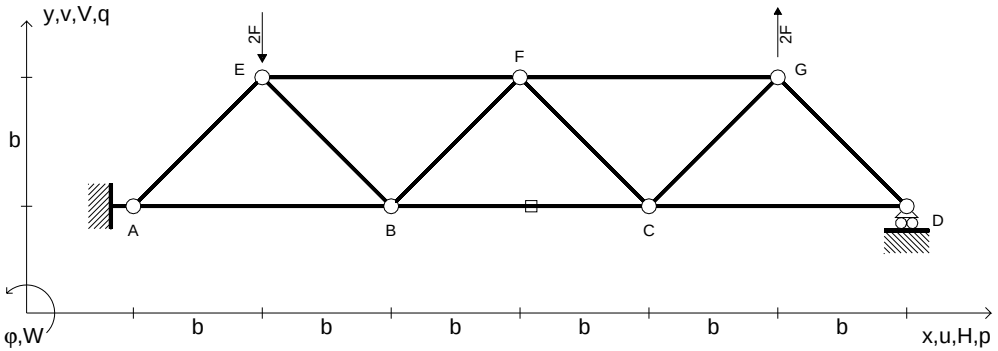


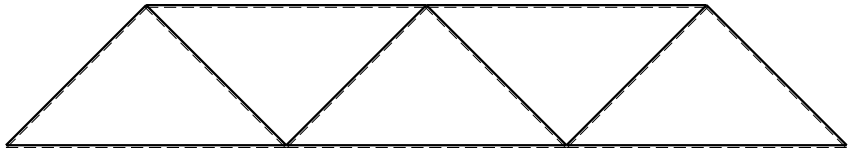
V_E = -2F
V_G = 2F
$\varepsilon_{BC} = 2\alpha T = 2F/EA$
u_F = ?

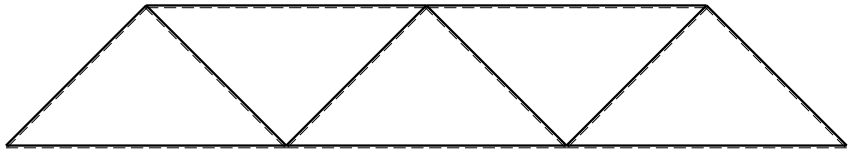
v_F = ?
$EA_{AB} = EA$
$EA_{BC} = 2EA$
$EA_{CD} = EA$

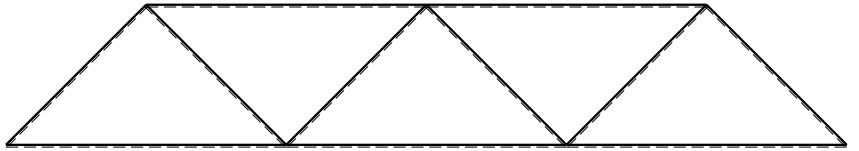
$EA_{EF} = EA$
$EA_{FG} = EA$
$EA_{AE} = EA$
$EA_{EB} = EA$

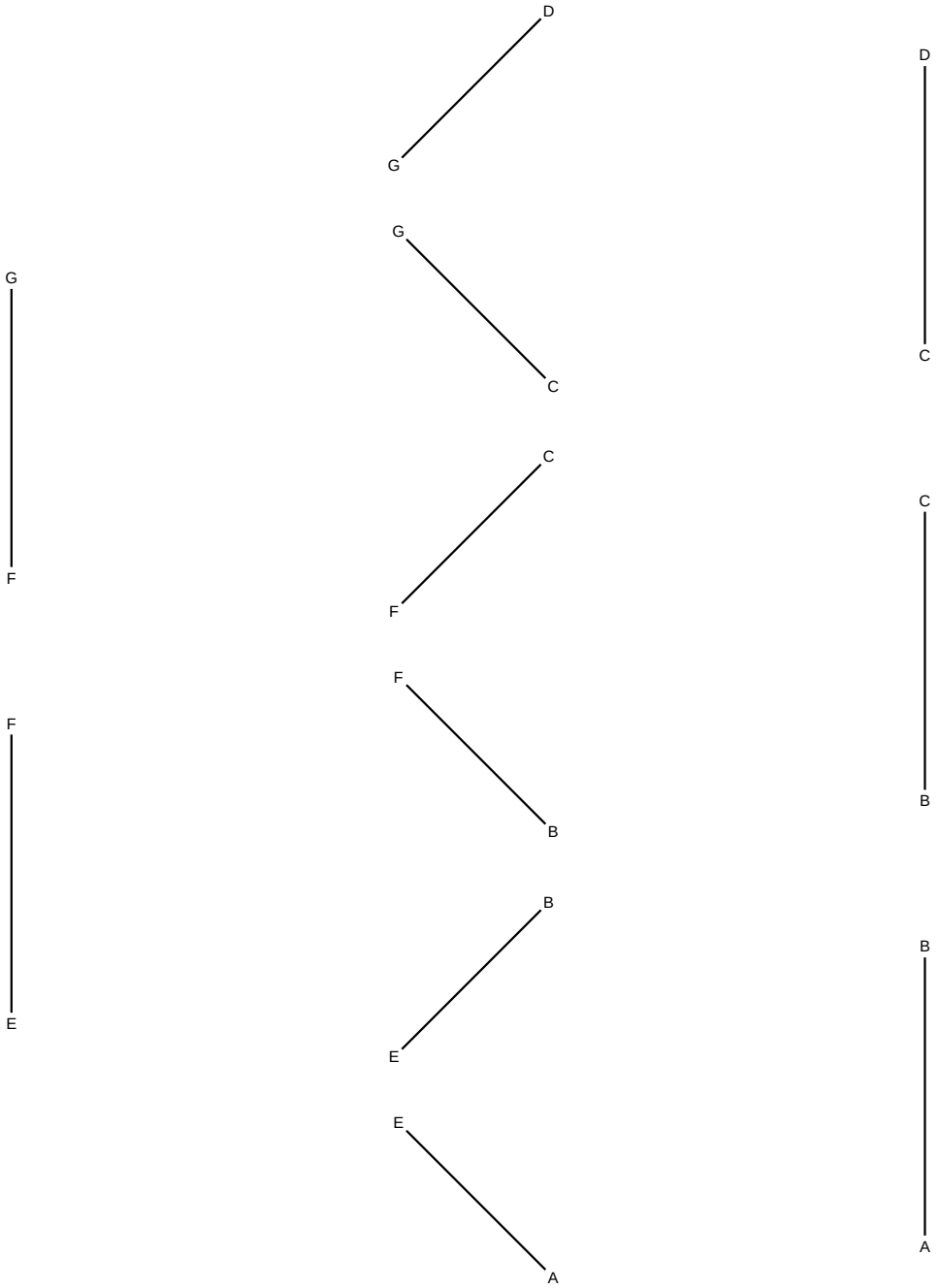
$EA_{BF} = EA$
$EA_{FC} = EA$
$EA_{CG} = EA$
$EA_{GD} = EA$

