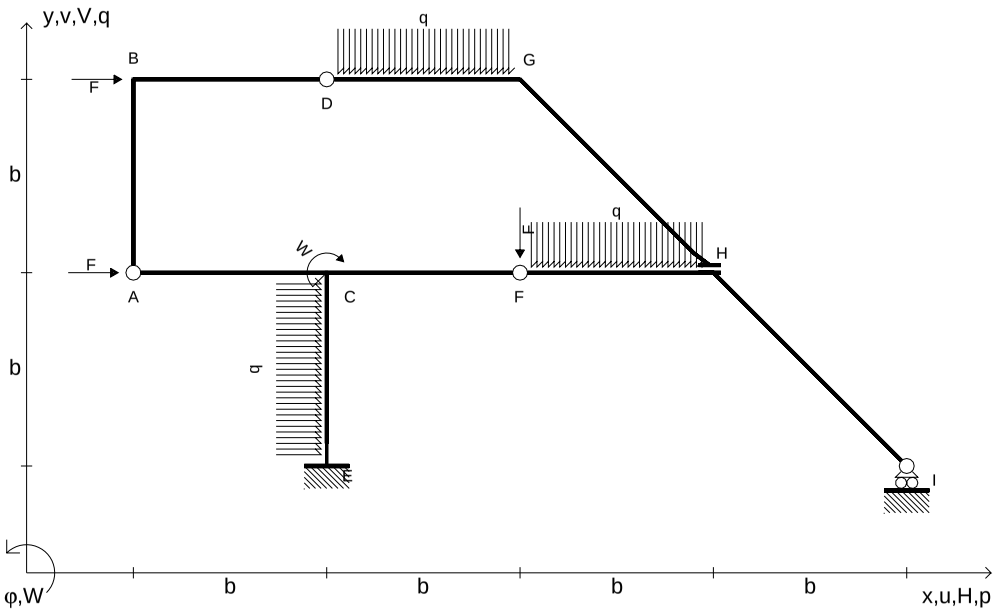

$H_B = F$	$p_{EC} = q = F/b$	$EJ_{AC} = EJ$	$EJ_{DG} = EJ$
$H_A = F$	$q_{FH} = -q = -F/b$	$EJ_{BD} = EJ$	$EJ_{GH} = EJ$
$V_F = -F$	$q_{DG} = -q = -F/b$	$EJ_{EC} = EJ$	$EJ_{FH} = EJ$
$W_C = -W = -Fb$	$EJ_{AB} = EJ$	$EJ_{CF} = EJ$	$EJ_{HI} = EJ$

Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi quotati delle azioni interne nelle aste.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.

Struttura Isostatica.001

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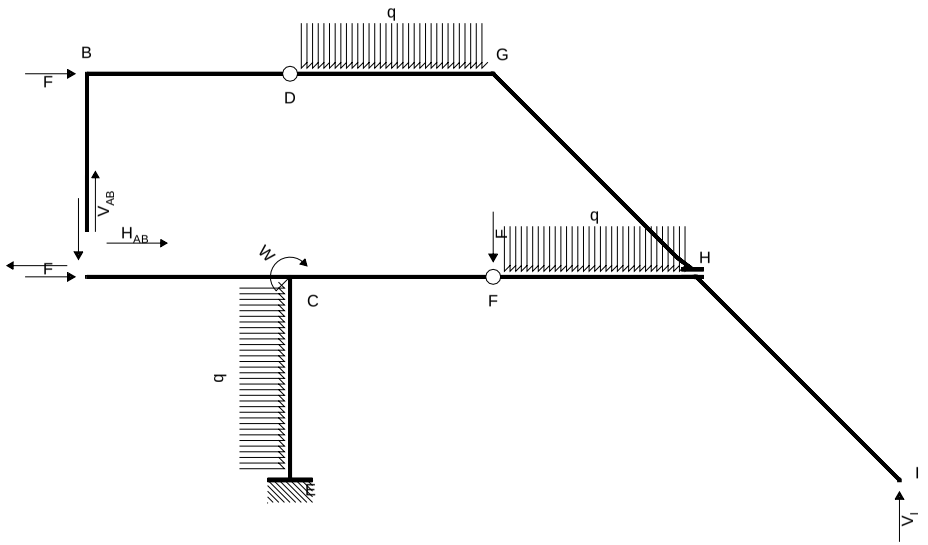


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a F: aste FH HG HI GD DB BA

$2V_I b - 2V_{AB} b = Fb$

Traslazione orizzontale: aste HG GD DB BA

$H_{AB} = -F$

Rotazione intorno a D: aste DB BA

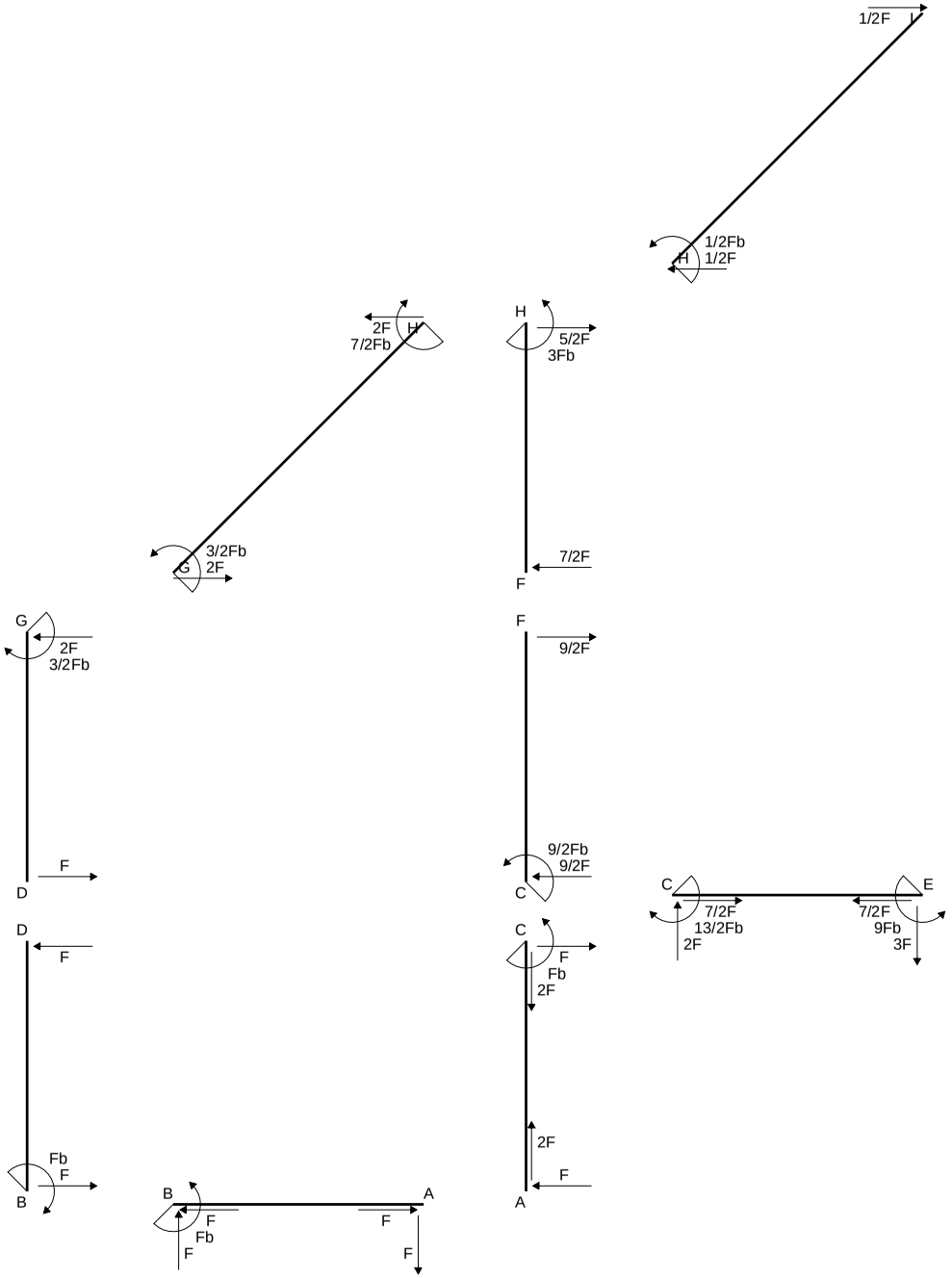
$H_{AB} b - V_{AB} b = 0$

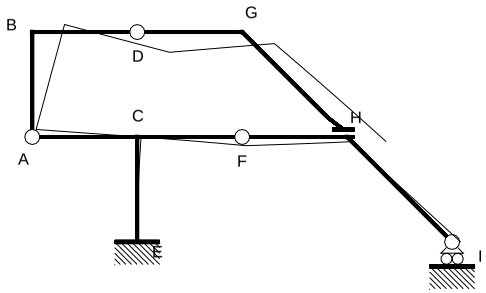
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{FC} \\ u_{HG} \\ \varphi_{DB} \end{array} \begin{bmatrix} V_I b & H_{AB} b & V_{AB} b \\ 2 & 0 & -2 \\ 0 & 1 & 0 \\ 0 & 1 & -1 \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 1 & 0 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

