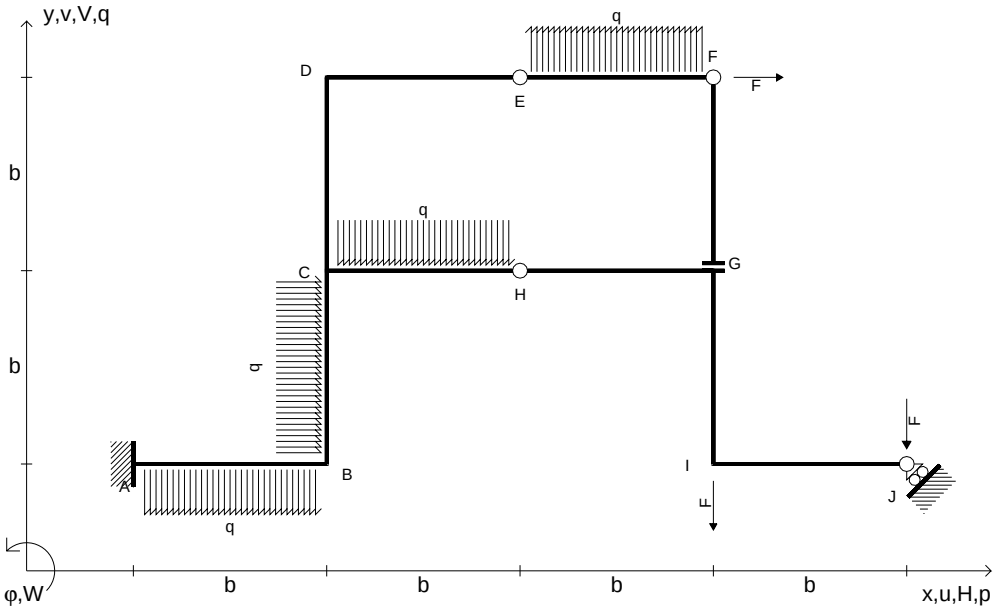

$V_I = -F$
$H_F = F$
$V_J = -F$
$p_{BC} = q = F/b$
$q_{CH} = -q = -F/b$
$q_{EF} = q = F/b$

$q_{AB} = -q = -F/b$
$EJ_{AB} = EJ$
$EJ_{BC} = EJ$
$EJ_{CD} = EJ$
$EJ_{DE} = EJ$
$EJ_{EF} = EJ$

$EJ_{FG} = EJ$
$EJ_{CH} = EJ$
$EJ_{HG} = EJ$
$EJ_{GI} = EJ$
$EJ_{IJ} = EJ$

Piano J

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.
Piano di scorrimento del vincolo con inclinazione assegnata.

Struttura Isostatica.001

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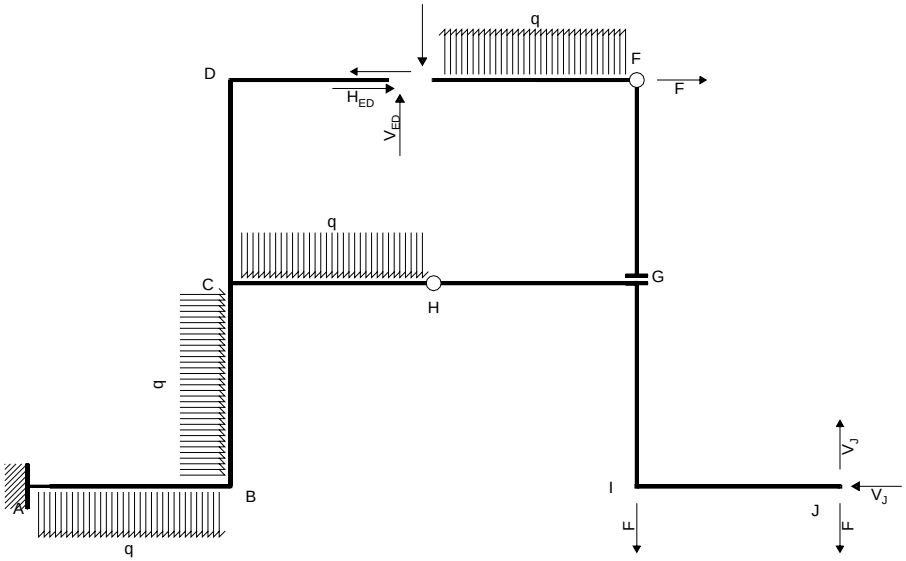