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

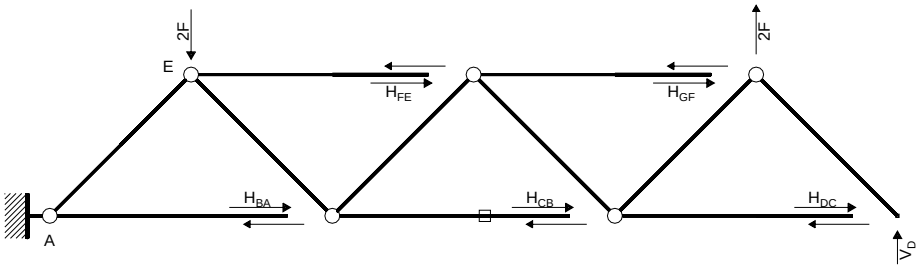
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = -8Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = -8Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = -6Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = -4Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = -2Fb$

Rotazione intorno a G: aste GD

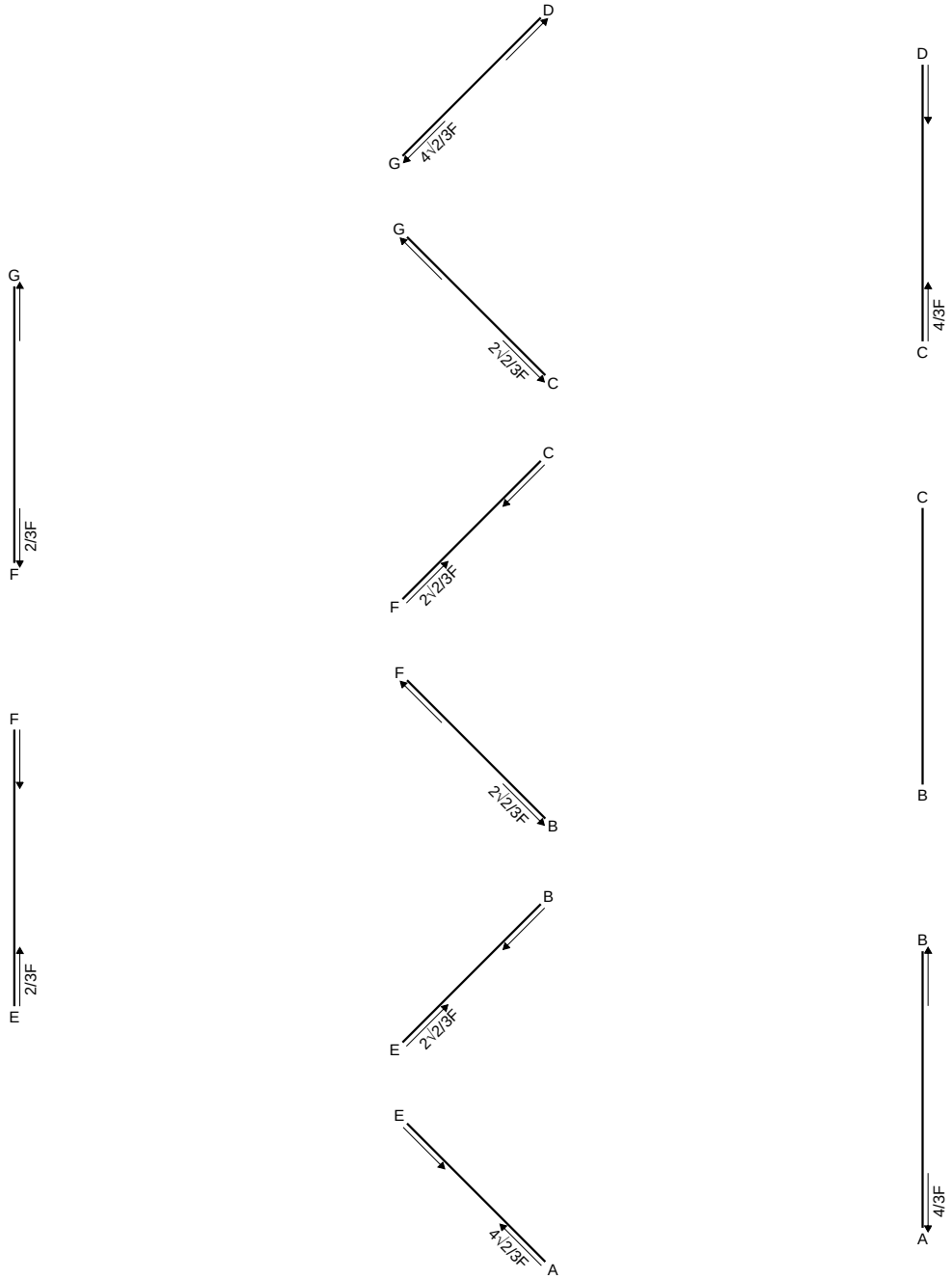
$V_Db - H_{DC}b = 0$

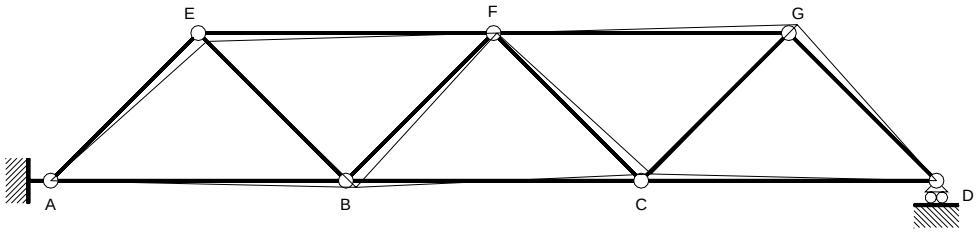
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{AE} \\ \varphi_{EB} \\ \varphi_{BF} \\ \varphi_{FC} \\ \varphi_{CG} \\ \varphi_{GD} \end{array} \begin{bmatrix} V_Db & H_{BA}b & H_{CB}b & H_{DC}b & H_{FE}b & H_{GF}b \\ 6 & 0 & 0 & 0 & 0 & 0 \\ 5 & -1 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 3 & 0 & -1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb \\ -8 \\ -8 \\ -6 \\ -4 \\ -2 \\ 0 \end{bmatrix}$$

