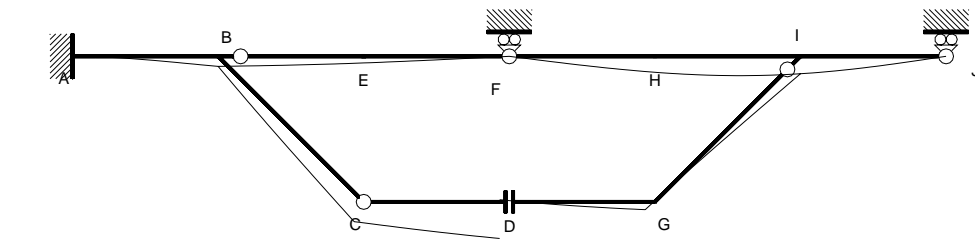
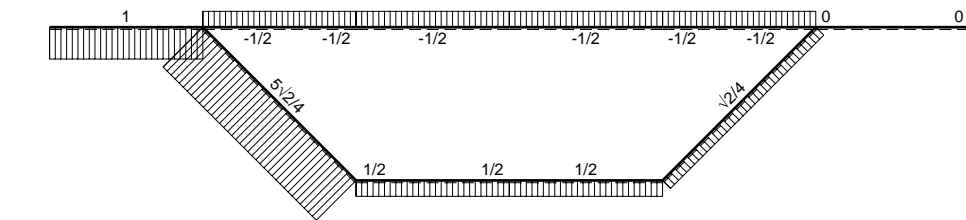
$$\begin{bmatrix} \phi_{BE} \\ \phi_{FE} \\ \phi_{IG} \\ \phi_{DG} \end{bmatrix} \begin{bmatrix} V_F b & V_J b & H_{CD} b & V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 5 & 1 & 1 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & -1 & 10 \\ 2 & -1 & 7/2 \\ 0 & -1 & -5/2 \\ 0 & 0 & 1 \end{bmatrix}$$

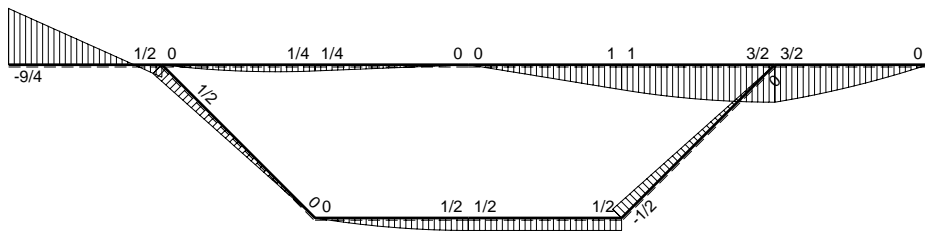
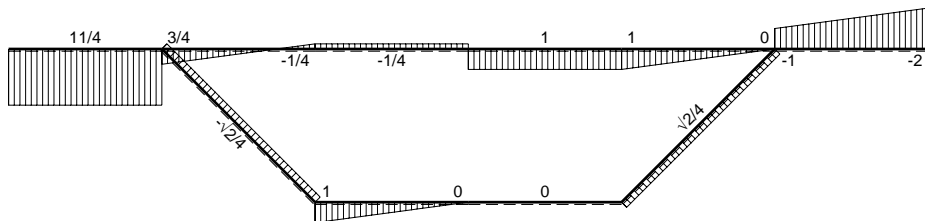
## Soluzione del sistema

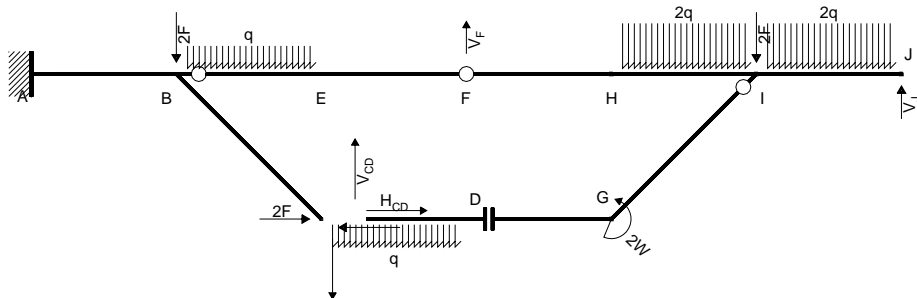
$$\begin{bmatrix} V_F b \\ V_J b \\ H_{CD} b \\ V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 1/3 & 0 & 11/12 \\ 2/3 & 0 & 4/3 \\ 0 & -1 & 1/2 \\ 0 & 0 & 1 \end{bmatrix}$$




$$\text{H} \text{---} \text{H} \text{---} 5 \text{ Fb}^3/\text{EJ}$$


A diagram showing a square box with a plus sign (+) inside. An arrow points to the left from the left side of the box, and another arrow points to the right from the right side of the box. To the right of the right-pointing arrow is the letter F.





## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_J b + H_{CD} b + V_{CD} b = 8Fb - 2W + 18qb^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_J b + H_{CD} b - V_{CD} b = 4Fb - 2W + 15/2 qb^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD} b - 3V_{CD} b = -2W - 5/2 qb^2$$

Traslazione verticale: aste DC

$$V_{CD} = qb$$

## Matrice di equilibrio

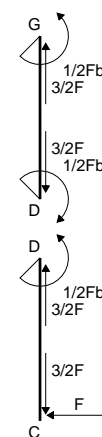
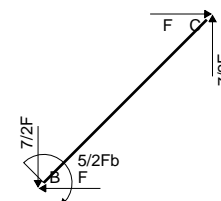
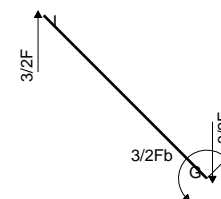
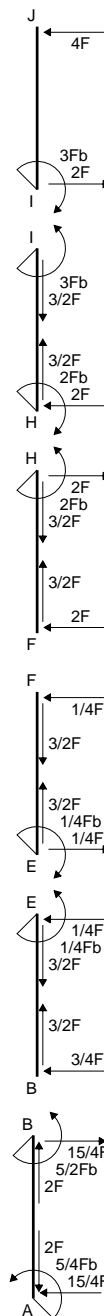
$$\begin{bmatrix} \varphi_{BE} \\ \varphi_{FE} \\ \varphi_{IG} \\ v_{DG} \end{bmatrix} \begin{bmatrix} V_F b & V_J b & H_{CD} b & V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \end{bmatrix}$$