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a H: aste HG GF GI FE IJ

$V_J b + H_{ED} b = 4Fb - 1/2qb^2$

Traslazione orizzontale: aste GF FE

$-H_{ED} = -F$

Rotazione intorno a F: aste FE

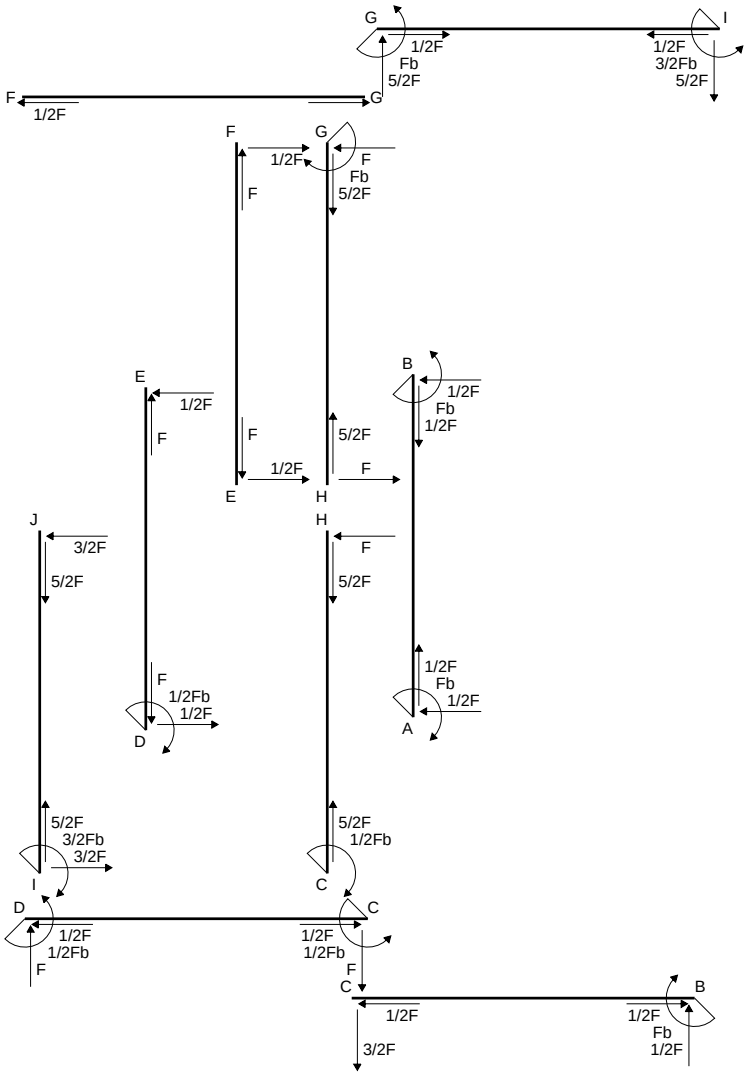
$V_{ED} b = 1/2qb^2$

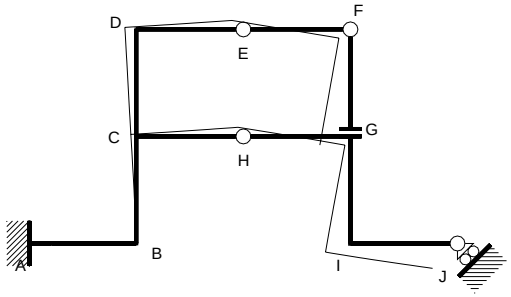
Matrice di equilibrio

$$\begin{matrix} & \begin{bmatrix} V_J b & H_{ED} b & V_{ED} b \end{bmatrix} \\ \varphi_{HC} \\ u_{GF} \\ \varphi_{FE} \end{matrix} \begin{bmatrix} 1 & 1 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ 4 & -1/2 \\ -1 & 0 \\ 0 & 1/2 \end{bmatrix}$$

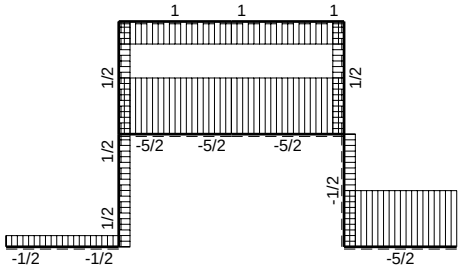
Soluzione del sistema

$$\begin{bmatrix} V_J b \\ H_{ED} b \\ V_{ED} b \end{bmatrix} = \begin{matrix} \begin{bmatrix} Fb & qb^2 \end{bmatrix} \\ \begin{bmatrix} 3 & -1/2 \\ 1 & 0 \\ 0 & 1/2 \end{bmatrix} \end{matrix}$$

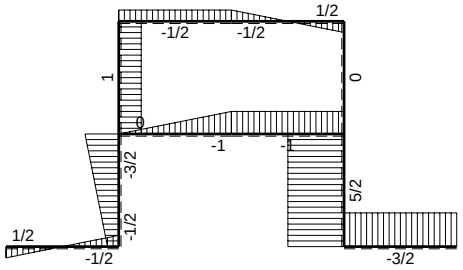




20 Fb^3/EJ



F



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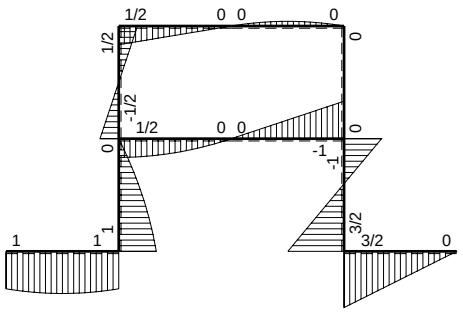

Fb

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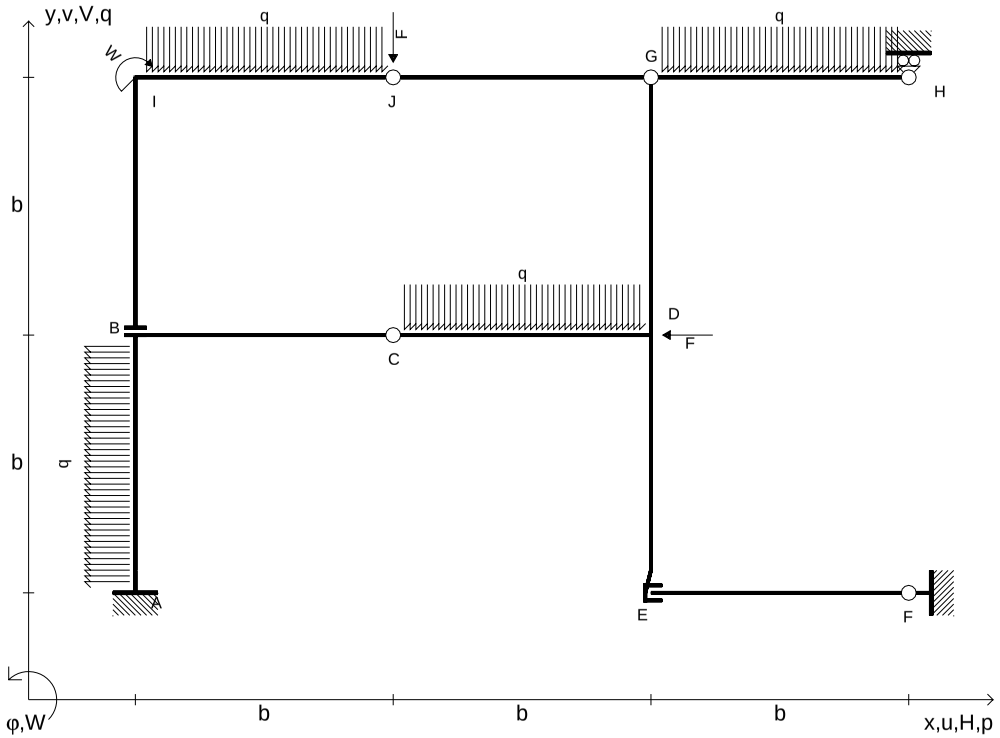