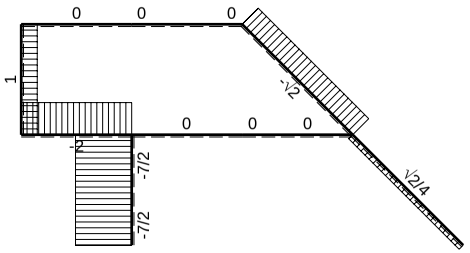
Soluzione del sistema

$$\begin{bmatrix} V_I b \\ H_{AB} b \\ V_{AB} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ -1/2 & 0 & 0 \\ -1 & 0 & 0 \\ -1 & 0 & 0 \end{bmatrix}$$





80 Fb^3/EJ



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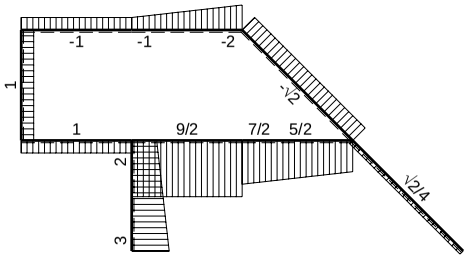

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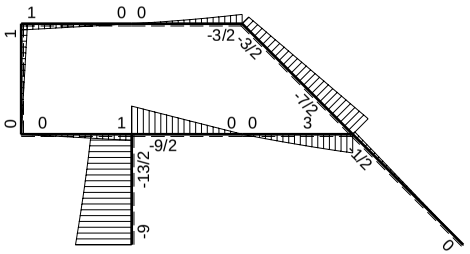
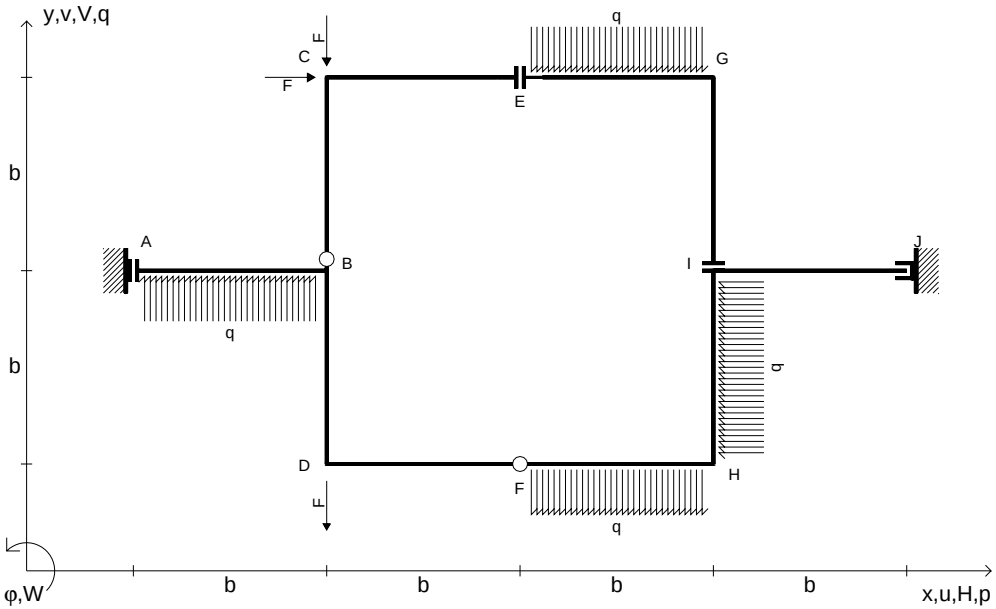


Fb



$H_C = F$	$q_{AB} = q = F/b$	$p_{HI} = -q = -F/b$	$EJ_{BD} = EJ$	$EJ_{EG} = EJ$	$EJ_{HI} = EJ$
$V_C = -F$	$q_{EG} = -q = -F/b$	$EJ_{AB} = EJ$	$EJ_{CE} = EJ$	$EJ_{FH} = EJ$	$EJ_{IJ} = EJ$
$V_D = -F$	$q_{FH} = -q = -F/b$	$EJ_{BC} = EJ$	$EJ_{DF} = EJ$	$EJ_{GI} = EJ$	

Carichi e deformazioni date hanno verso efficace in disegno.
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J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.

Struttura Isostatica.001

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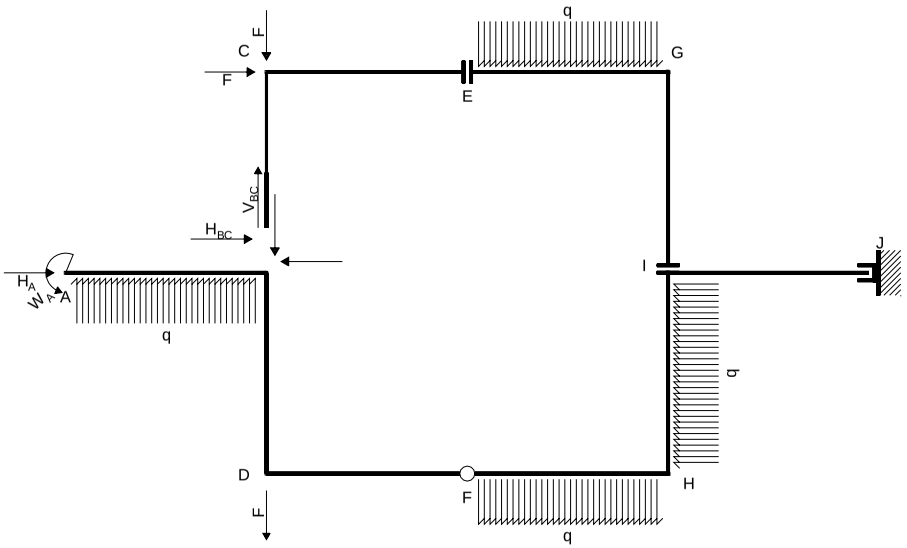


EQUAZIONI DI EQUILIBRIO

Traslazione orizzontale globale

$H_A = -F + qb$

Traslazione orizzontale: aste IG GE EC CB

$H_{BC} = -F$

Traslazione verticale: aste EC CB

$V_{BC} = F$

Rotazione intorno a F: aste FD DB BA

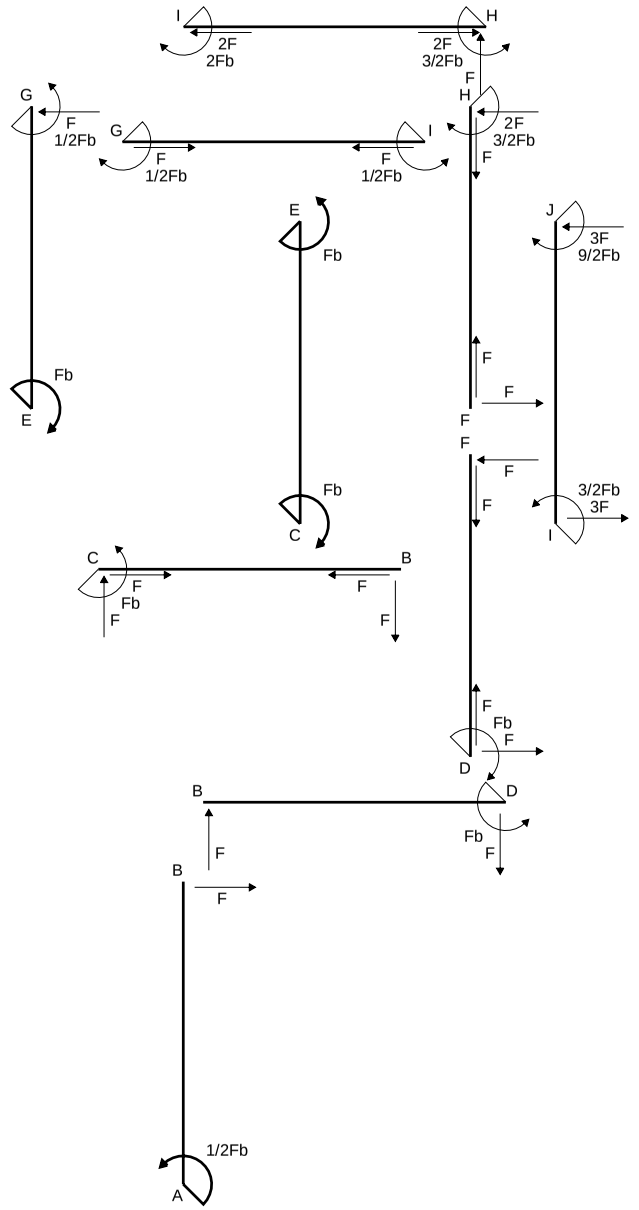
$-H_A b + W_A + H_{BC} b + V_{BC} b = -Fb + 3/2 qb^2$