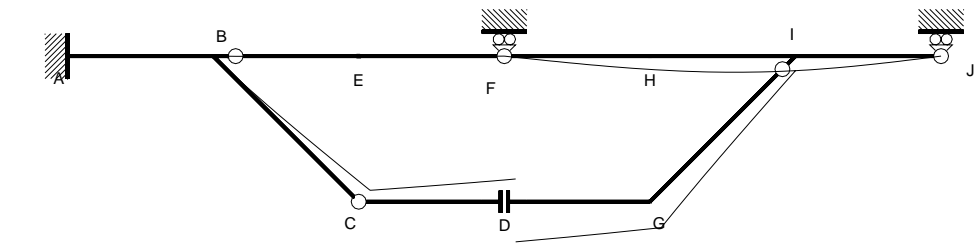
$$\begin{bmatrix} 2 & 5 & 1 & 1 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 8 & -2 & 18 \\ 4 & -2 & 15/2 \\ 0 & -2 & -5/2 \\ 0 & 0 & 1 \end{bmatrix}$$

## Soluzione del sistema

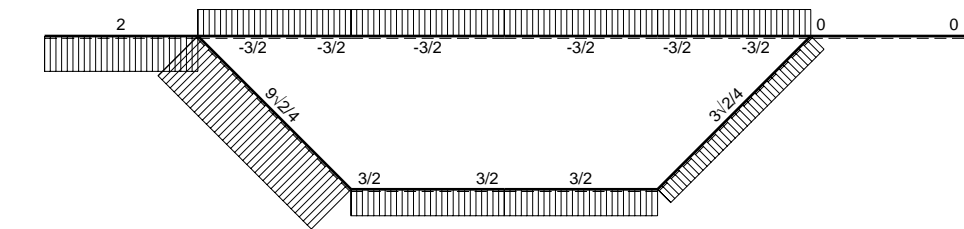
$$\begin{bmatrix} V_F b \\ V_J b \\ H_{CD} b \\ V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \end{bmatrix}$$

$$\begin{bmatrix} 2/3 & 0 & 19/12 \\ 4/3 & 0 & 8/3 \\ 0 & -2 & 1/2 \\ 0 & 0 & 1 \end{bmatrix}$$

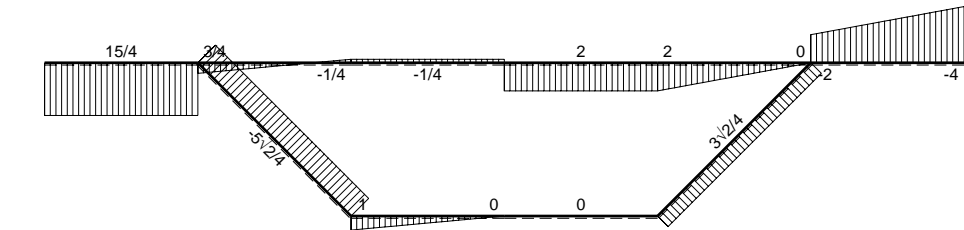




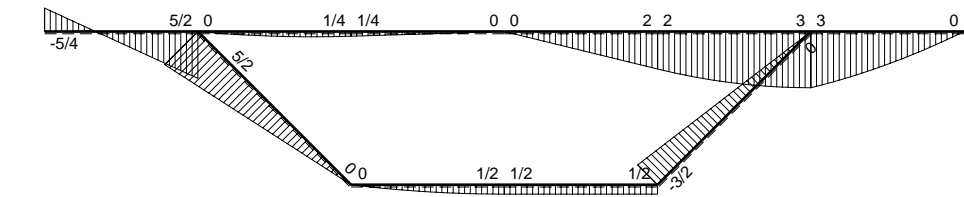
$I = 12 Fb^3/EJ$



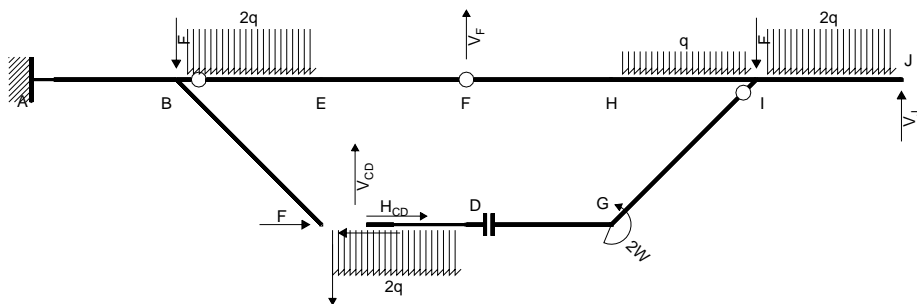
$\leftarrow \boxed{+} \rightarrow F$



$\uparrow \boxed{+} \downarrow F$



$\curvearrowright \boxed{+} \curvearrowleft Fb$



## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_{cb} + H_{CD} b + V_{CD} b = 4Fb - 2W + 33/2qb^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_{\text{L}}b + H_{\text{GD}}b - V_{\text{GD}}b = 2Fb - 2W + 11/2qb^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD}b - 3V_{CD}b = -2W - 5qb^2$$