$V_J = -F$ $p_{AB} = -q = -F/b$ $EJ_{BC} = EJ$ $EJ_{DG} = EJ$ $EJ_{JG} = EJ$

$H_D = -F$ $q_{IJ} = -q = -F/b$ $EJ_{CD} = EJ$ $EJ_{GH} = EJ$

$W_I = -W = -Fb$ $q_{GH} = -q = -F/b$ $EJ_{DE} = EJ$ $EJ_{BI} = EJ$

$q_{CD} = -q = -F/b$ $EJ_{AB} = EJ$ $EJ_{EF} = EJ$ $EJ_{IJ} = EJ$

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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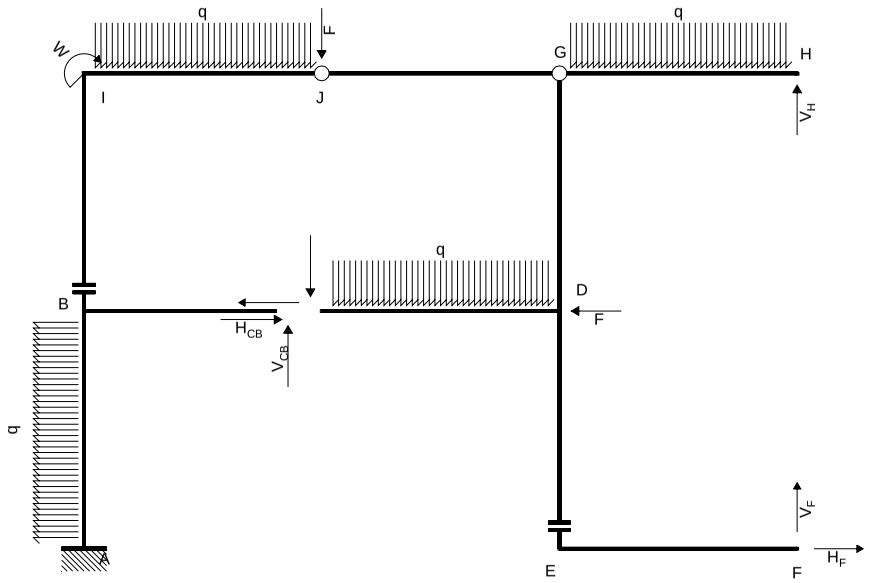


EQUAZIONI DI EQUILIBRIO

Traslazione orizzontale: aste BI IJ JG GD GH DC DE EF

$H_F - H_{CB} = F$

Rotazione intorno a J: aste JG GD GH DC DE EF

$2H_Fb + 2V_Fb + 2V_Hb - H_{CB}b = Fb + 2qb^2$

Rotazione intorno a G: aste GD GH DC DE EF

$2H_Fb + V_Fb + V_Hb - H_{CB}b + V_{CB}b = Fb$

Rotazione intorno a G: aste GD DC DE EF

$2H_Fb + V_Fb - H_{CB}b + V_{CB}b = Fb - 1/2qb^2$

Traslazione orizzontale: aste EF

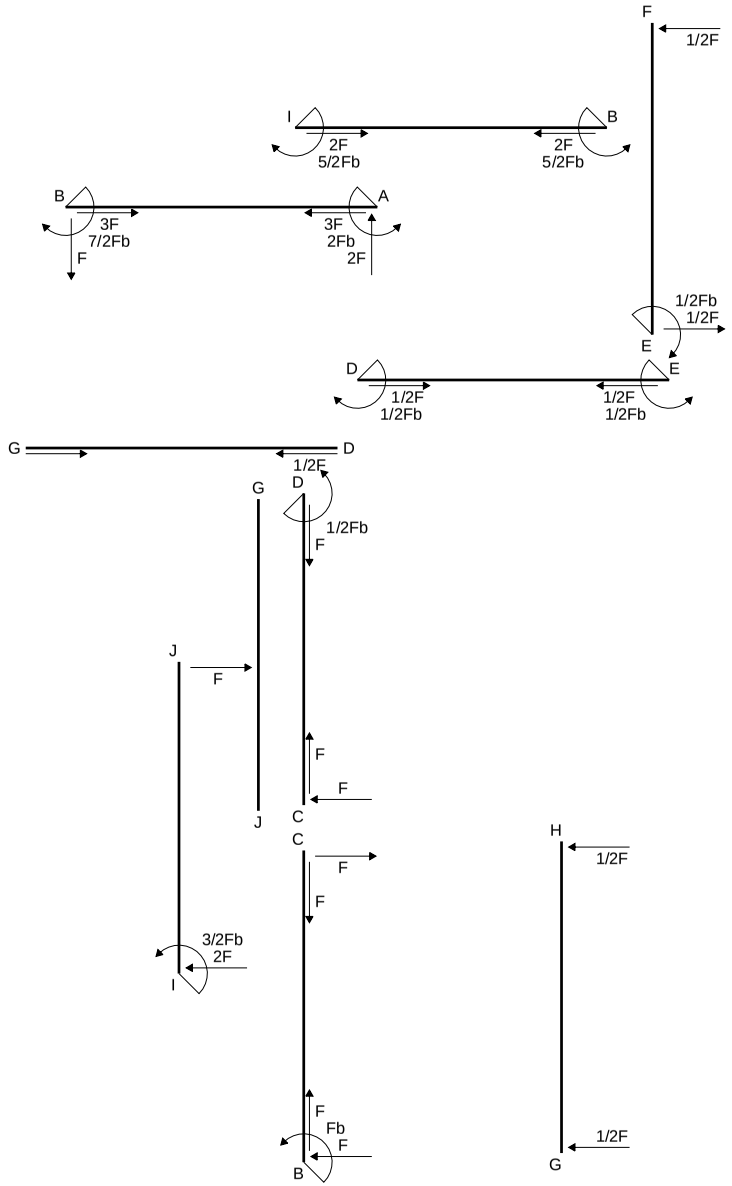
$H_F = 0$

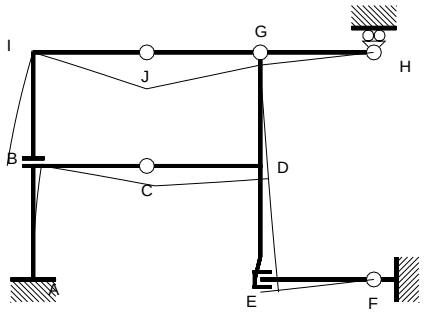
Matrice di equilibrio

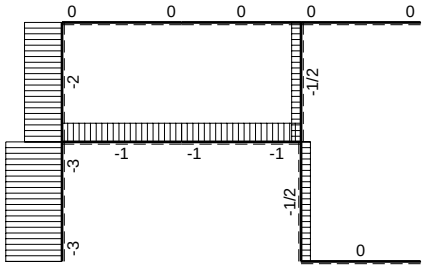
	H_Fb	V_Fb	V_Hb	$H_{CB}b$	$V_{CB}b$		Fb	W	qb^2
u_{BI}	1	0	0	-1	0		1	0	0
φ_{JI}	2	2	2	-1	0		1	0	2
φ_{GJ}	2	1	1	-1	1	=	1	0	0
φ_{GD}	2	1	0	-1	1		1	0	-1/2
u_{ED}	1	0	0	0	0		0	0	0