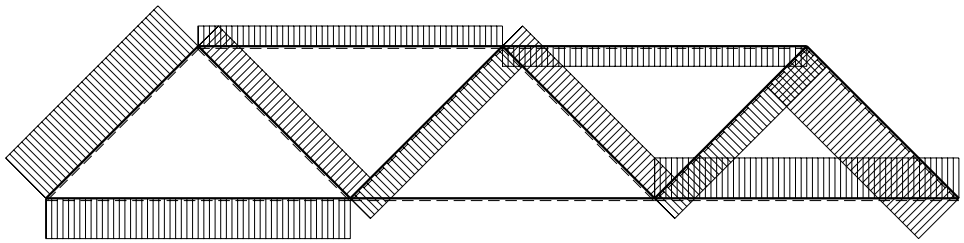
Soluzione del sistema

$$\begin{bmatrix} V_Db \\ H_{BA}b \\ H_{FE}b \\ H_{CB}b \\ H_{GF}b \\ H_{DC}b \end{bmatrix} = \begin{bmatrix} Fb \\ -4/3 \\ 4/3 \\ -2/3 \\ 0 \\ 2/3 \\ -4/3 \end{bmatrix}$$





20 Fb/EA



2.5 F

REAZIONI

$H_A = 0$ $V_A = 4/3F$ $V_D = -4/3F$

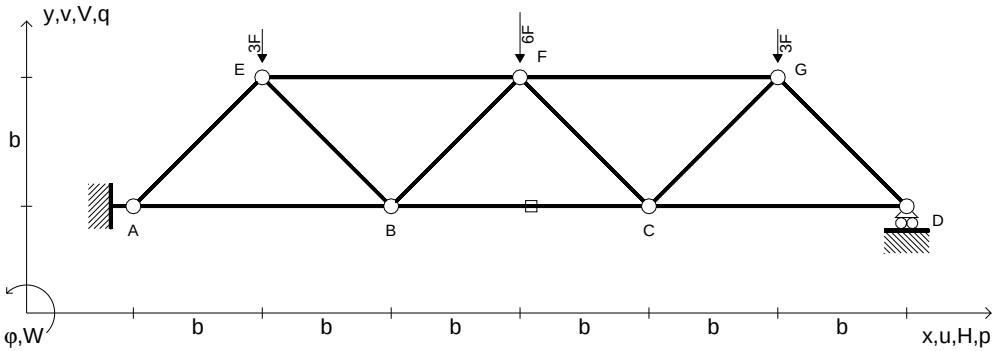
$N_{AB} = 4/3F$ $N_{BC} = 0$ $N_{CD} = -4/3F$ $N_{EF} = -2/3F$ $N_{FG} = 2/3F$ $N_{AE} = -4\sqrt{2}/3F$

$N_{EB} = -2\sqrt{2}/3F$ $N_{BF} = 2\sqrt{2}/3F$ $N_{FC} = -2\sqrt{2}/3F$ $N_{CG} = 2\sqrt{2}/3F$ $N_{GD} = 4\sqrt{2}/3F$

SPOSTAMENTI ASSOLUTI

$u_F = 26/9(Fb/EA)$

$v_F = -6(Fb/EA)$



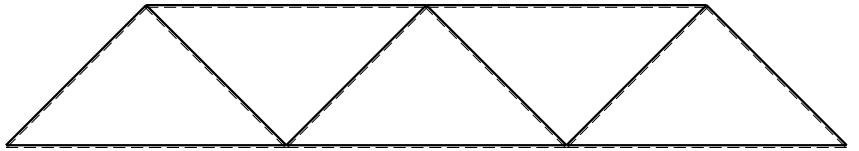
V_E = -3F
V_F = -6F
V_G = -3F
$\varepsilon_{BC} = 2\alpha T = 2F/EA$
u_F = ?

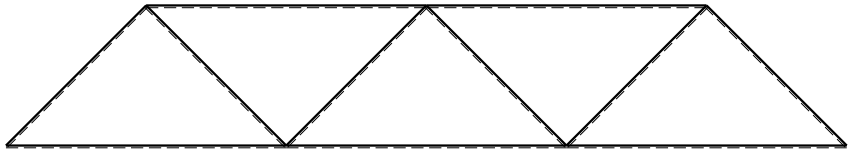
v_F = ?
EA_{AB} = EA
EA_{BC} = 3EA
EA_{CD} = EA
EA_{EF} = EA

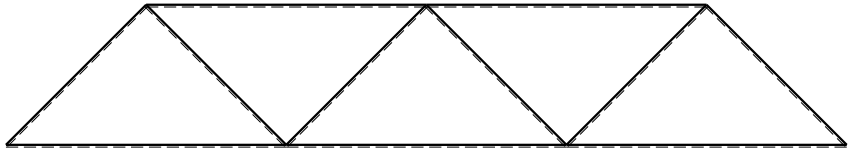
EA_{FG} = EA
EA_{AE} = EA
EA_{EB} = EA
EA_{BF} = EA
EA_{FC} = EA