Traslazione verticale: aste DC

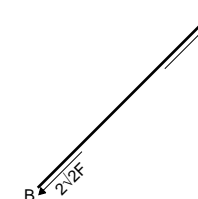
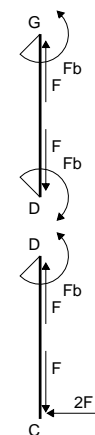
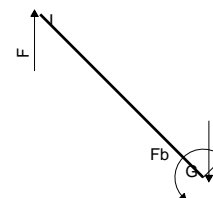
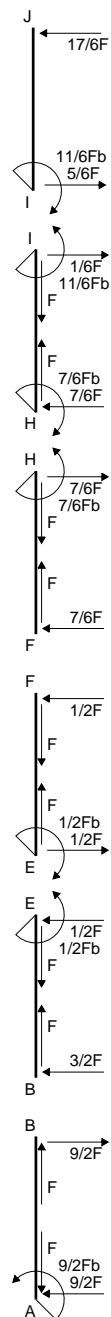
$$V_{CD} = 2qb$$

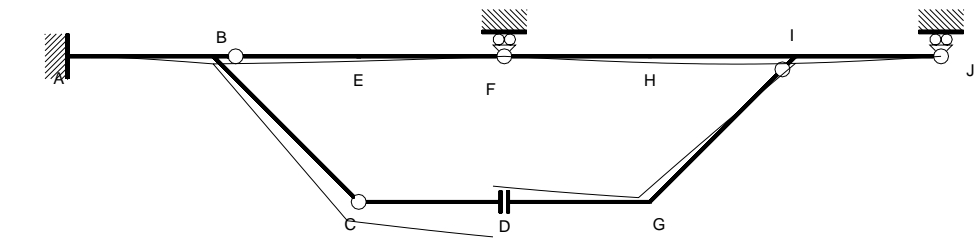
### Matrice di equilibrio

$$\begin{bmatrix} V_{Fb} & V_{Jb} & H_{CDb} & V_{CDb} \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \end{bmatrix}$$

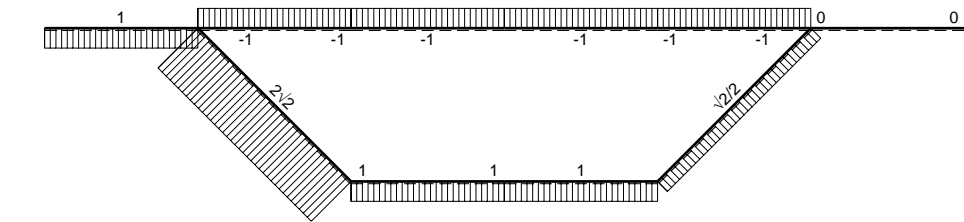
### Soluzione del sistema

$$\begin{bmatrix} V_{Fb} \\ V_{Jb} \\ H_{CDb} \\ V_{CDb} \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 1/3 & 0 & 4/3 \\ 2/3 & 0 & 13/6 \\ 0 & -2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$$

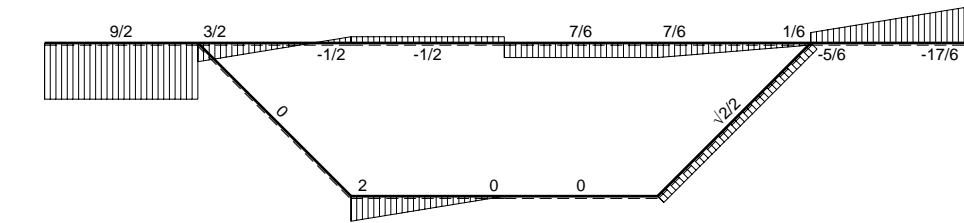




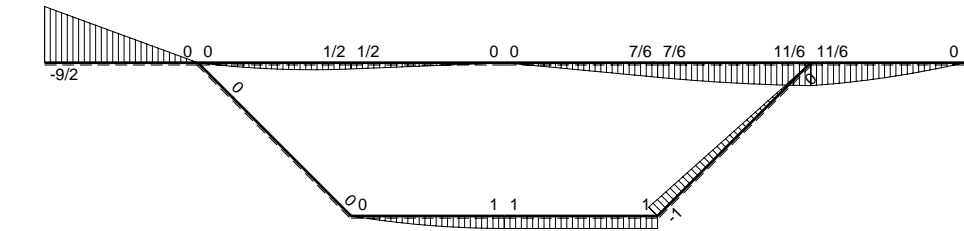
$\text{---} \text{---} \text{---} 15 Fb^3/EJ$



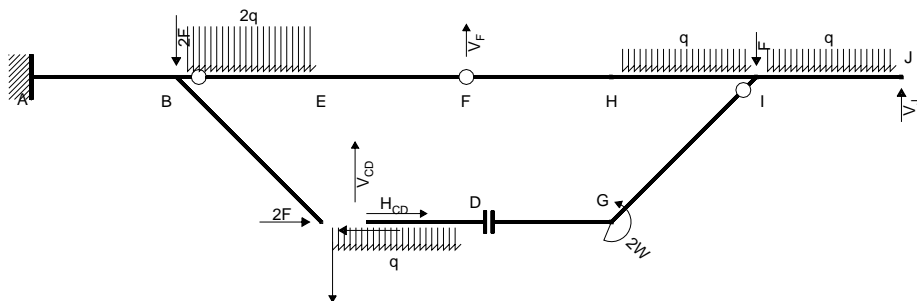
$\leftarrow \boxed{+} \rightarrow F$



$\uparrow \boxed{+} \downarrow F$



$\curvearrowright \boxed{+} \curvearrowleft Fb$



## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_J b + H_{CD} b + V_{CD} b = 4Fb - 2W + 21/2 q b^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_J b + H_{CD} b - V_{CD} b = 2Fb - 2W + 7/2 q b^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD} b - 3V_{CD} b = -2W - 5/2 q b^2$$

Traslazione verticale: aste DC

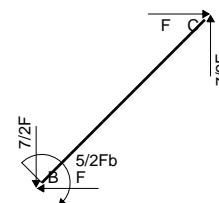
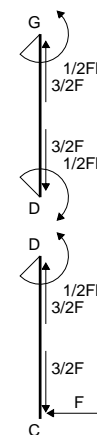
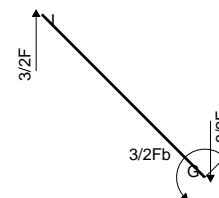
$$V_{CD} = qb$$