Soluzione del sistema

		Fb	W	qb^2
H_Fb		0	0	0
V_Fb		0	0	1/2
$H_{CB}b$	=	-1	0	0
V_Hb		0	0	1/2
$V_{CB}b$		0	0	-1

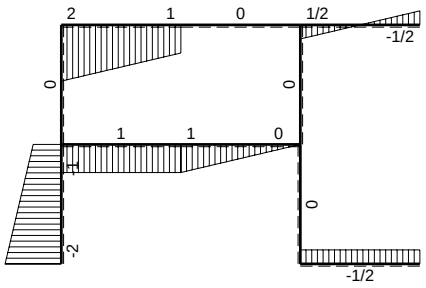


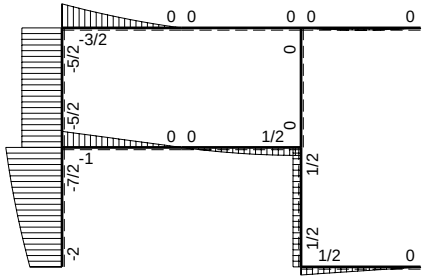




$\vdash\!\!\!\dashv$ 12 Fb^3/EJ

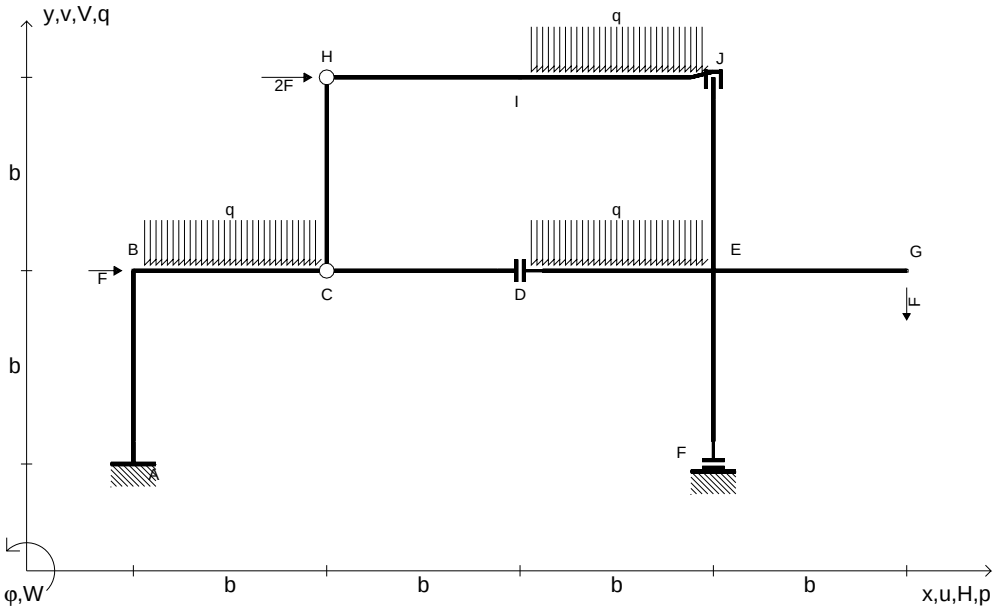
$\leftarrow$ F $\rightarrow$





$\uparrow\downarrow$ F

Fb



$H_B = F$	$q_{BC} = -q = -F/b$	$EJ_{AB} = EJ$	$EJ_{DE} = EJ$	$EJ_{CH} = EJ$	$EJ_{JE} = EJ$
$V_G = -F$	$q_{DE} = -q = -F/b$	$EJ_{BC} = EJ$	$EJ_{EF} = EJ$	$EJ_{HI} = EJ$	
$H_H = 2F$	$q_{IJ} = -q = -F/b$	$EJ_{CD} = EJ$	$EJ_{EG} = EJ$	$EJ_{IJ} = EJ$	

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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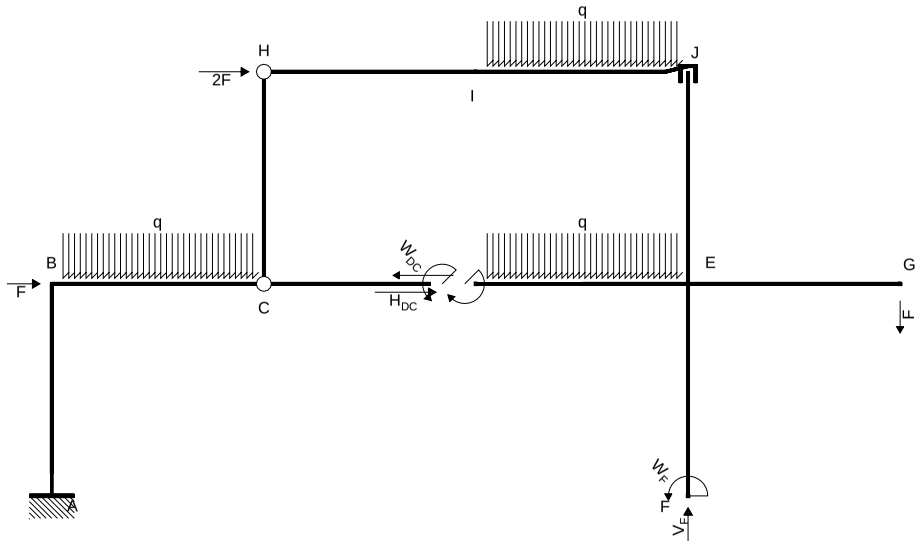


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a C: aste CD CH HI IJ JE ED EF EG