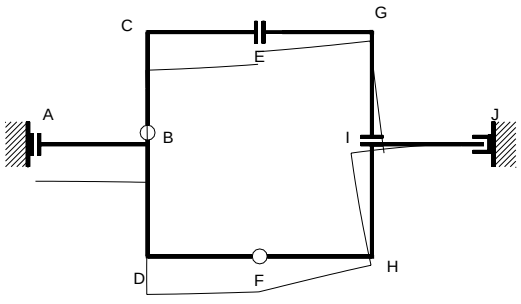
Matrice di equilibrio

$$\begin{array}{c} \\ u_J \\ u_{IG} \\ v_{EC} \\ \varphi_{FD} \end{array} \begin{bmatrix} H_A b & W_A & H_{BC} b & V_{BC} b \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ -1 & 1 & 1 & 1 \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ -1 & 1 \\ -1 & 0 \\ 1 & 0 \\ -1 & 3/2 \end{bmatrix}$$

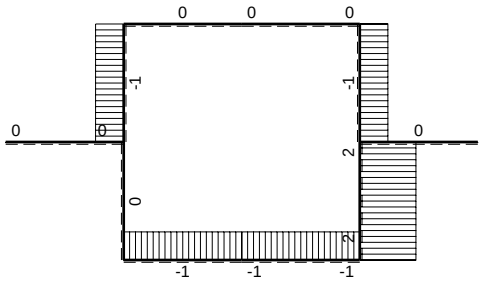
Soluzione del sistema

$$\begin{bmatrix} H_A b \\ H_{BC} b \\ V_{BC} b \\ W_A \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ -1 & 1 \\ -1 & 0 \\ 1 & 0 \\ -2 & 5/2 \end{bmatrix}$$





15 Fb^3/EJ



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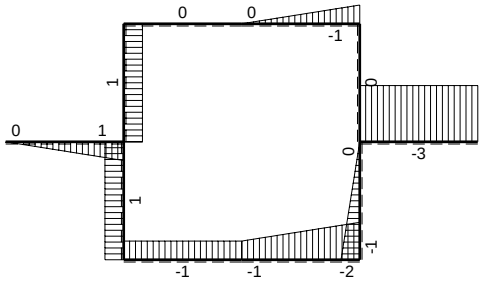

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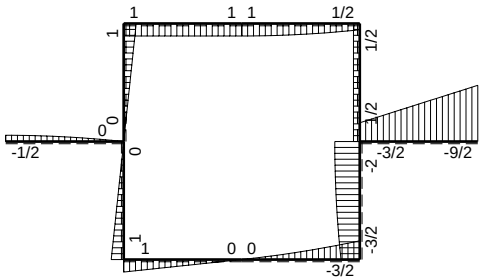
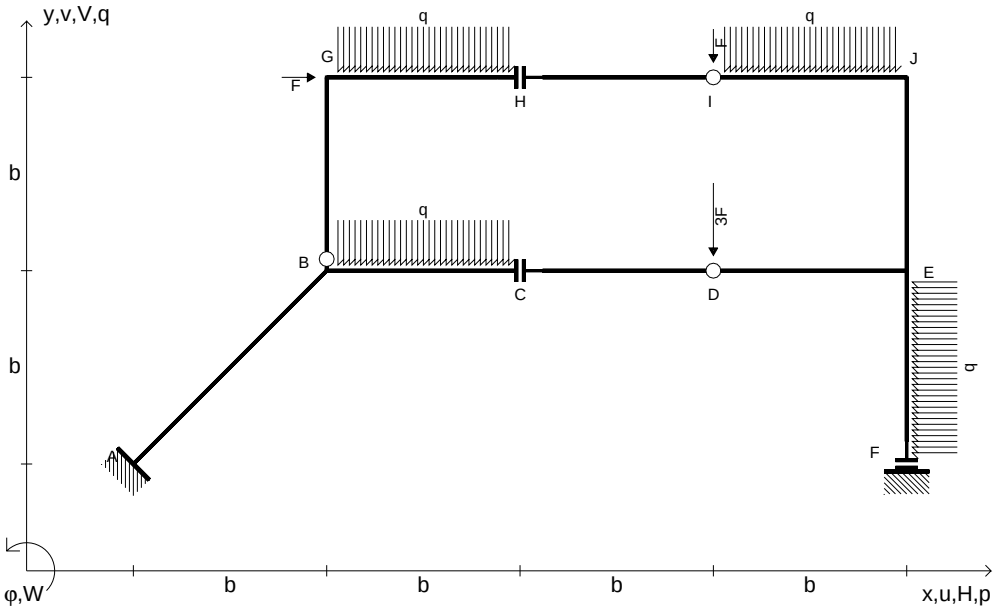


Fb



$H_G = F$	$q_{IJ} = -q = -F/b$	$EJ_{BC} = EJ$	$EJ_{BG} = EJ$	$EJ_{JE} = EJ$
$V_I = -F$	$q_{GH} = -q = -F/b$	$EJ_{CD} = EJ$	$EJ_{GH} = EJ$	
$V_D = -3F$	$p_{EF} = -q = -F/b$	$EJ_{DE} = EJ$	$EJ_{HI} = EJ$	
$q_{BC} = -q = -F/b$	$EJ_{AB} = EJ$	$EJ_{EF} = EJ$	$EJ_{IJ} = EJ$	

Carichi e deformazioni date hanno verso efficace in disegno.
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J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.

Struttura Isostatica.001

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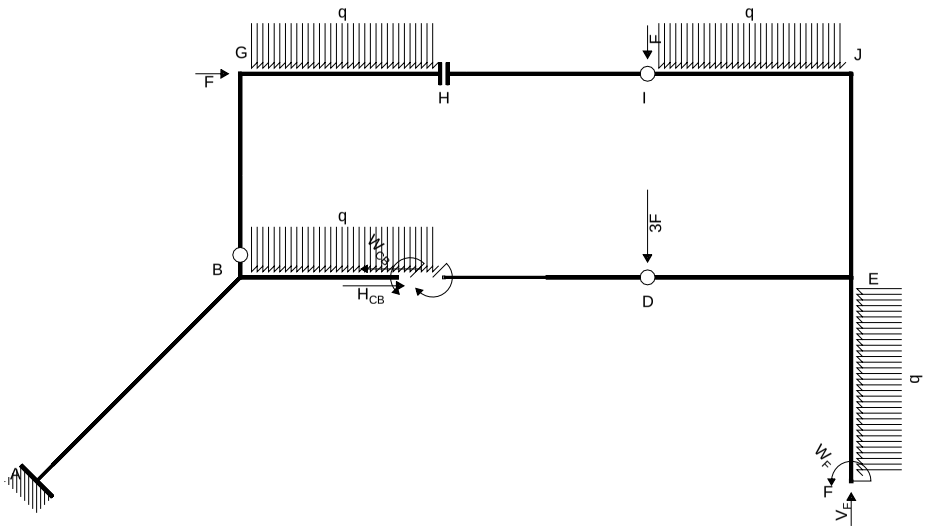