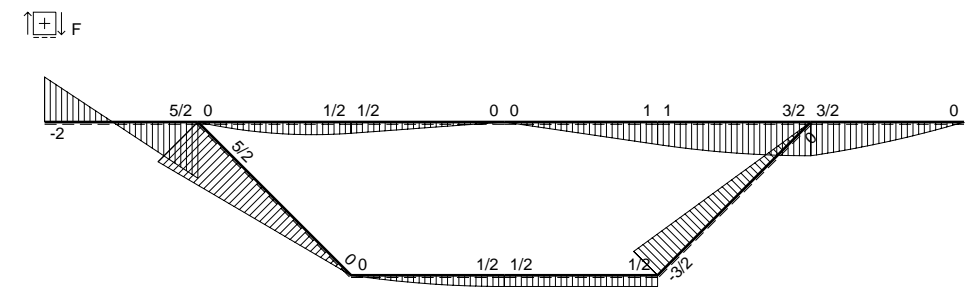
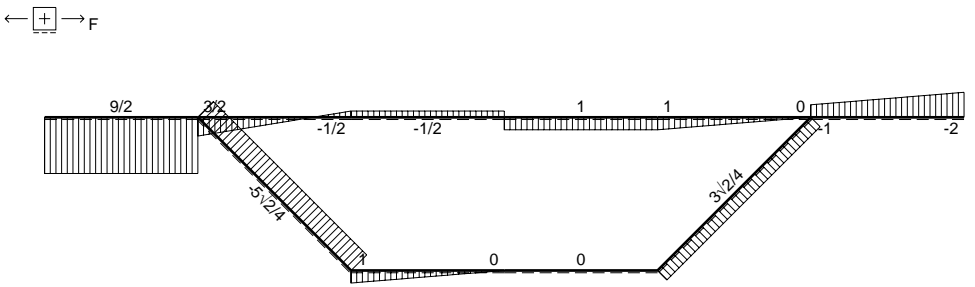
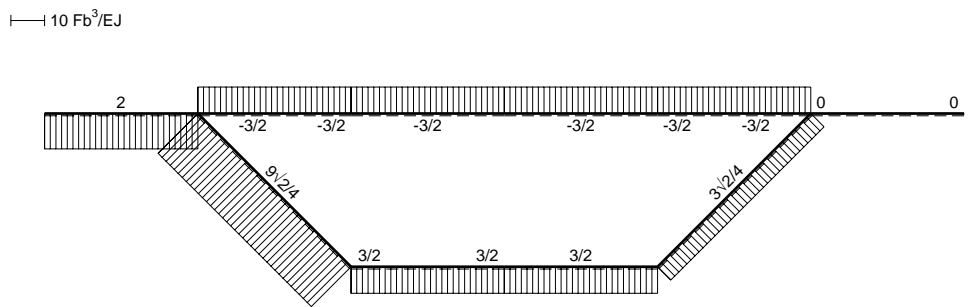
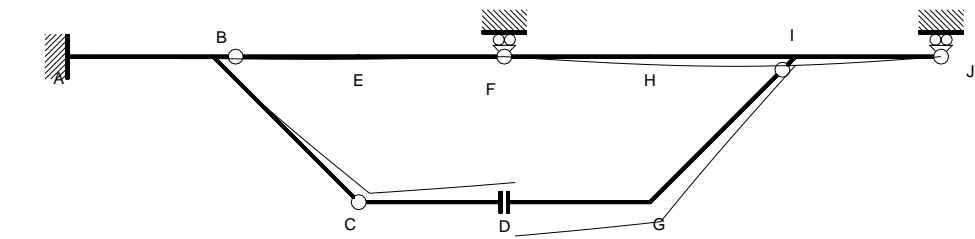
## Matrice di equilibrio

$$\begin{bmatrix} \varphi_{BE} \\ \varphi_{FE} \\ \varphi_{IG} \\ v_{DG} \end{bmatrix} \begin{bmatrix} V_F b & V_J b & H_{CD} b & V_{CD} b \\ 2 & 5 & 1 & 1 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 4 & -2 & 21/2 \\ 2 & -2 & 7/2 \\ 0 & -2 & -5/2 \\ 0 & 0 & 1 \end{bmatrix}$$

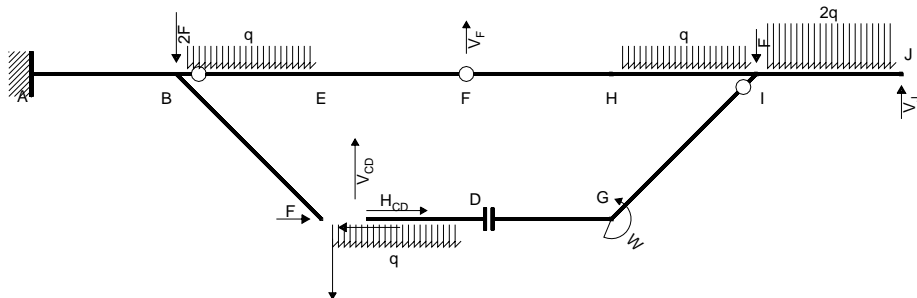
## Soluzione del sistema

$$\begin{bmatrix} V_F b \\ V_J b \\ H_{CD} b \\ V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 1/3 & 0 & 7/6 \\ 2/3 & 0 & 4/3 \\ 0 & -2 & 1/2 \\ 0 & 0 & 1 \end{bmatrix}$$









## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_J b + H_{CD} b + V_{CD} b = 4Fb - W + 29/2 qb^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_J b + H_{CD} b - V_{CD} b = 2Fb - W + 6qb^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD} b - 3V_{CD} b = -W - 5/2 qb^2$$