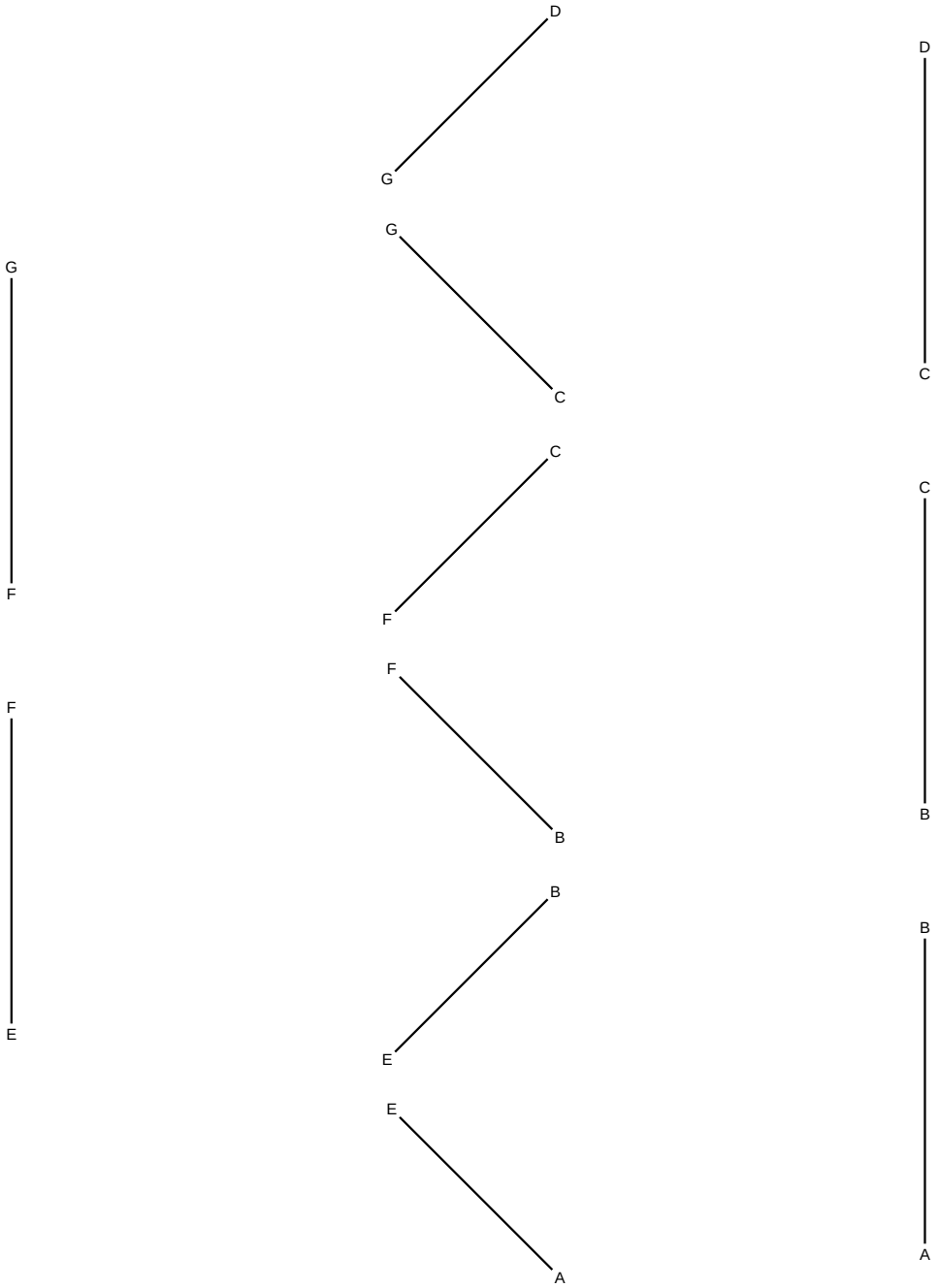
EA_{CG} = EA
EA_{GD} = EA

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

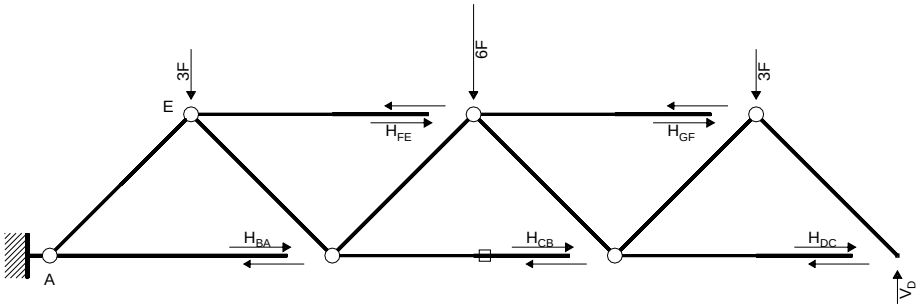
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = 36Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = 24Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = 15Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 6Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = 3Fb$