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BG GH HI IJ JE ED EF DC

$3V_Fb + W_F - W_{CB} = 9Fb + 7/2qb^2$

Traslazione verticale: aste HI IJ JE ED EF DC

$V_F = 4F + qb$

Rotazione intorno a I: aste IJ JE ED EF DC

$V_Fb + W_F - H_{CB}b - W_{CB} = 2qb^2$

Rotazione intorno a D: aste DC

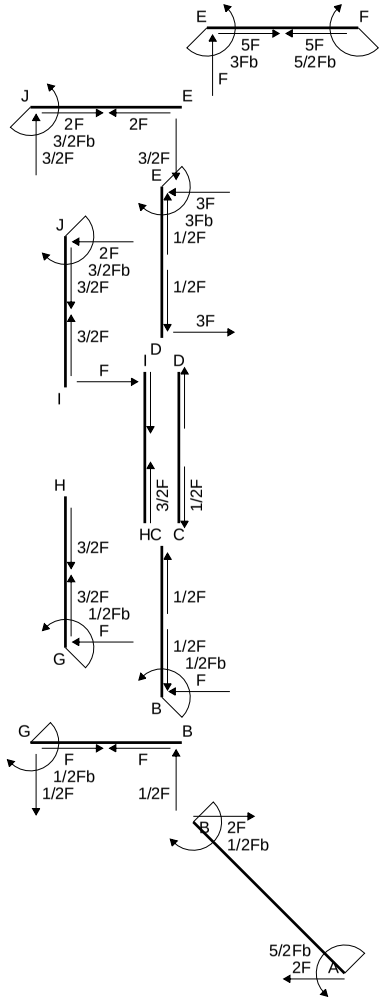
$-W_{CB} = 0$

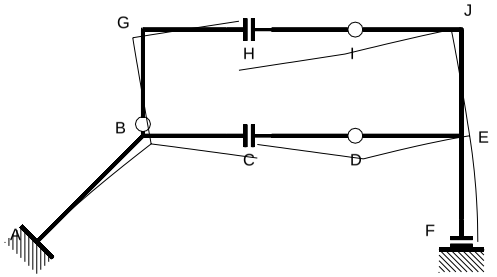
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{BG} \\ v_{HG} \\ \varphi_{IH} \\ \varphi_{DC} \end{array} \begin{bmatrix} V_Fb & W_F & H_{CB}b & W_{CB} \\ 3 & 1 & 0 & -1 \\ 1 & 0 & 0 & 0 \\ 1 & 1 & -1 & -1 \\ 0 & 0 & 0 & -1 \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ 9 & 7/2 \\ 4 & 1 \\ 0 & 2 \\ 0 & 0 \end{bmatrix}$$

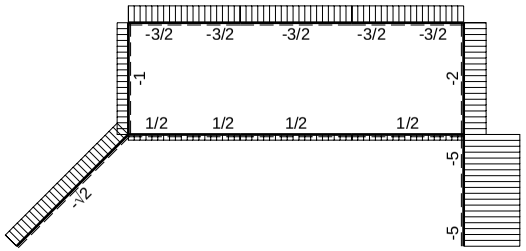
Soluzione del sistema

$$\begin{bmatrix} V_Fb \\ W_F \\ H_{CB}b \\ W_{CB} \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ 4 & 1 \\ -3 & 1/2 \\ 1 & -1/2 \\ 0 & 0 \end{bmatrix}$$

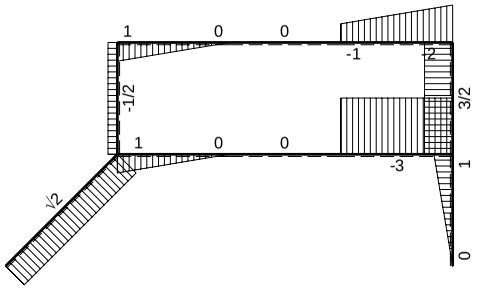




12 Fb^3/EJ



F



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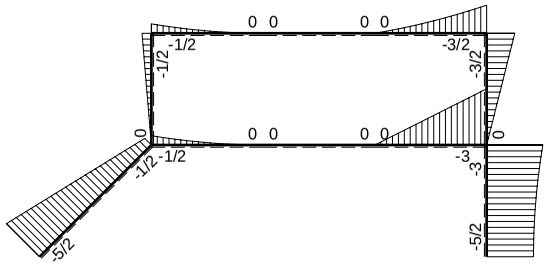
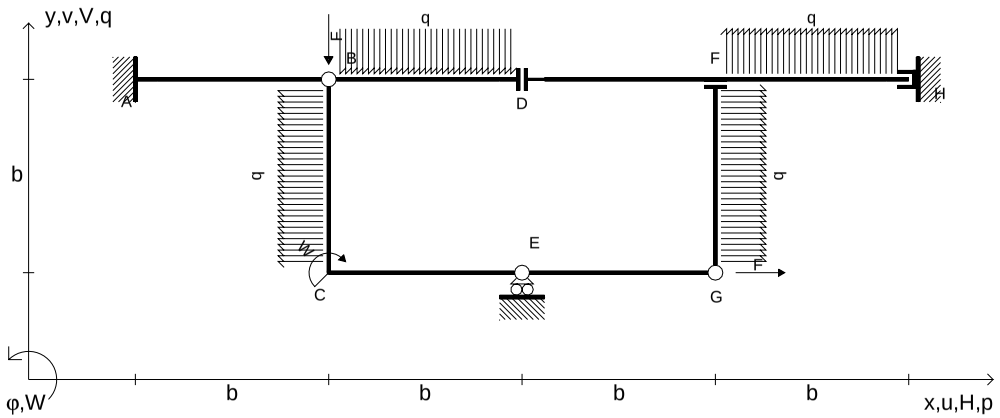


Fb



$H_G = F$	$q_{BD} = -q = -F/b$	$p_{BC} = -q = -F/b$	$EJ_{BD} = EJ$	$EJ_{EG} = EJ$
$V_B = -F$	$q_{FH} = q = F/b$	$EJ_{AB} = EJ$	$EJ_{CE} = EJ$	$EJ_{GF} = EJ$
$W_C = -W = -Fb$	$p_{GF} = q = F/b$	$EJ_{BC} = EJ$	$EJ_{DF} = EJ$	$EJ_{FH} = EJ$

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J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.

Struttura Isostatica.001

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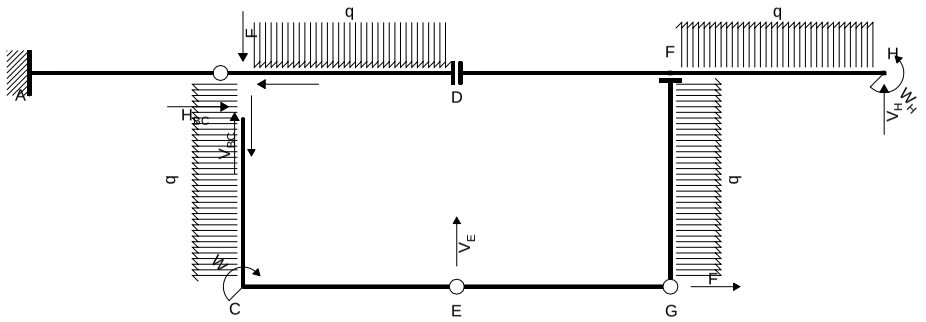


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a B: aste BD DF FG FH GE EC CB