Traslazione verticale: aste DC

$$V_{CD} = qb$$

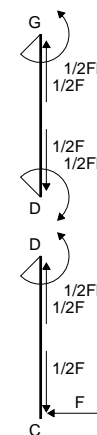
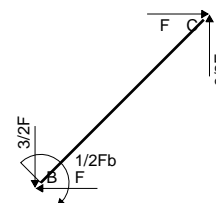
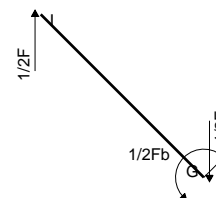
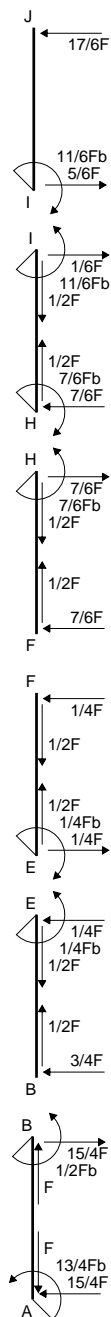
## Matrice di equilibrio

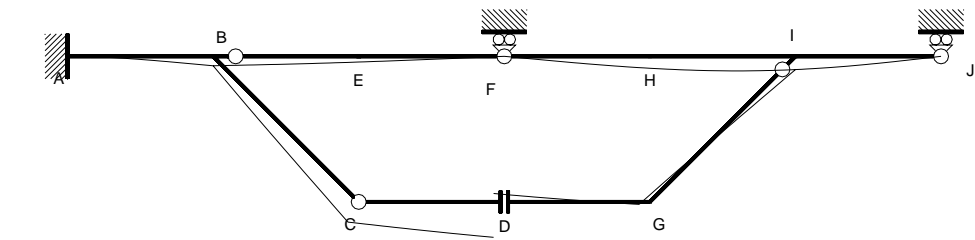
$$\begin{bmatrix} \varphi_{BE} \\ \varphi_{FE} \\ \varphi_{IG} \\ v_{DG} \end{bmatrix} \begin{bmatrix} V_F b & V_J b & H_{CD} b & V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 5 & 1 & 1 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & -1 & 29/2 \\ 2 & -1 & 6 \\ 0 & -1 & -5/2 \\ 0 & 0 & 1 \end{bmatrix}$$

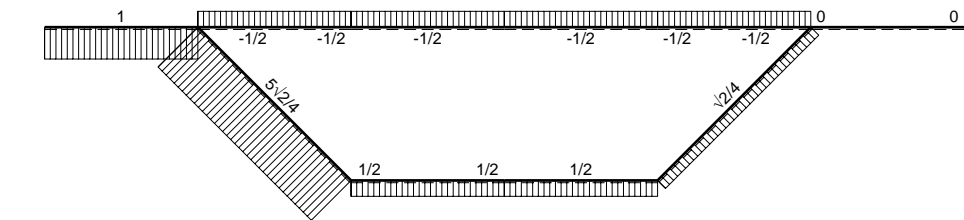
## Soluzione del sistema

$$\begin{bmatrix} V_F b \\ V_J b \\ H_{CD} b \\ V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 1/3 & 0 & 13/12 \\ 2/3 & 0 & 13/6 \\ 0 & -1 & 1/2 \\ 0 & 0 & 1 \end{bmatrix}$$

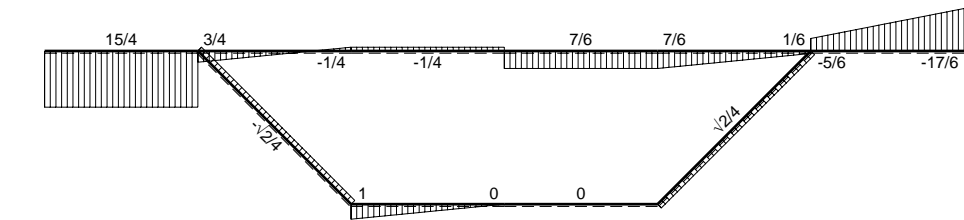




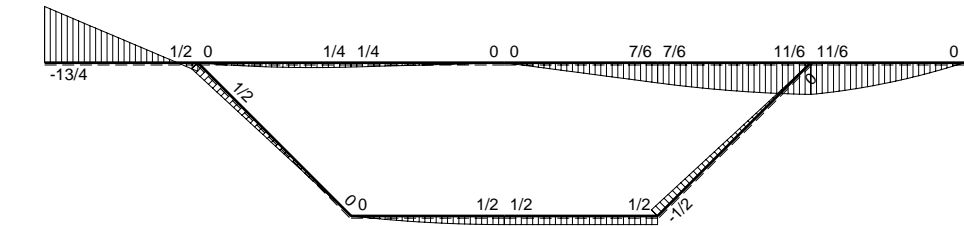
$\frac{1}{8} \frac{F b^3}{EJ}$



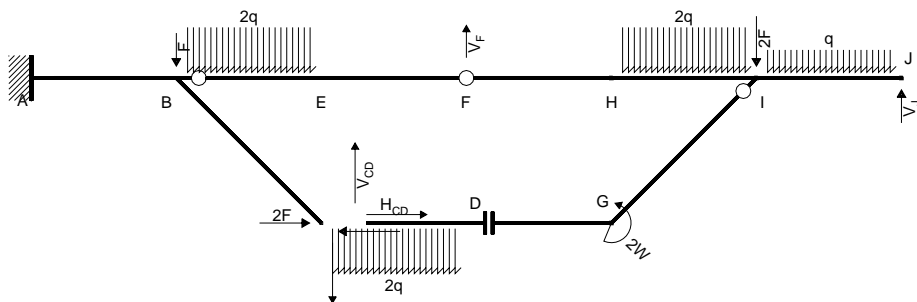
$\leftarrow \boxed{+} \rightarrow F$



$\uparrow \boxed{+} \downarrow F$



$\curvearrowright \boxed{+} \curvearrowleft F_b$



## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_J b + H_{CD} b + V_{CD} b = 8Fb - 2W + 31/2 q b^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_J b + H_{CD} b - V_{CD} b = 4Fb - 2W + 9/2 q b^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD} b - 3V_{CD} b = -2W - 5q b^2$$