$2V_Fb + W_F = 5Fb + 3qb^2$

Rotazione intorno a C: aste CH HI IJ JE ED EF EG

$2V_Fb + W_F - W_{DC} = 5Fb + 3qb^2$

Rotazione intorno a H: aste HI IJ JE ED EF EG

$2V_Fb + W_F - H_{DC}b - W_{DC} = 3Fb + 3qb^2$

Traslazione verticale: aste JE ED EF EG

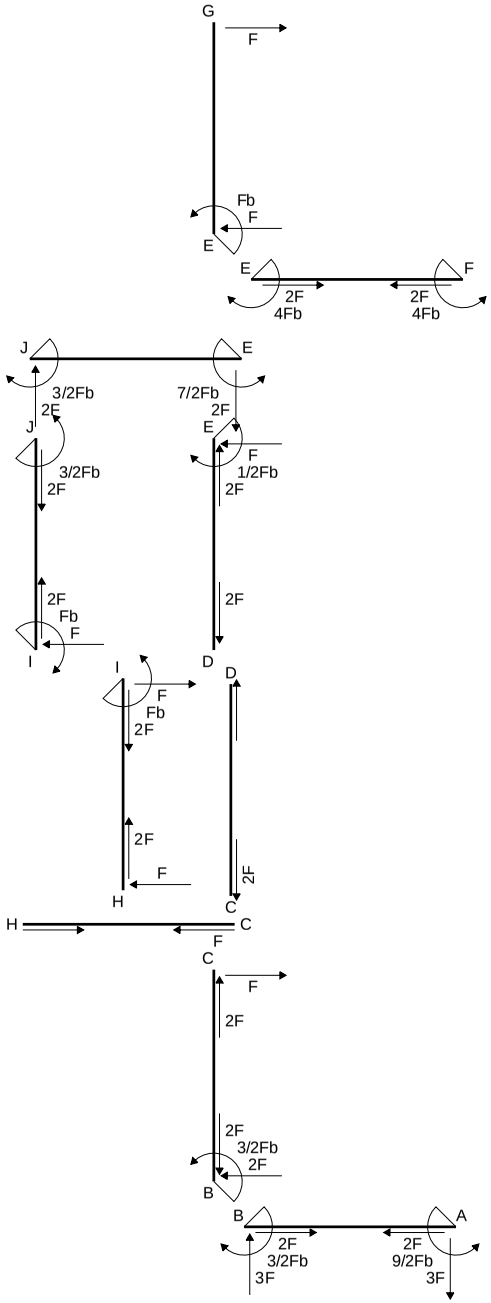
$V_F = F + qb$

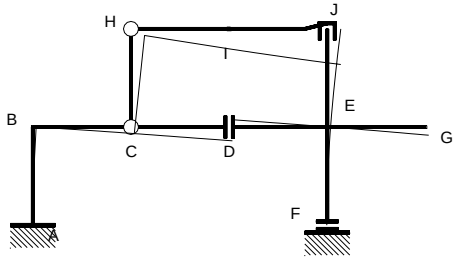
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{CB} \\ \varphi_{CH} \\ \varphi_{HI} \\ v_{JI} \end{array} \begin{bmatrix} V_Fb & W_F & H_{DC}b & W_{DC} \\ 2 & 1 & 0 & 0 \\ 2 & 1 & 0 & -1 \\ 2 & 1 & -1 & -1 \\ 1 & 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ 5 & 3 \\ 5 & 3 \\ 3 & 3 \\ 1 & 1 \end{bmatrix}$$

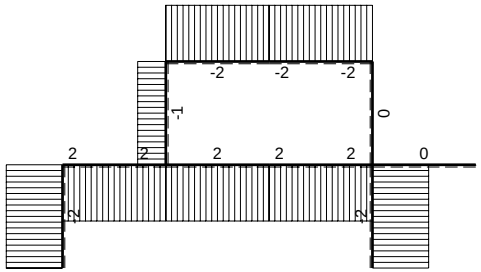
Soluzione del sistema

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

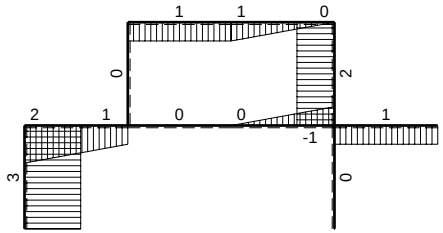




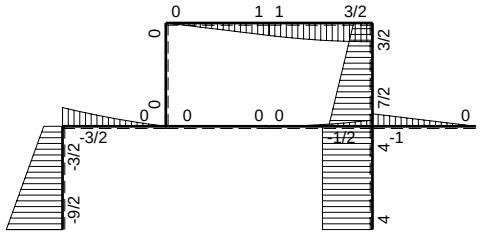
40 Fb^3/EJ



F



F



Fb

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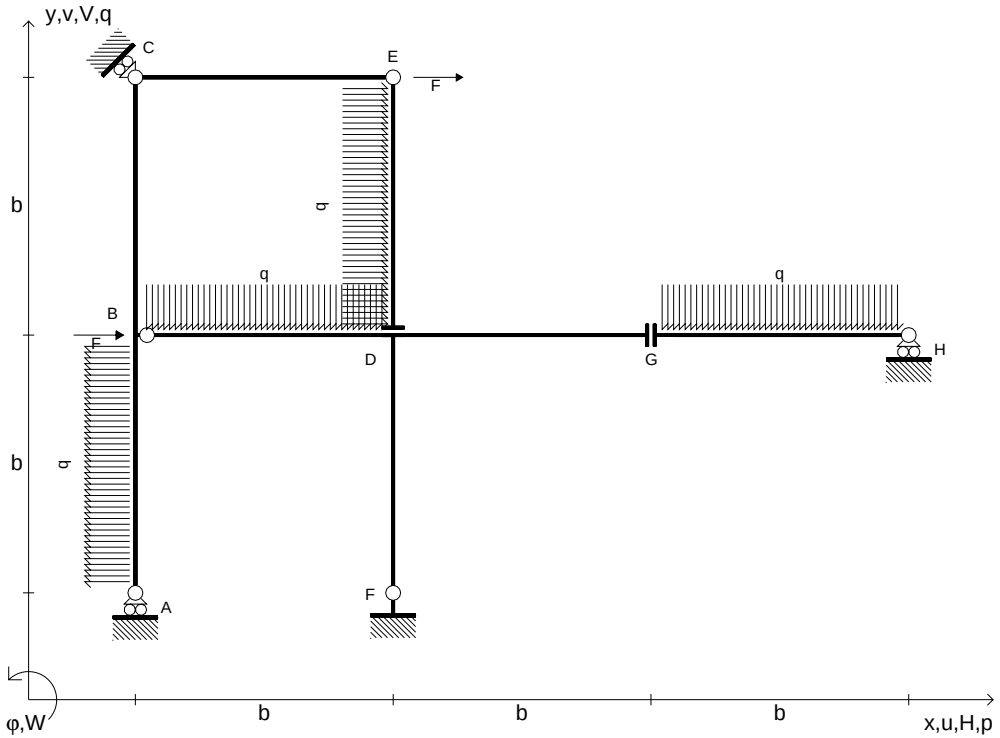