$V_E b + 3V_H b + W_H = -Fb + W - 2qb^2$

Traslazione verticale: aste DF FG FH GE EC CB

$V_E + V_H + V_{BC} = -qb$

Traslazione orizzontale: aste FG GE EC CB

$H_{BC} = -F$

Rotazione intorno a G: aste GE EC CB

$-V_E b - H_{BC} b - 2V_{BC} b = W - 1/2qb^2$

Rotazione intorno a E: aste EC CB

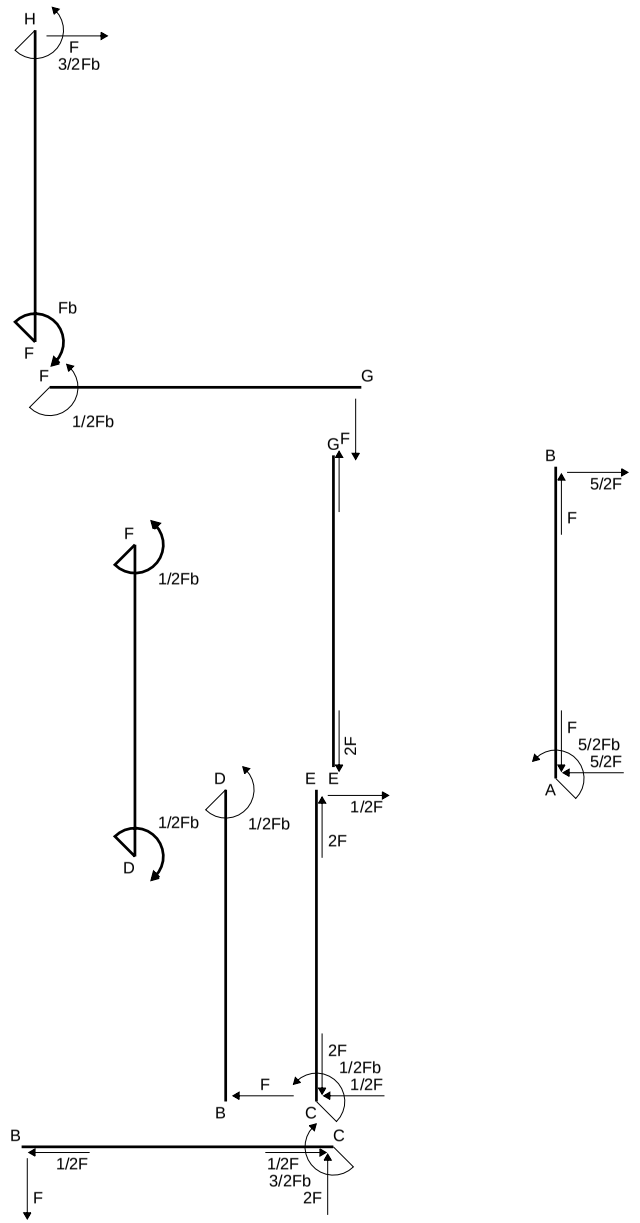
$-H_{BC} b - V_{BC} b = W - 1/2qb^2$

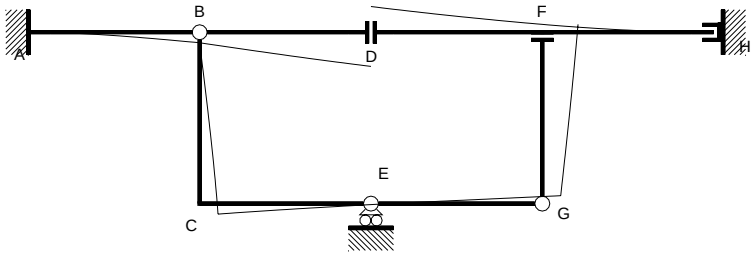
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{BA} \\ v_{DB} \\ u_{FG} \\ \varphi_{GE} \\ \varphi_{EC} \end{array} \begin{bmatrix} V_E b & V_H b & W_H & H_{BC} b & V_{BC} b \\ 1 & 3 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ -1 & 0 & 0 & -1 & -2 \\ 0 & 0 & 0 & -1 & -1 \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ -1 & 1 & -2 \\ 0 & 0 & -1 \\ -1 & 0 & 0 \\ 0 & 1 & -1/2 \\ 0 & 1 & -1/2 \end{bmatrix}$$

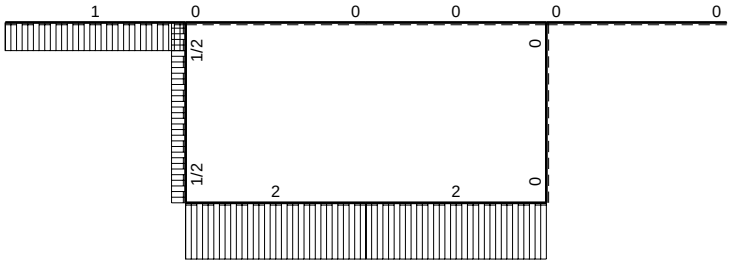
Soluzione del sistema

$$\begin{bmatrix} V_E b \\ V_H b \\ H_{BC} b \\ W_H \\ V_{BC} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ -1 & 1 & -1/2 \\ 0 & 0 & -1 \\ -1 & 0 & 0 \\ 0 & 0 & 3/2 \\ 1 & -1 & 1/2 \end{bmatrix}$$

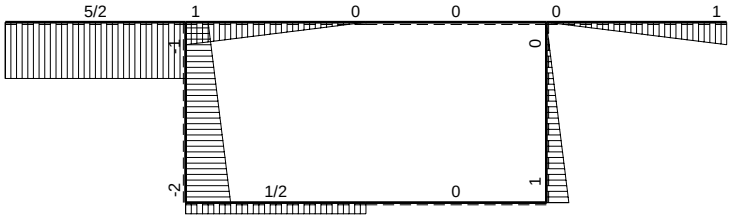




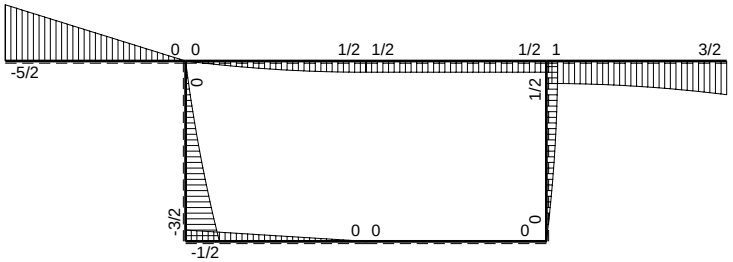
$\vdash\!\!\!\!\dashv$ 6 Fb^3/EJ



$\leftarrow \boxplus \rightarrow$ F



$\uparrow \boxplus \downarrow$ F



$\circlearrowleft \boxplus \circlearrowright$ Fb

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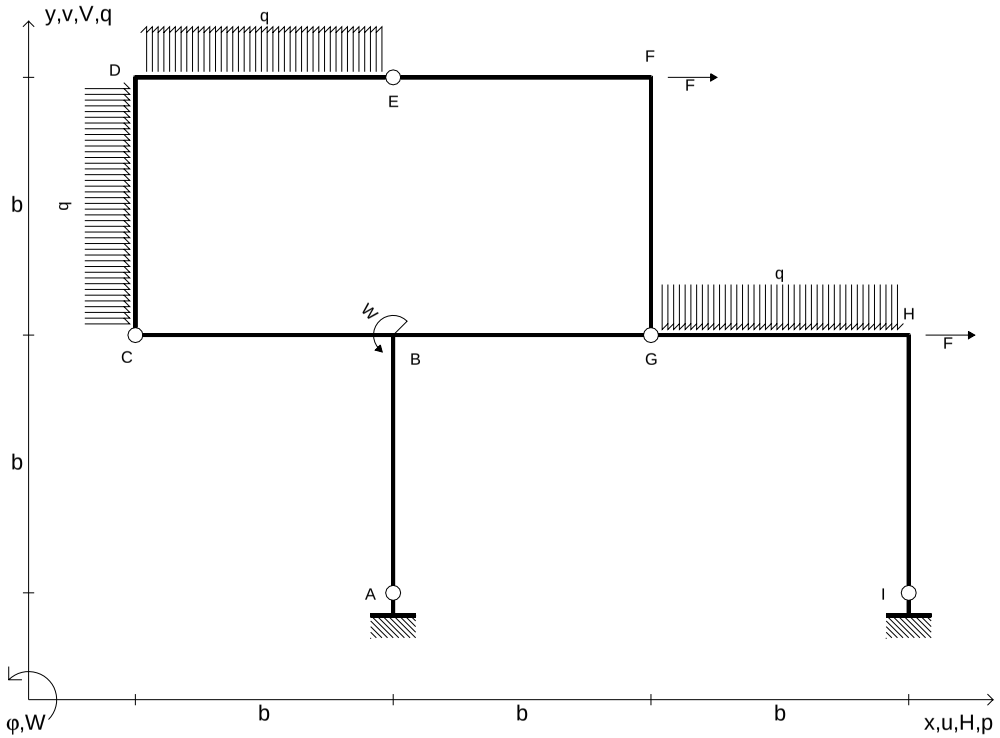

$H_H = F$	$q_{GH} = -q = -F/b$	$EJ_{AB} = EJ$	$EJ_{DE} = EJ$	$EJ_{BG} = EJ$
$H_F = F$	$q_{DE} = q = F/b$	$EJ_{BC} = EJ$	$EJ_{EF} = EJ$	$EJ_{GH} = EJ$
$W_B = W = Fb$	$p_{CD} = q = F/b$	$EJ_{CD} = EJ$	$EJ_{FG} = EJ$	$EJ_{HI} = EJ$

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Struttura Isostatica.001

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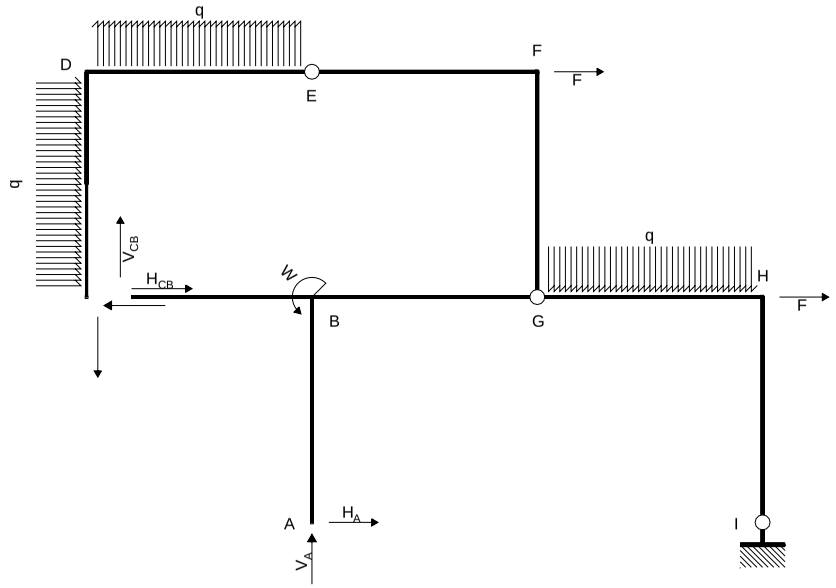