Traslazione verticale: aste DC

$$V_{CD} = 2qb$$

## Matrice di equilibrio

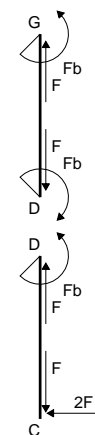
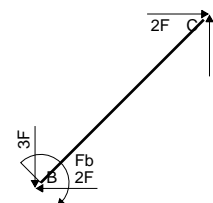
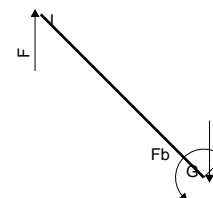
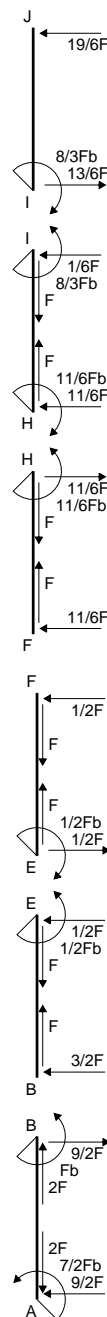
$$\begin{bmatrix} \varphi_{BE} \\ \varphi_{FE} \\ \varphi_{IG} \\ \varphi_{DG} \end{bmatrix} \begin{bmatrix} V_F b & V_J b & H_{CD} b & V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & q b^2 \end{bmatrix}$$

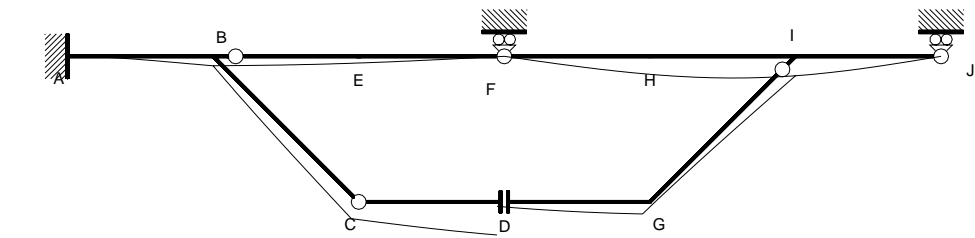
$$\begin{bmatrix} 2 & 5 & 1 & 1 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 8 & -2 & 31/2 \\ 4 & -2 & 9/2 \\ 0 & -2 & -5 \\ 0 & 0 & 2 \end{bmatrix}$$

## Soluzione del sistema

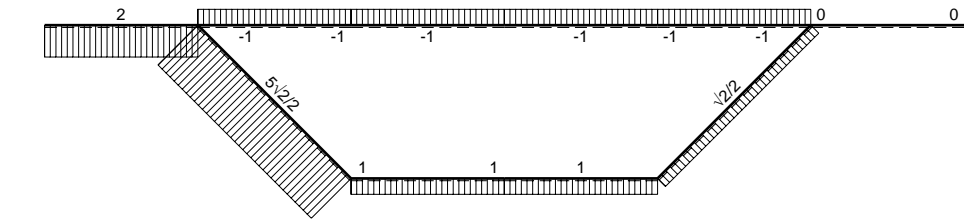
$$\begin{bmatrix} V_F b \\ V_J b \\ H_{CD} b \\ V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & q b^2 \end{bmatrix}$$

$$\begin{bmatrix} 2/3 & 0 & 5/3 \\ 4/3 & 0 & 11/6 \\ 0 & -2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$$

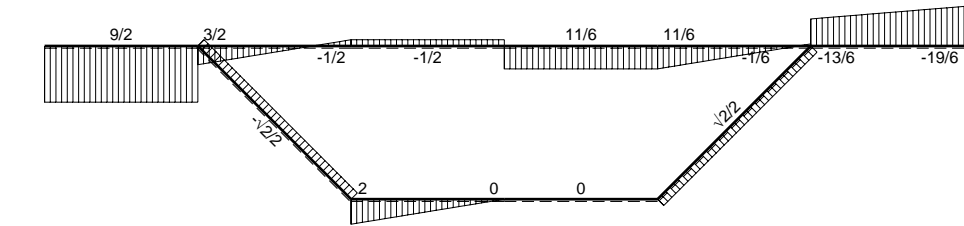




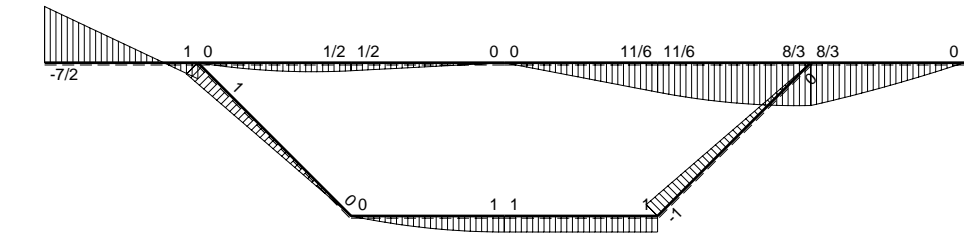
$\frac{1}{8} F b^3 / EJ$



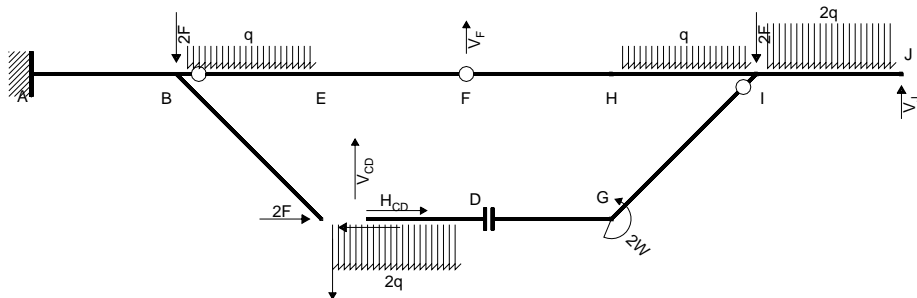
$\leftarrow \boxed{+} \rightarrow F$



$\uparrow \boxed{+} \downarrow F$



$\curvearrowright \boxed{+} \curvearrowleft F_b$



## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_J b + H_{CD} b + V_{CD} b = 8Fb - 2W + 16qb^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_J b + H_{CD} b - V_{CD} b = 4Fb - 2W + 11/2 qb^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD} b - 3V_{CD} b = -2W - 5qb^2$$