$H_E = F$
$H_B = F$
$p_{AB} = -q = -F/b$
$q_{BD} = -q = -F/b$

$q_{GH} = -q = -F/b$
$p_{DE} = q = F/b$
$EJ_{AB} = EJ$
$EJ_{BC} = EJ$

$EJ_{BD} = EJ$
$EJ_{DE} = EJ$
$EJ_{DF} = EJ$
$EJ_{DG} = EJ$

$EJ_{GH} = EJ$
$EJ_{EC} = EJ$

1
1

Piano C

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.
Piano di scorrimento del vincolo con inclinazione assegnata.

Struttura Isostatica.001

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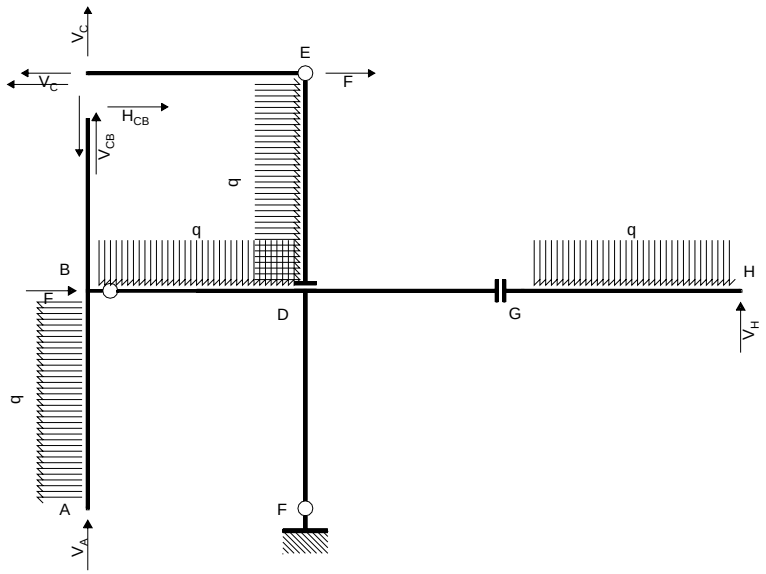