EQUAZIONI DI EQUILIBRIO

Rotazione globale intorno a I

$-2V_A b = 3Fb - W + 7/2qb^2$

Rotazione intorno a G: aste GF FE ED DC

$2V_{CB} b = Fb + 2qb^2$

Rotazione intorno a G: aste GB BA BC

$H_A b - V_A b - 2V_{CB} b = -W$

Rotazione intorno a E: aste ED DC

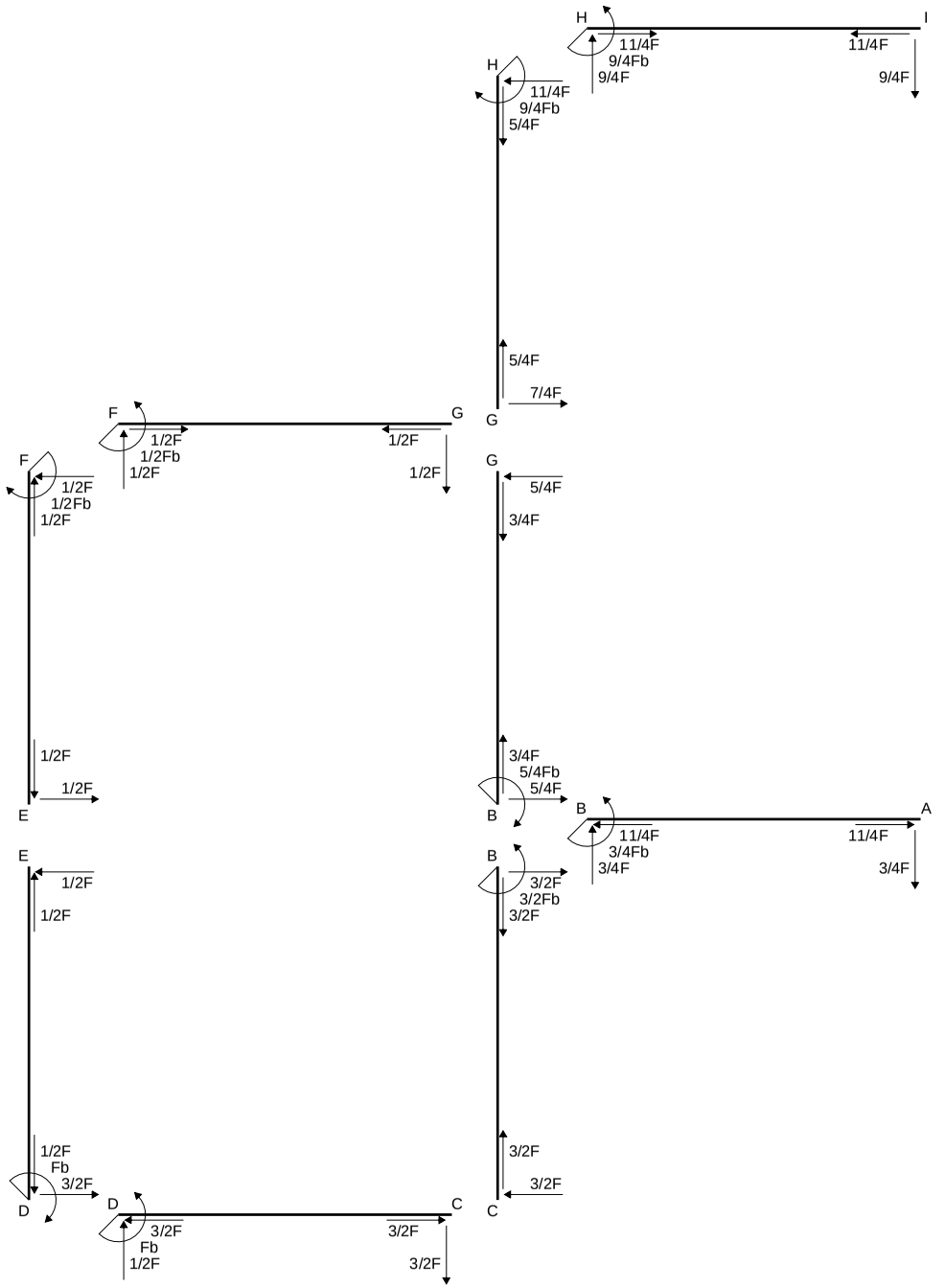
$-H_{CB} b + V_{CB} b = 0$

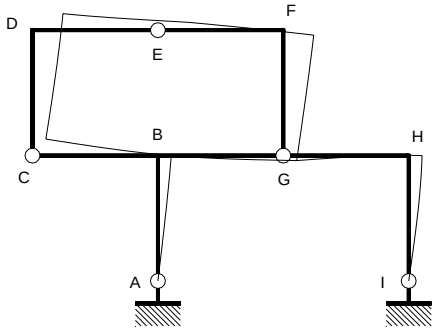
Matrice di equilibrio

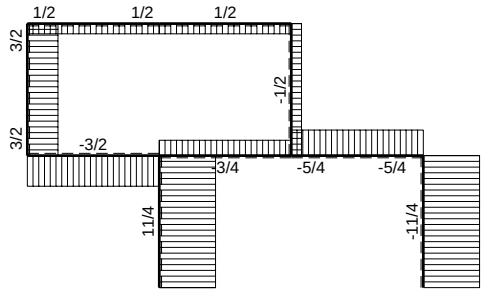
$$\begin{array}{c} \\ \varphi_I \\ \varphi_{GF} \\ \varphi_{GB} \\ \varphi_{ED} \end{array} \begin{bmatrix} H_A b & V_A b & H_{CB} b & V_{CB} b \\ 0 & -2 & 0 & 0 \\ 0 & 0 & 0 & 2 \\ 1 & -1 & 0 & -2 \\ 0 & 0 & -1 & 1 \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ 3 & -1 & 7/2 \\ 1 & 0 & 2 \\ 0 & -1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Soluzione del sistema

$$\begin{bmatrix} V_A b \\ V_{CB} b \\ H_A b \\ H_{CB} b \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ -3/2 & 1/2 & -7/4 \\ 1/2 & 0 & 1 \\ -1/2 & -1/2 & 1/4 \\ 1/2 & 0 & 1 \end{bmatrix}$$

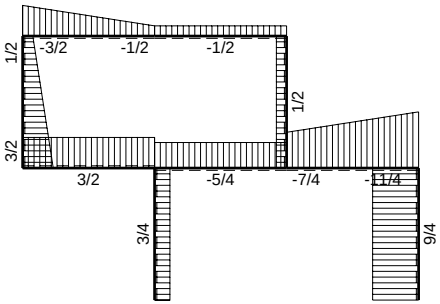


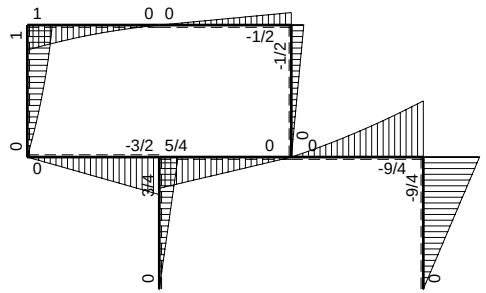




$\vdash\!\!\!\dashv$ 6 Fb^3/EJ

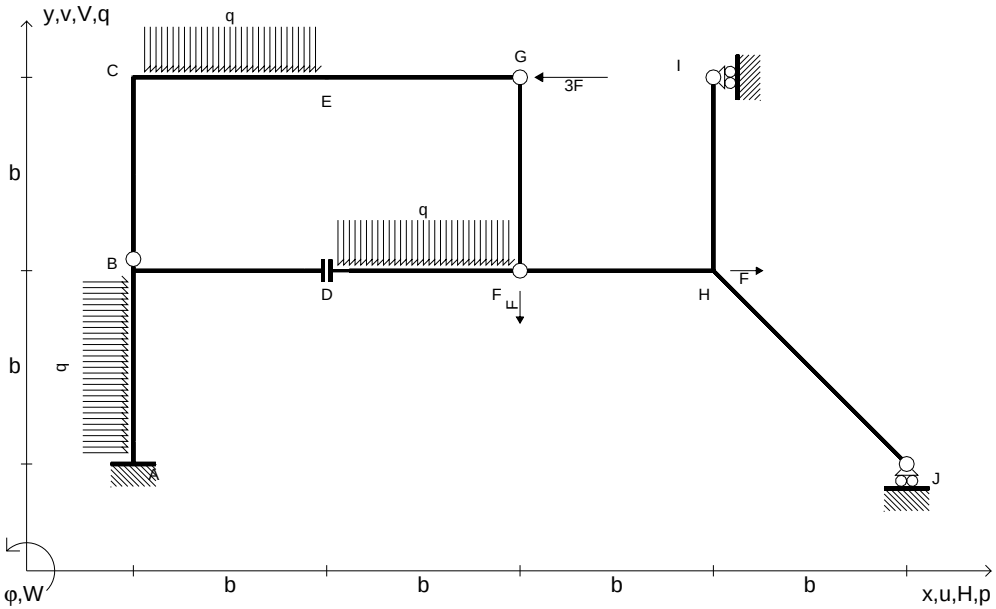
$\leftarrow$ F $\rightarrow$





F

Fb



$H_H = F$	$p_{AB} = q = F/b$	$EJ_{AB} = EJ$	$EJ_{CE} = EJ$	$EJ_{GF} = EJ$	$EJ_{HJ} = EJ$
$H_G = -3F$	$q_{DF} = -q = -F/b$	$EJ_{BC} = EJ$	$EJ_{DF} = EJ$	$EJ_{FH} = EJ$	
$V_F = -F$	$q_{CE} = -q = -F/b$	$EJ_{BD} = EJ$	$EJ_{EG} = EJ$	$EJ_{HI} = EJ$	

Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi quotati delle azioni interne nelle aste.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.