Traslazione verticale: aste DC

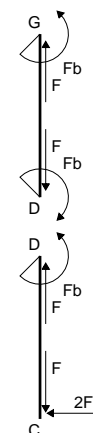
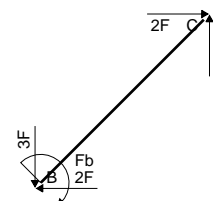
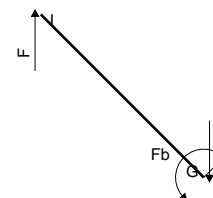
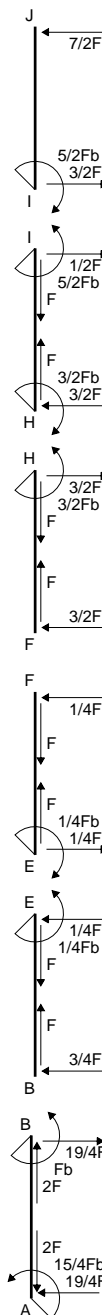
$$V_{CD} = 2qb$$

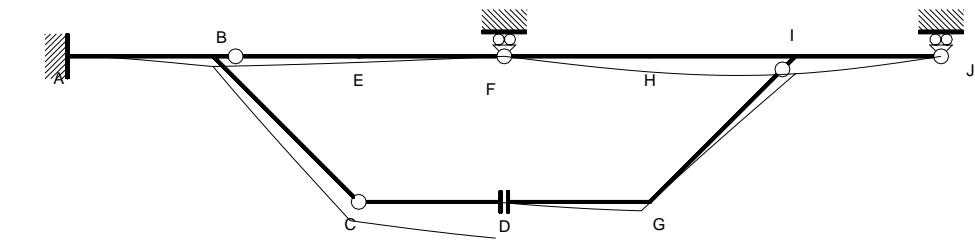
## Matrice di equilibrio

$$\begin{bmatrix} \varphi_{BE} \\ \varphi_{FE} \\ \varphi_{IG} \\ v_{DG} \end{bmatrix} \begin{bmatrix} V_F b & V_J b & H_{CD} b & V_{CD} b \\ 2 & 5 & 1 & 1 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 8 & -2 & 16 \\ 4 & -2 & 11/2 \\ 0 & -2 & -5 \\ 0 & 0 & 2 \end{bmatrix}$$

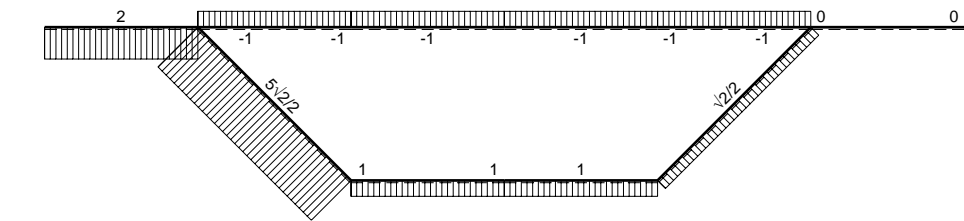
## Soluzione del sistema

$$\begin{bmatrix} V_F b \\ V_J b \\ H_{CD} b \\ V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 2/3 & 0 & 13/12 \\ 4/3 & 0 & 13/6 \\ 0 & -2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$$