Rotazione intorno a G: aste GD

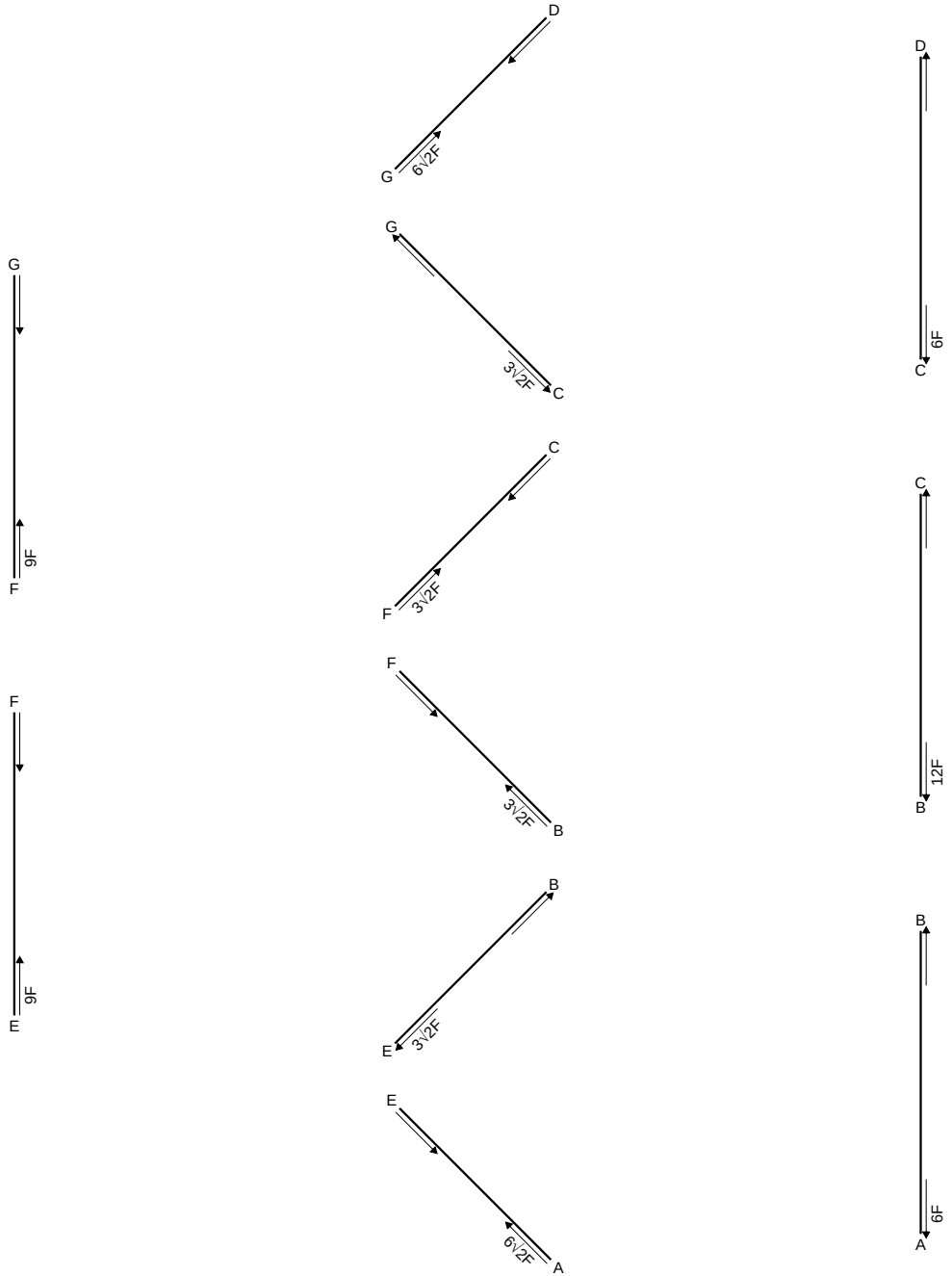
$V_Db - H_{DC}b = 0$

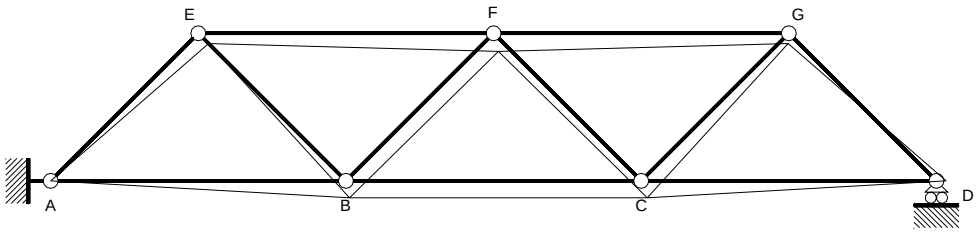
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{AE} \\ \varphi_{EB} \\ \varphi_{BF} \\ \varphi_{FC} \\ \varphi_{CG} \\ \varphi_{GD} \end{array} \begin{bmatrix} V_Db & H_{BA}b & H_{CB}b & H_{DC}b & H_{FE}b & H_{GF}b \\ 6 & 0 & 0 & 0 & 0 & 0 \\ 5 & -1 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 3 & 0 & -1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb \\ 36 \\ 24 \\ 15 \\ 6 \\ 3 \\ 0 \end{bmatrix}$$

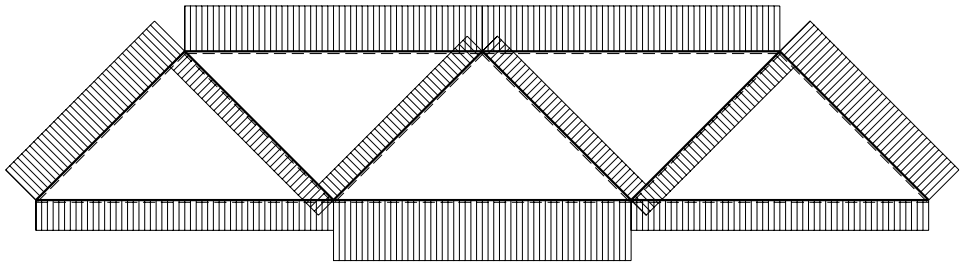
Soluzione del sistema

$$\begin{bmatrix} V_Db \\ H_{BA}b \\ H_{FE}b \\ H_{CB}b \\ H_{GF}b \\ H_{DC}b \end{bmatrix} = \begin{bmatrix} Fb \\ 6 \\ 6 \\ -9 \\ 12 \\ -9 \\ 6 \end{bmatrix}$$