Struttura Isostatica.001

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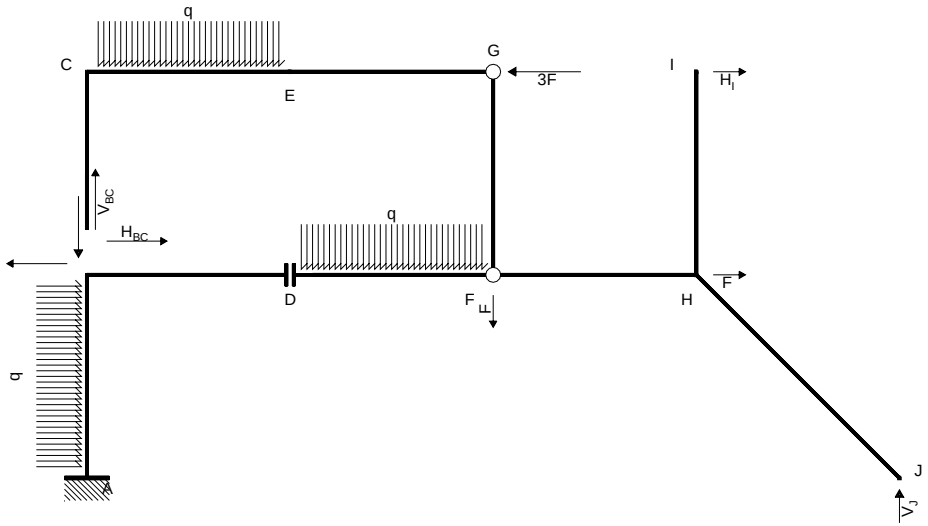


EQUAZIONI DI EQUILIBRIO

Traslazione verticale: aste DF FG FH GE HI HJ EC CB

$V_J + V_{BC} = F + 2qb$

Rotazione intorno a F: aste FG FH GE HI HJ EC CB

$-H_I b + 2V_J b - 2V_{BC} b = -3Fb - 3/2qb^2$

Rotazione intorno a F: aste FG GE EC CB

$-2V_{BC} b = -3Fb - 3/2qb^2$

Rotazione intorno a G: aste GE EC CB

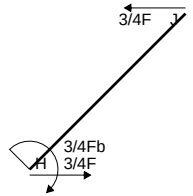
$H_{BC} b - 2V_{BC} b = -3/2qb^2$

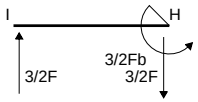
Matrice di equilibrio

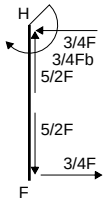
$$\begin{array}{c} \\ v_{DB} \\ \varphi_{FD} \\ \varphi_{FG} \\ \varphi_{GE} \end{array} \begin{bmatrix} H_I b & V_J b & H_{BC} b & V_{BC} b \\ 0 & 1 & 0 & 1 \\ -1 & 2 & 0 & -2 \\ 0 & 0 & 0 & -2 \\ 0 & 0 & 1 & -2 \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ 1 & 2 \\ -3 & -3/2 \\ -3 & -3/2 \\ 0 & -3/2 \end{bmatrix}$$

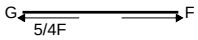
Soluzione del sistema

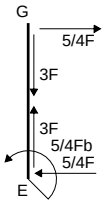
$$\begin{bmatrix} V_J b \\ H_I b \\ V_{BC} b \\ H_{BC} b \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ -1/2 & 5/4 \\ -1 & 5/2 \\ 3/2 & 3/4 \\ 3 & 0 \end{bmatrix}$$

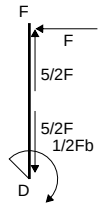


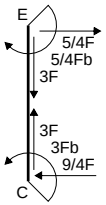


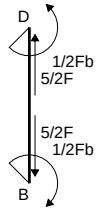


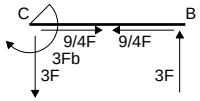


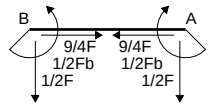


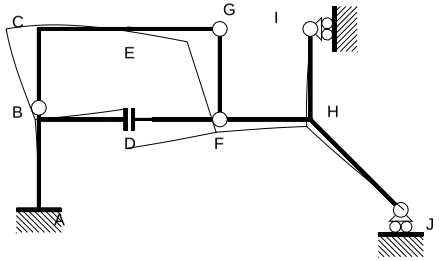


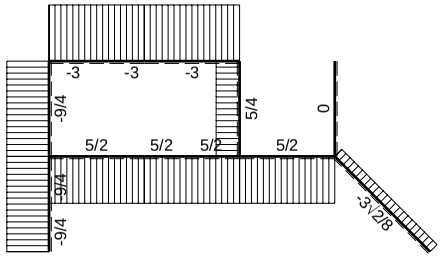






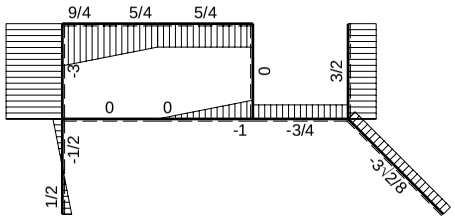


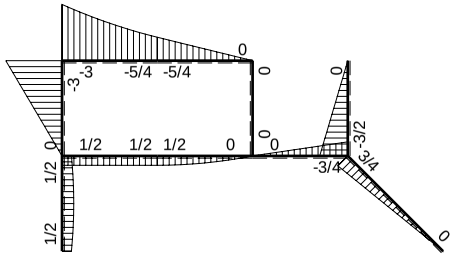




$\vdash\!\!\!\dashv$ 6 Fb^3/EJ

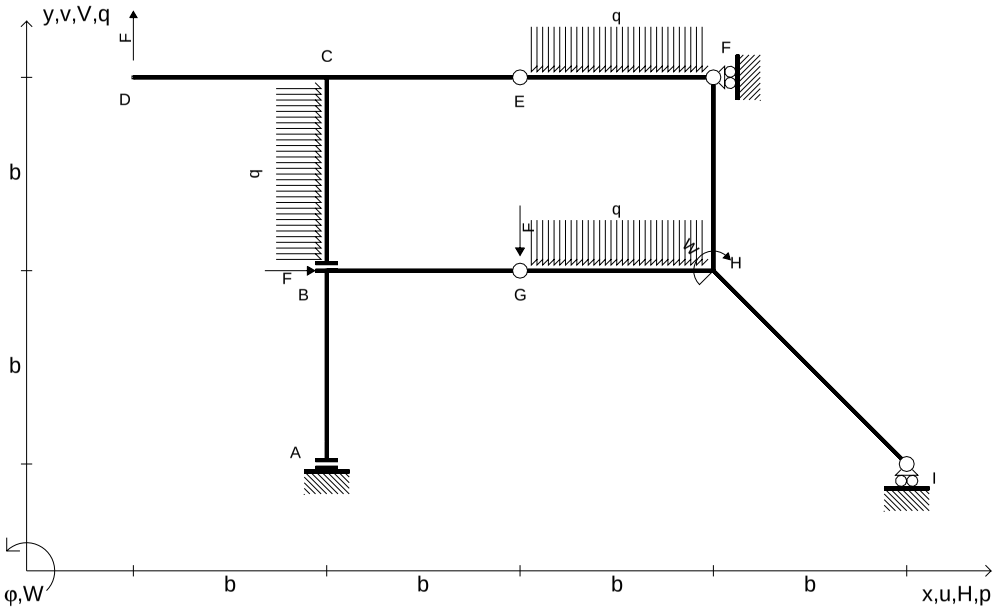
$\leftarrow$ F $\rightarrow$





F

Fb



$V_D = F$	$p_{BC} = q = F/b$	$EJ_{BC} = EJ$	$EJ_{BG} = EJ$
$H_{BG} = F$	$q_{GH} = -q = -F/b$	$EJ_{CD} = EJ$	$EJ_{GH} = EJ$
$V_G = -F$	$q_{EF} = -q = -F/b$	$EJ_{CE} = EJ$	$EJ_{FH} = EJ$
$W_H = -W = -Fb$	$EJ_{AB} = EJ$	$EJ_{EF} = EJ$	$EJ_{HI} = EJ$

Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi quotati delle azioni interne nelle aste.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.