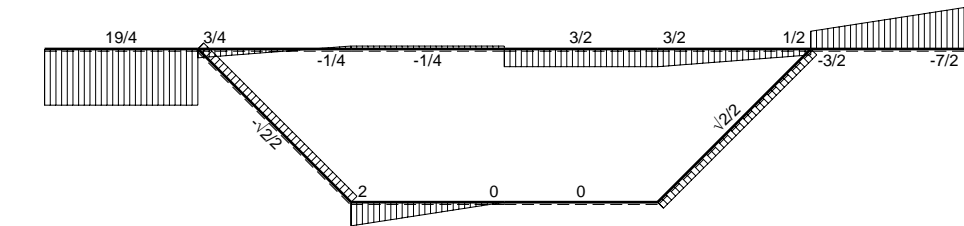




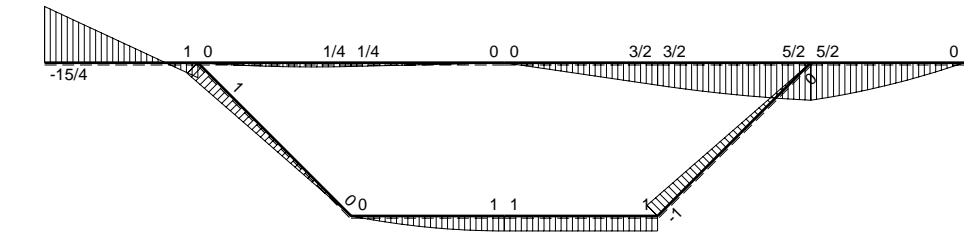
$\frac{1}{8} F b^3 / EJ$



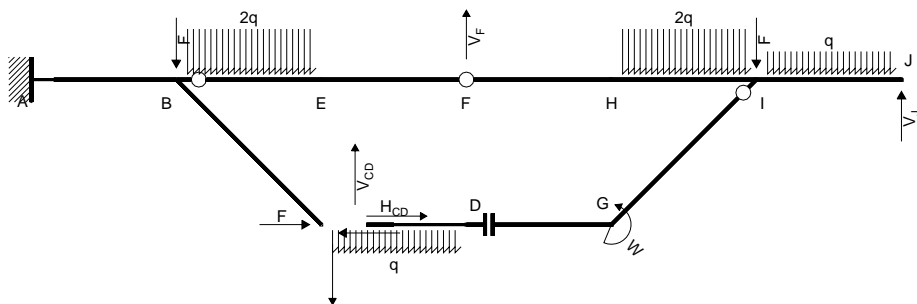
$\leftarrow \boxed{+} \rightarrow F$



$\uparrow \boxed{+} \downarrow F$



$\curvearrowright \boxed{+} \curvearrowleft F_b$



## EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BE EF FH HI IG IJ GD DC

$$2V_F b + 5V_J b + H_{CD} b + V_{CD} b = 4Fb - W + 14qb^2$$

Rotazione intorno a F: aste FH HI IG IJ GD DC

$$3V_J b + H_{CD} b - V_{CD} b = 2Fb - W + 5qb^2$$

Rotazione intorno a I: aste IG GD DC

$$H_{CD} b - 3V_{CD} b = -W - 5/2qb^2$$

Traslazione verticale: aste DC

$$V_{CD} = qb$$

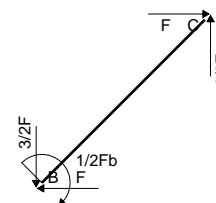
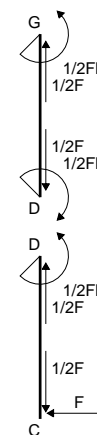
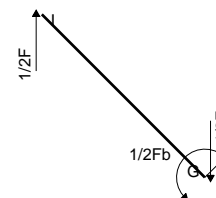
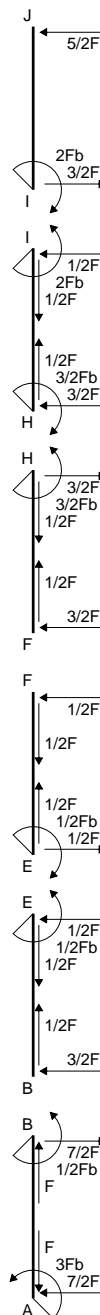
## Matrice di equilibrio

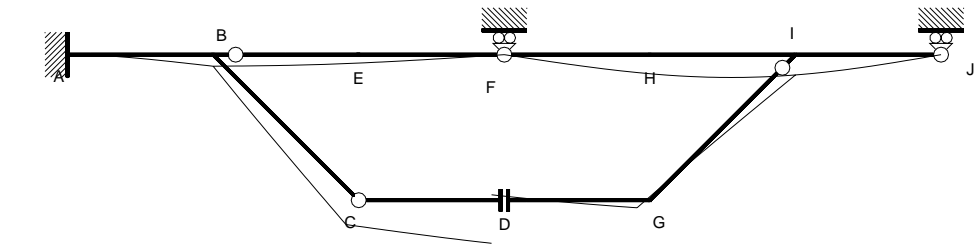
$$\begin{bmatrix} \phi_{BE} \\ \phi_{FE} \\ \phi_{IG} \\ V_{DG} \end{bmatrix} \begin{bmatrix} V_F b & V_J b & H_{CD} b & V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 5 & 1 & 1 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & -1 & 14 \\ 2 & -1 & 5 \\ 0 & -1 & -5/2 \\ 0 & 0 & 1 \end{bmatrix}$$

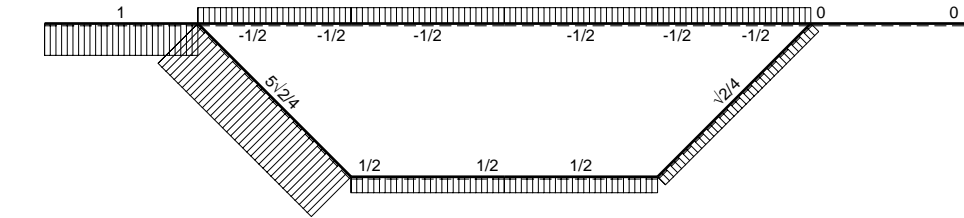
## Soluzione del sistema

$$\begin{bmatrix} V_F b \\ V_J b \\ H_{CD} b \\ V_{CD} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 1/3 & 0 & 5/3 \\ 2/3 & 0 & 11/6 \\ 0 & -1 & 1/2 \\ 0 & 0 & 1 \end{bmatrix}$$

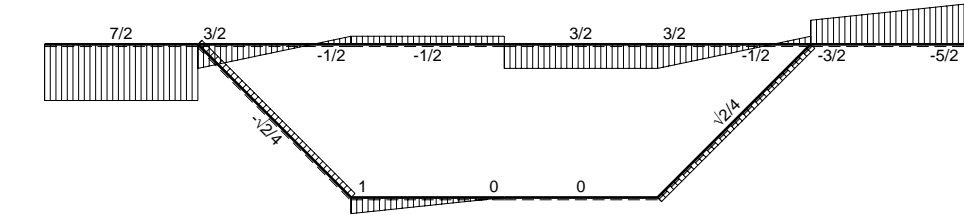




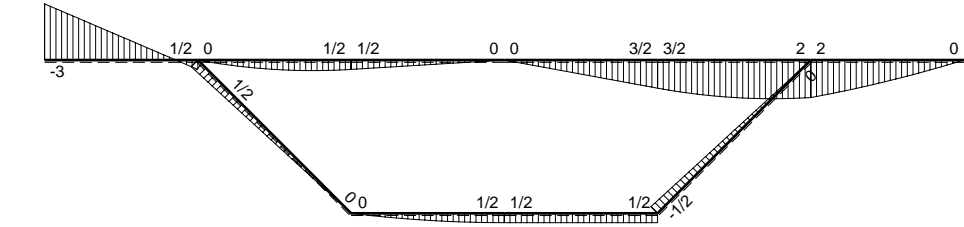
$\frac{1}{6} F b^3 / EJ$



$\leftarrow \boxed{+} \rightarrow F$



$\uparrow \boxed{+} \downarrow F$



$\curvearrowright \boxed{+} \curvearrowleft F_b$