250 Fb/EA



15 F

REAZIONI

$H_A = 0$ $V_A = 6F$ $V_D = 6F$

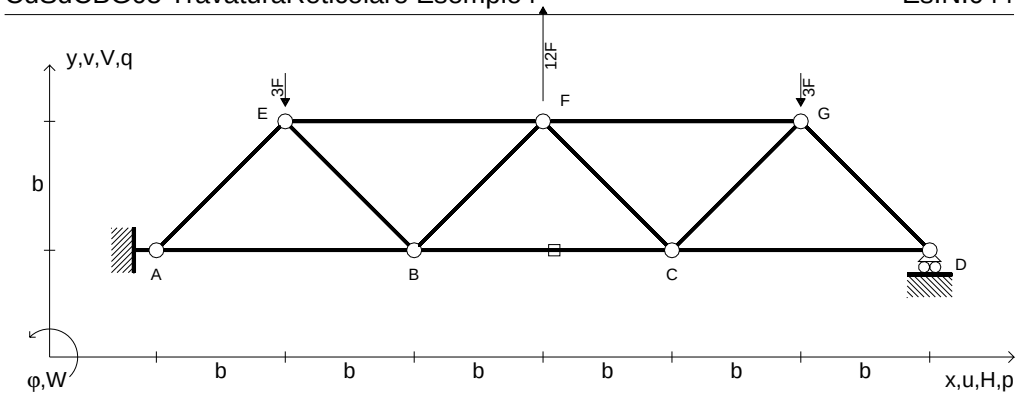
$N_{AB} = 6F$ $N_{BC} = 12F$ $N_{CD} = 6F$ $N_{EF} = -9F$ $N_{FG} = -9F$ $N_{AE} = -6\sqrt{2}F$

$N_{EB} = 3\sqrt{2}F$ $N_{BF} = -3\sqrt{2}F$ $N_{FC} = -3\sqrt{2}F$ $N_{CG} = 3\sqrt{2}F$ $N_{GD} = -6\sqrt{2}F$

SPOSTAMENTI ASSOLUTI

$u_F = 18(Fb/EA)$

$v_F = -(66+24\sqrt{2})(Fb/EA)$



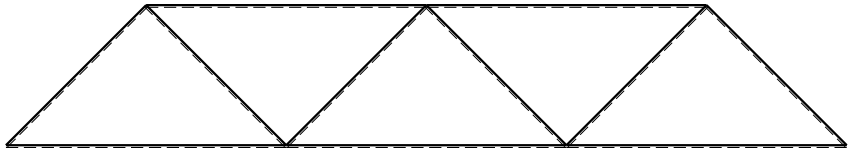
V_E = -3F
V_F = 12F
V_G = -3F
$\varepsilon_{BC} = 2\alpha T = 2F/EA$
u_F = ?

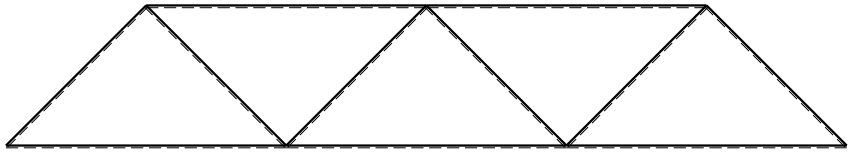
v_F = ?
EA_{AB} = EA
EA_{BC} = 4EA
EA_{CD} = EA
EA_{EF} = EA

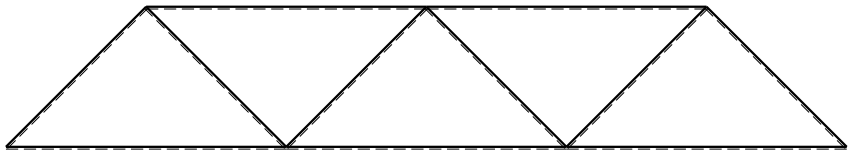
EA_{FG} = EA
EA_{AE} = EA
EA_{EB} = EA
EA_{BF} = EA
EA_{FC} = EA