Struttura Isostatica.001

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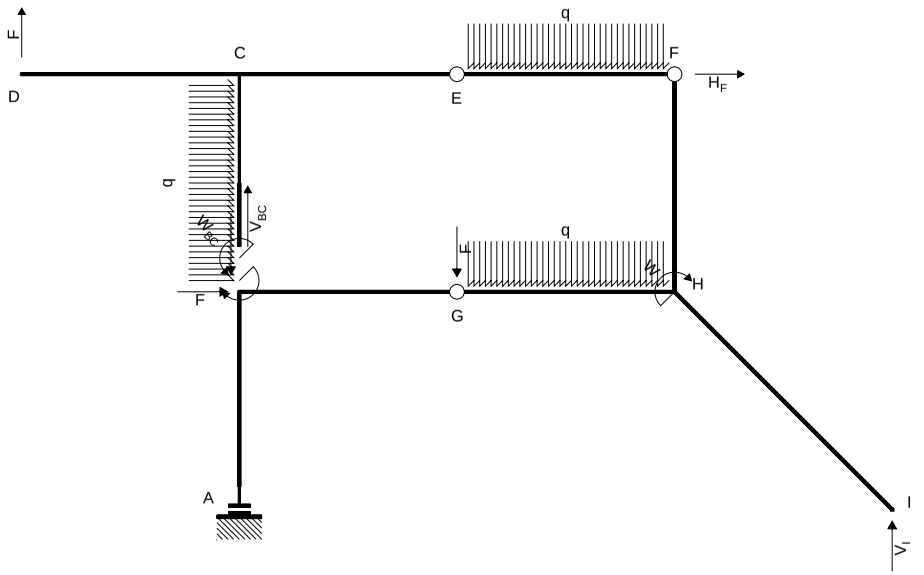


EQUAZIONI DI EQUILIBRIO

Traslazione orizzontale globale

$H_F = -F -qb$

Rotazione intorno a G: aste GH HF HI FE EC CB CD

$-H_F b +2V_I b -V_{BC} b +W_{BC} = 2Fb +W +3/2qb^2$

Rotazione intorno a F: aste FE EC CB CD

$-2V_{BC} b +W_{BC} = 3Fb -qb^2$

Rotazione intorno a E: aste EC CB CD

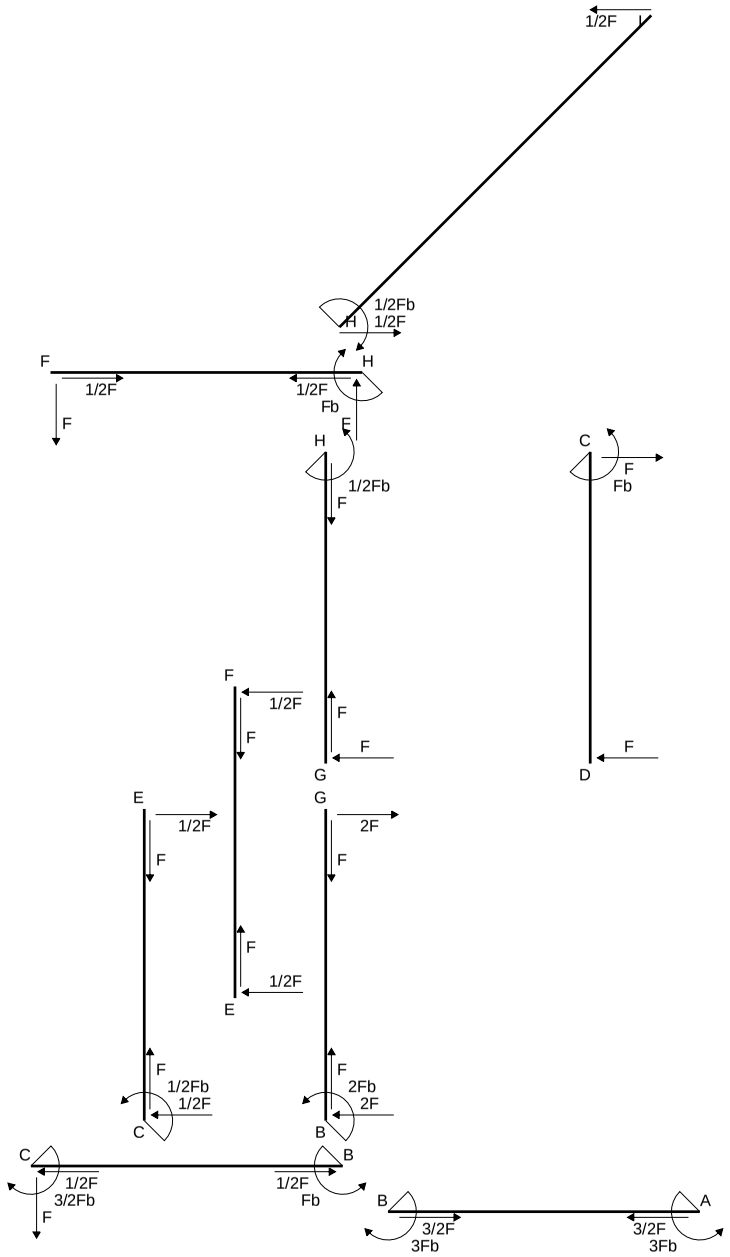
$-V_{BC} b +W_{BC} = 2Fb -1/2qb^2$

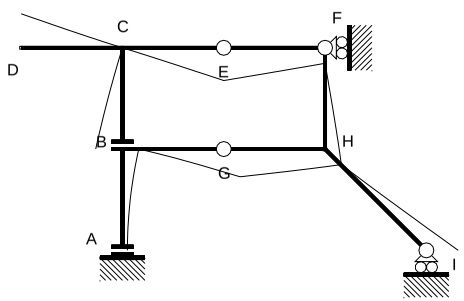
Matrice di equilibrio

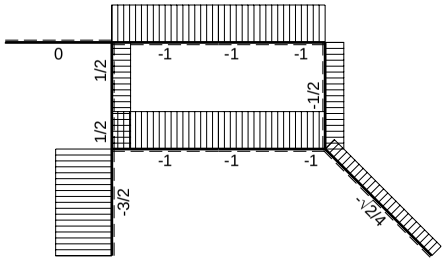
$$\begin{array}{c} \\ u_A \\ \varphi_{GB} \\ \varphi_{FE} \\ \varphi_{EC} \end{array} \begin{bmatrix} H_F b & V_I b & V_{BC} b & W_{BC} \\ 1 & 0 & 0 & 0 \\ -1 & 2 & -1 & 1 \\ 0 & 0 & -2 & 1 \\ 0 & 0 & -1 & 1 \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ -1 & 0 & -1 \\ 2 & 1 & 3/2 \\ 3 & 0 & -1 \\ 2 & 0 & -1/2 \end{bmatrix}$$

Soluzione del sistema

$$\begin{bmatrix} H_F b \\ V_I b \\ V_{BC} b \\ W_{BC} \end{bmatrix} = \begin{bmatrix} Fb & W & qb^2 \\ -1 & 0 & -1 \\ -1/2 & 1/2 & 1/2 \\ -1 & 0 & 1/2 \\ 1 & 0 & 0 \end{bmatrix}$$

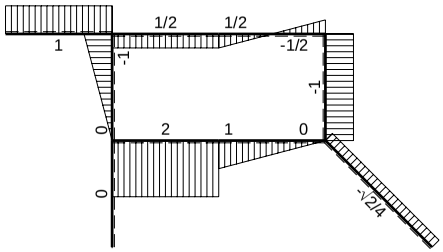


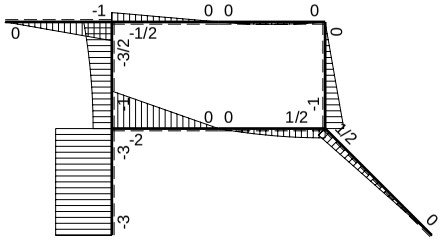




10 Fb^3/EJ

F





F

Fb