EQUAZIONI DI EQUILIBRIO

Rotazione globale intorno a F

$-V_A b + V_C b + 2V_H b = 3Fb + 2qb^2$

Rotazione intorno a B: aste BA BC

$-H_{CB} b = 1/2 qb^2$

Traslazione orizzontale: aste DE EC

$-V_C - H_{CB} = -F - qb$

Traslazione verticale: aste GH

$V_H = qb$

Rotazione intorno a E: aste EC

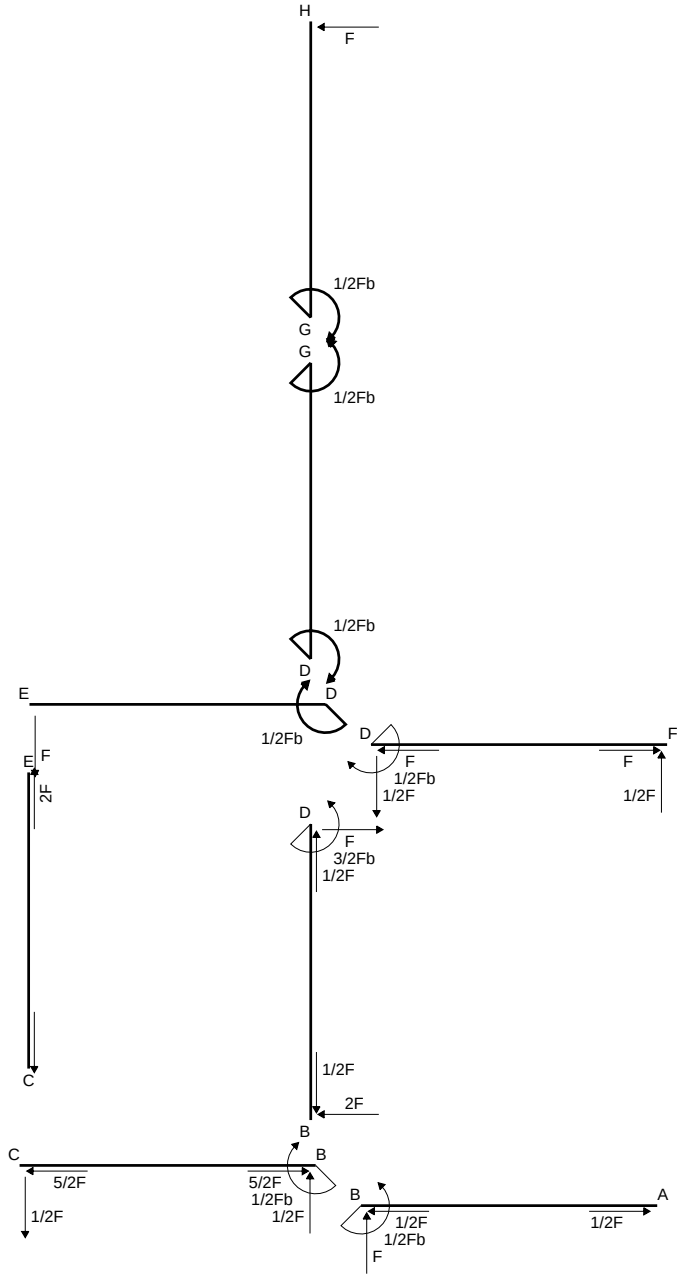
$-V_C b + V_{CB} b = 0$

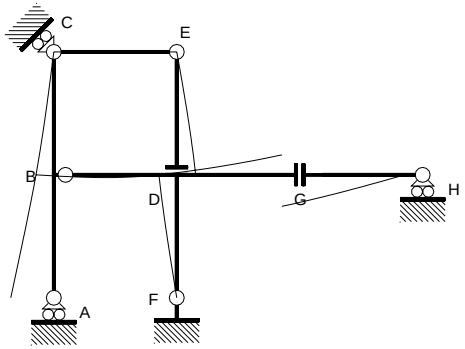
Matrice di equilibrio

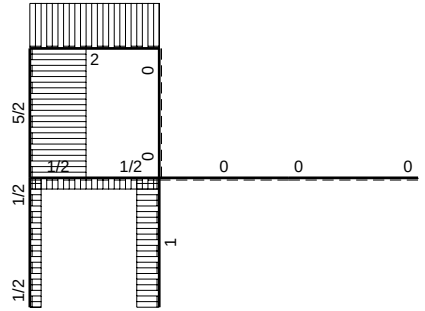
	$V_A b$	$V_C b$	$V_H b$	$H_{CB} b$	$V_{CB} b$		Fb	qb^2
φ_F	-1	1	2	0	0	=	3	2
φ_{BD}	0	0	0	-1	0		0	1/2
u_{DE}	0	-1	0	-1	0		-1	-1
v_{GD}	0	0	1	0	0		0	1
φ_{EC}	0	-1	0	0	1		0	0

Soluzione del sistema

		Fb	qb^2
$V_A b$		-2	3/2
$H_{CB} b$		0	-1/2
$V_C b$	=	1	3/2
$V_H b$		0	1
$V_{CB} b$		1	3/2

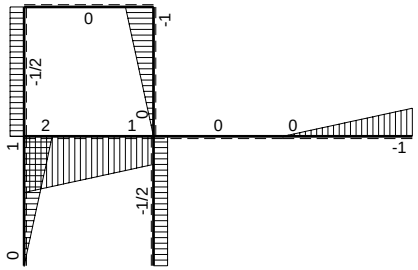


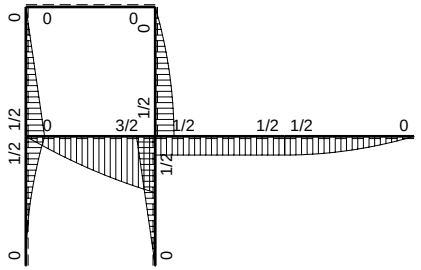




$\vdash\!\!\!\dashv$ 3 Fb^3/EJ

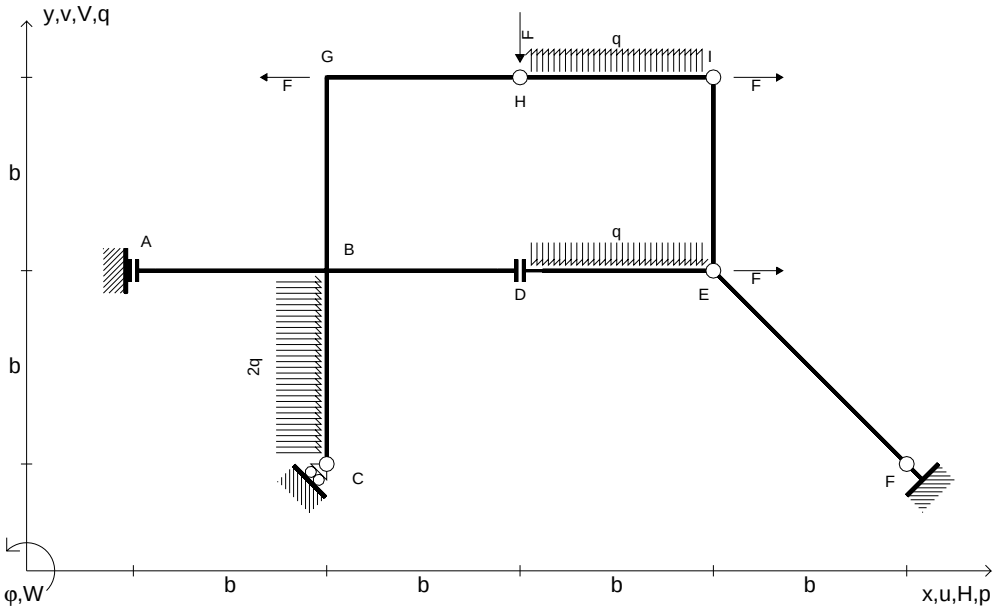
$\leftarrow$ + $\rightarrow$ F





$\uparrow$ + $\downarrow$ F

$\circlearrowright$ + $\circlearrowleft$ Fb



$H_E = F$
$H_G = -F$
$H_I = F$
$V_H = -F$
$q_{DE} = -q = -F/b$
$q_{HI} = q = F/b$

$p_{BC} = 2q = 2F/b$
$EJ_{AB} = EJ$
$EJ_{BC} = EJ$
$EJ_{BD} = EJ$
$EJ_{DE} = EJ$
$EJ_{EF} = EJ$

$EJ_{BG} = EJ$
$EJ_{GH} = EJ$
$EJ_{HI} = EJ$
$EJ_{IE} = EJ$

1
1 Piano C

Carichi e deformazioni date hanno verso efficace in disegno.
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Struttura Isostatica.001

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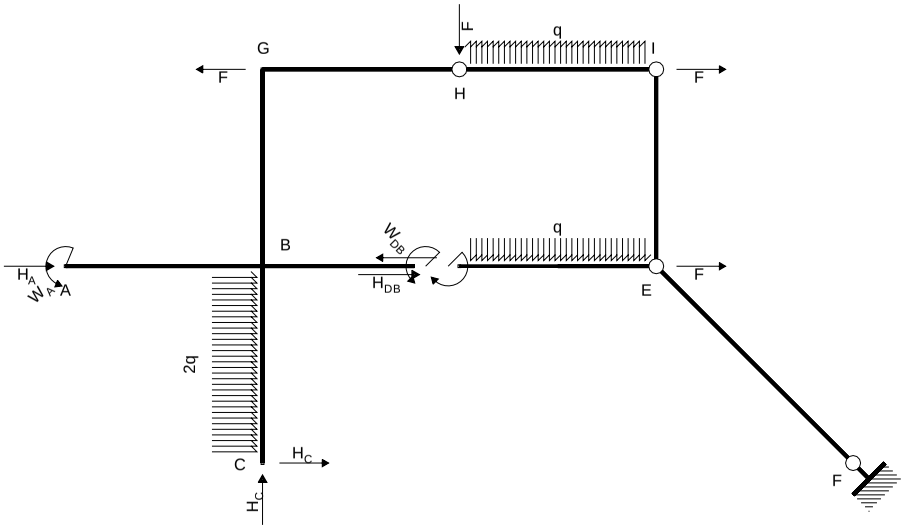