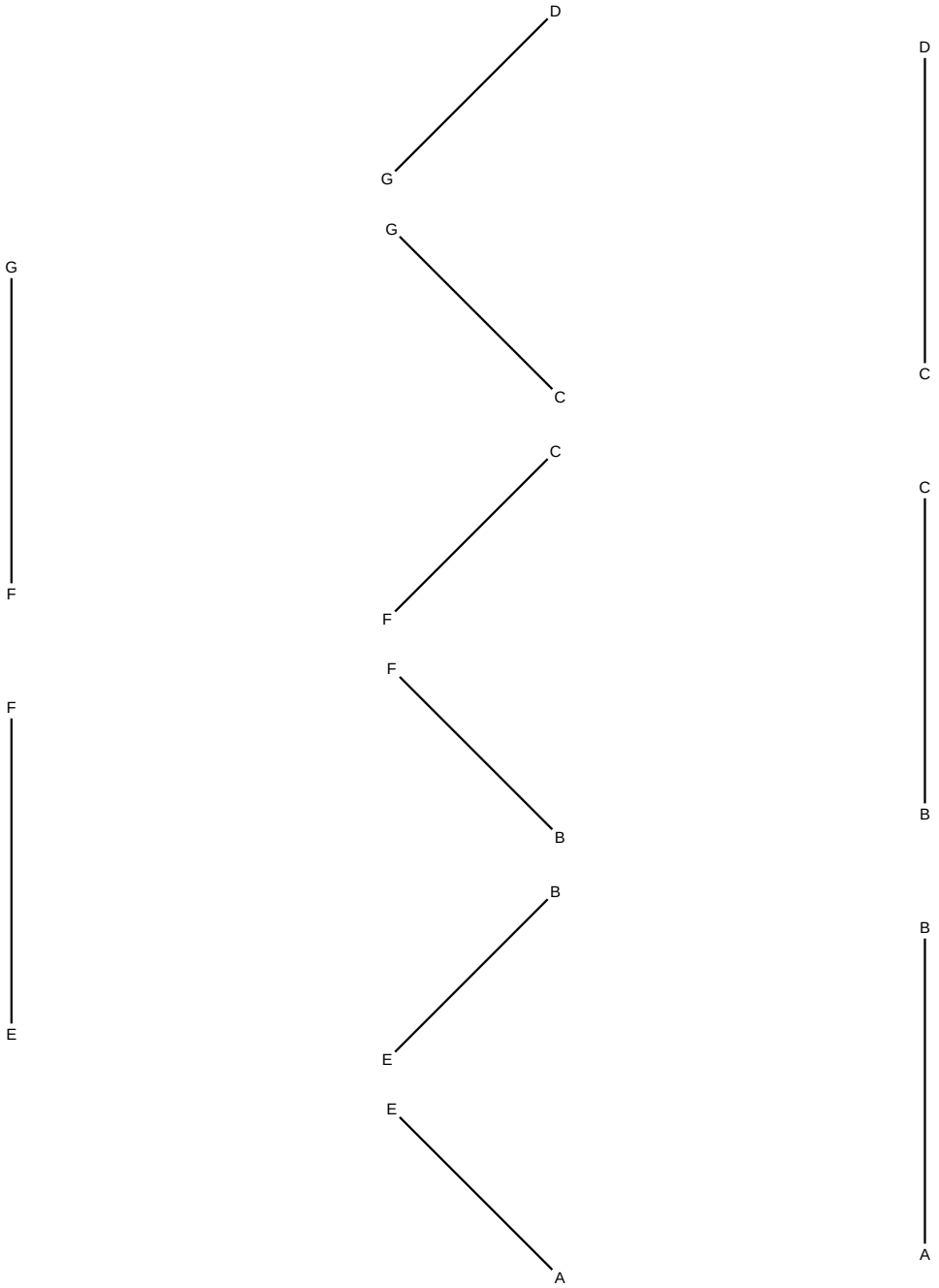
EA_{CG} = EA
EA_{GD} = EA

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

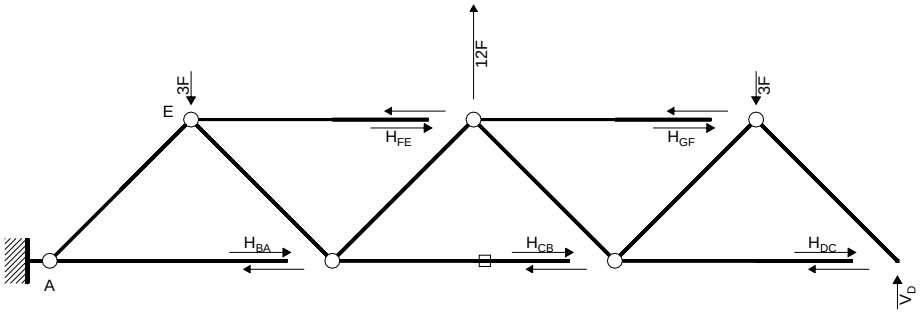
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = -18Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = -12Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = -3Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 6Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = 3Fb$