EQUAZIONI DI EQUILIBRIO

Rotazione globale intorno a F

$-H_A b + W_A - 3H_C b = -Fb + qb^2$

Rotazione intorno a E: aste ED

$-W_{DB} = -1/2qb^2$

Rotazione intorno a E: aste EI IH HG GB BA BC BD

$W_A - H_C b + W_{DB} = -Fb - 1/2qb^2$

Rotazione intorno a I: aste IH HG GB BA BC BD

$H_A b + W_A + H_{DB} b + W_{DB} = -Fb - 5/2qb^2$

Rotazione intorno a H: aste HG GB BA BC BD

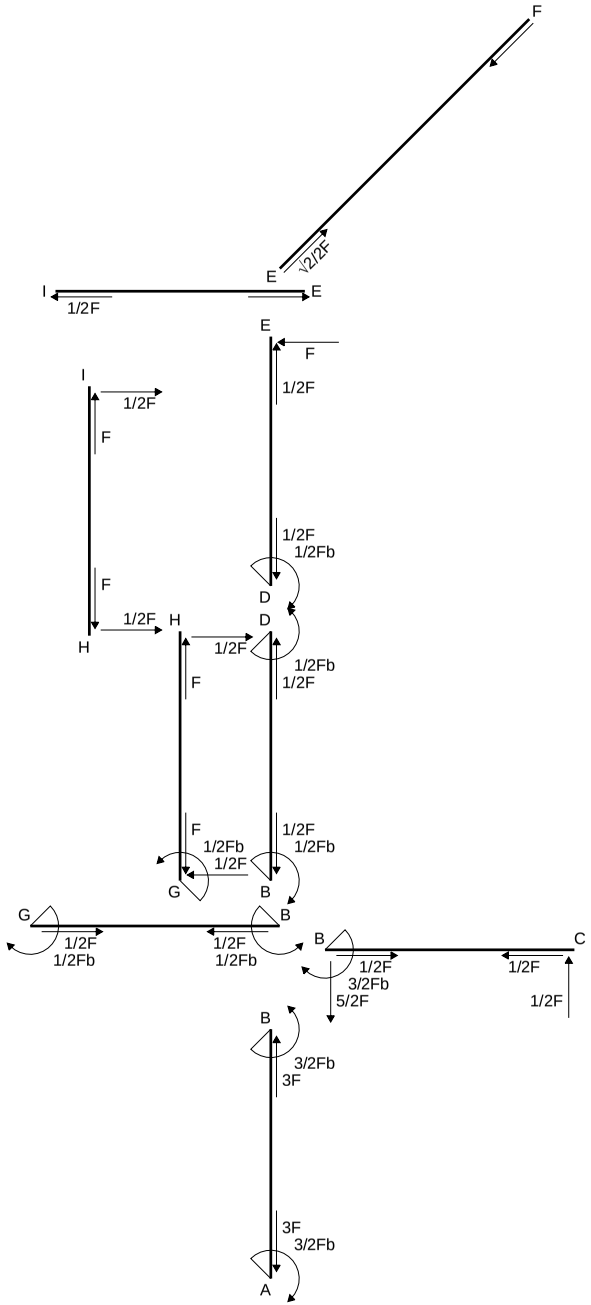
$H_A b + W_A + H_C b + H_{DB} b + W_{DB} = -3qb^2$

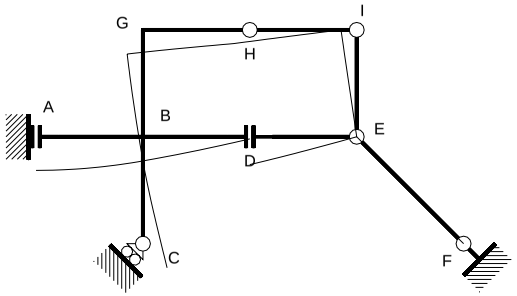
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_F \\ \varphi_{ED} \\ \varphi_{EI} \\ \varphi_{IH} \\ \varphi_{HG} \end{array} \begin{bmatrix} H_A b & W_A & H_C b & H_{DB} b & W_{DB} \\ -1 & 1 & -3 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 \\ 0 & 1 & -1 & 0 & 1 \\ 1 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ -1 & 1 \\ 0 & -1/2 \\ -1 & -1/2 \\ -1 & -5/2 \\ 0 & -3 \end{bmatrix}$$

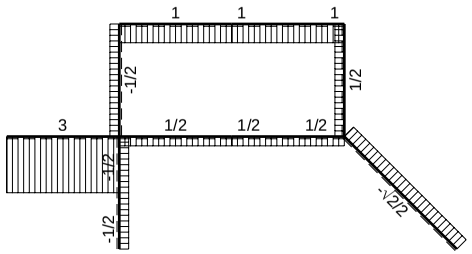
Soluzione del sistema

$$\begin{bmatrix} H_A b \\ W_{DB} \\ H_C b \\ H_{DB} b \\ W_A \end{bmatrix} = \begin{bmatrix} Fb & qb^2 \\ -2 & -1 \\ 0 & 1/2 \\ 1 & -1/2 \\ 1 & -1/2 \\ 0 & -3/2 \end{bmatrix}$$

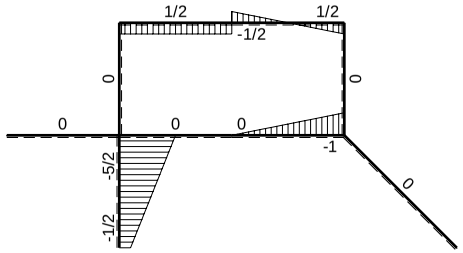




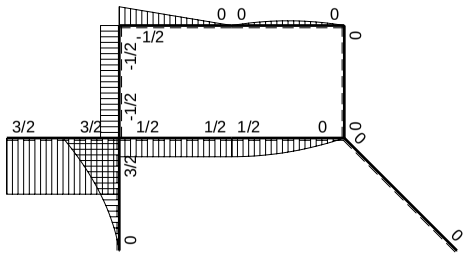
$\vdash\!\!\dashv$ 6 Fb^3/EJ



$\leftarrow\boxplus\rightarrow$ F



$\uparrow\boxplus\downarrow$ F



$\circlearrowleft\boxplus\circlearrowright$ Fb