Rotazione intorno a G: aste GD

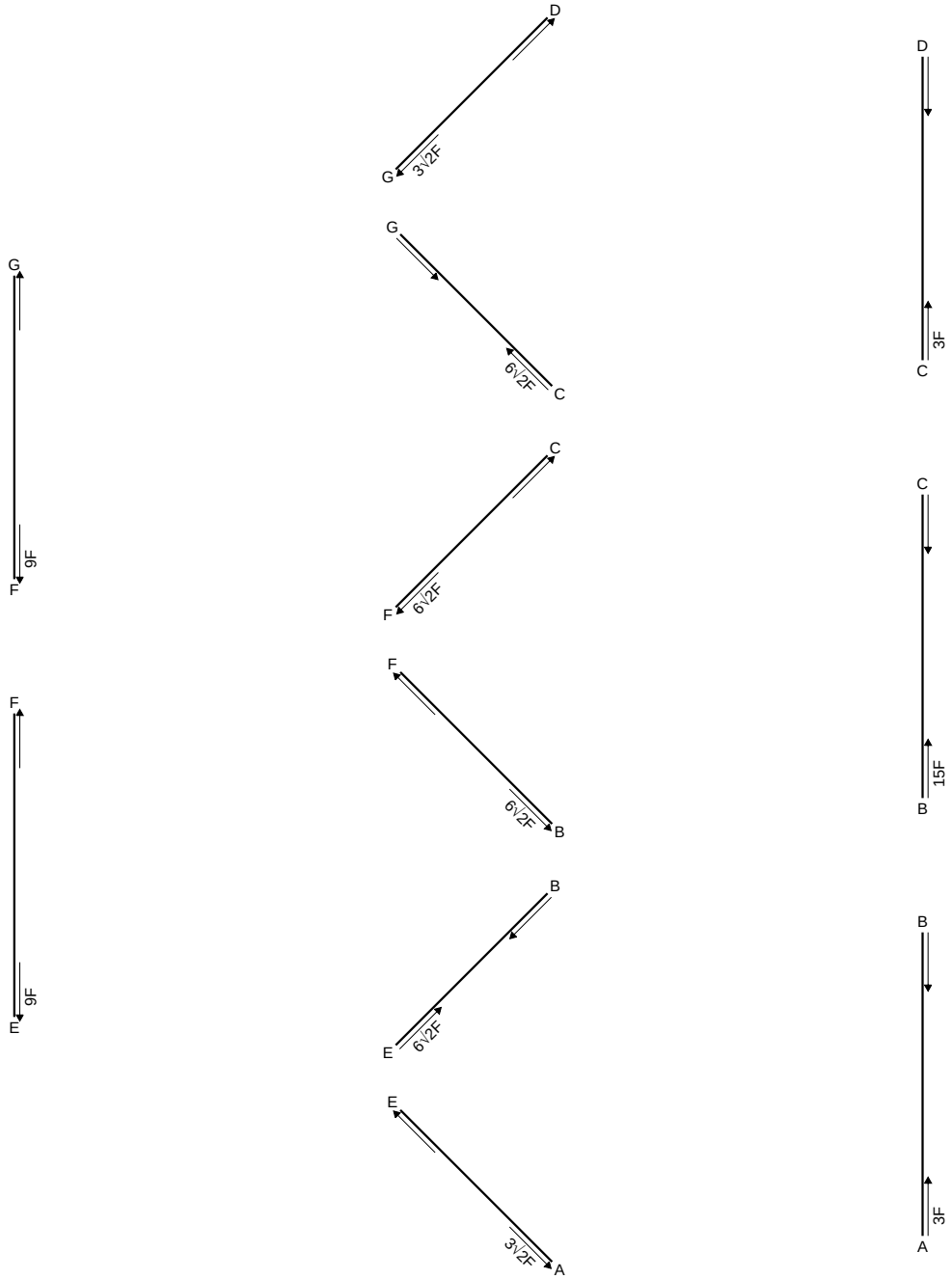
$V_Db - H_{DC}b = 0$

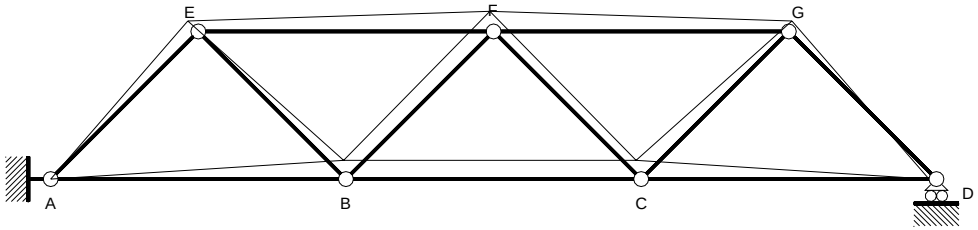
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{AE} \\ \varphi_{EB} \\ \varphi_{BF} \\ \varphi_{FC} \\ \varphi_{CG} \\ \varphi_{GD} \end{array} \begin{bmatrix} V_Db & H_{BA}b & H_{CB}b & H_{DC}b & H_{FE}b & H_{GF}b \\ 6 & 0 & 0 & 0 & 0 & 0 \\ 5 & -1 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 3 & 0 & -1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb \\ -18 \\ -12 \\ -3 \\ 6 \\ 3 \\ 0 \end{bmatrix}$$

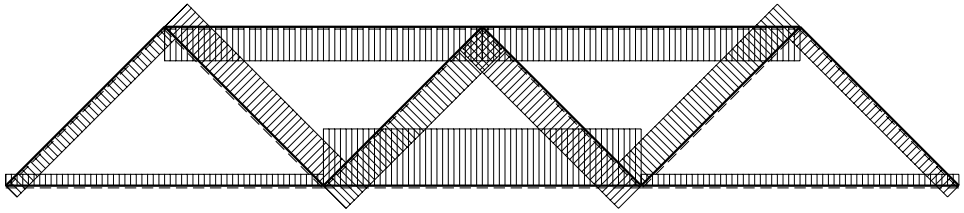
Soluzione del sistema

$$\begin{bmatrix} V_Db \\ H_{BA}b \\ H_{FE}b \\ H_{CB}b \\ H_{GF}b \\ H_{DC}b \end{bmatrix} = \begin{bmatrix} Fb \\ -3 \\ -3 \\ 9 \\ -15 \\ 9 \\ -3 \end{bmatrix}$$





200 Fb/EA



20 F

REAZIONI

$H_A = 0$ $V_A = -3F$ $V_D = -3F$

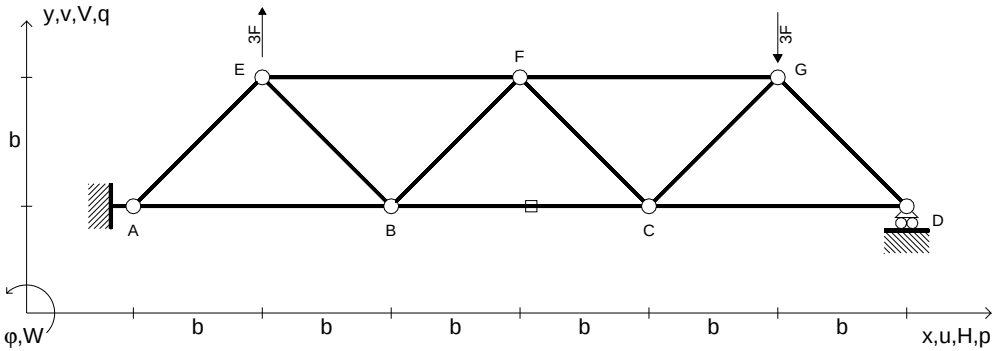
$N_{AB} = -3F$ $N_{BC} = -15F$ $N_{CD} = -3F$ $N_{EF} = 9F$ $N_{FG} = 9F$ $N_{AE} = 3\sqrt{2}F$

$N_{EB} = -6\sqrt{2}F$ $N_{BF} = 6\sqrt{2}F$ $N_{FC} = 6\sqrt{2}F$ $N_{CG} = -6\sqrt{2}F$ $N_{GD} = 3\sqrt{2}F$

SPOSTAMENTI ASSOLUTI

$u_F = -31/4(Fb/EA)$

$v_F = (189+120\sqrt{2})/4(Fb/EA)$



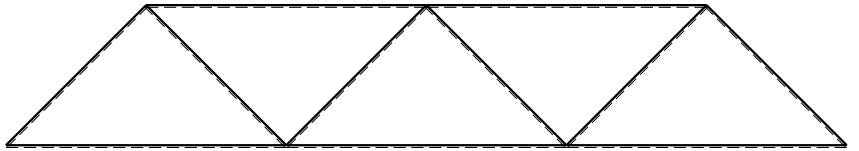
$V_E = 3F$
$V_G = -3F$
$\varepsilon_{BC} = 2\alpha T = 2F/EA$
$u_F = ?$

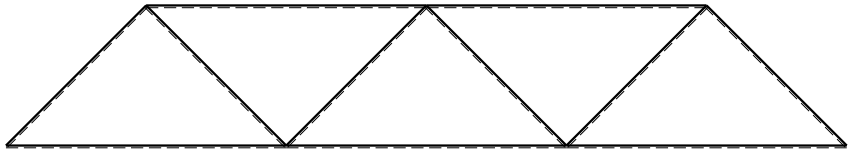
$v_F = ?$
$EA_{AB} = EA$
$EA_{BC} = 1/4EA$
$EA_{CD} = EA$

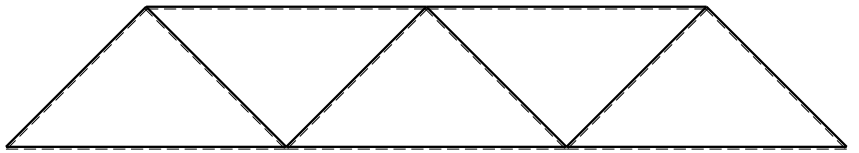
$EA_{EF} = EA$
$EA_{FG} = EA$
$EA_{AE} = EA$
$EA_{EB} = EA$

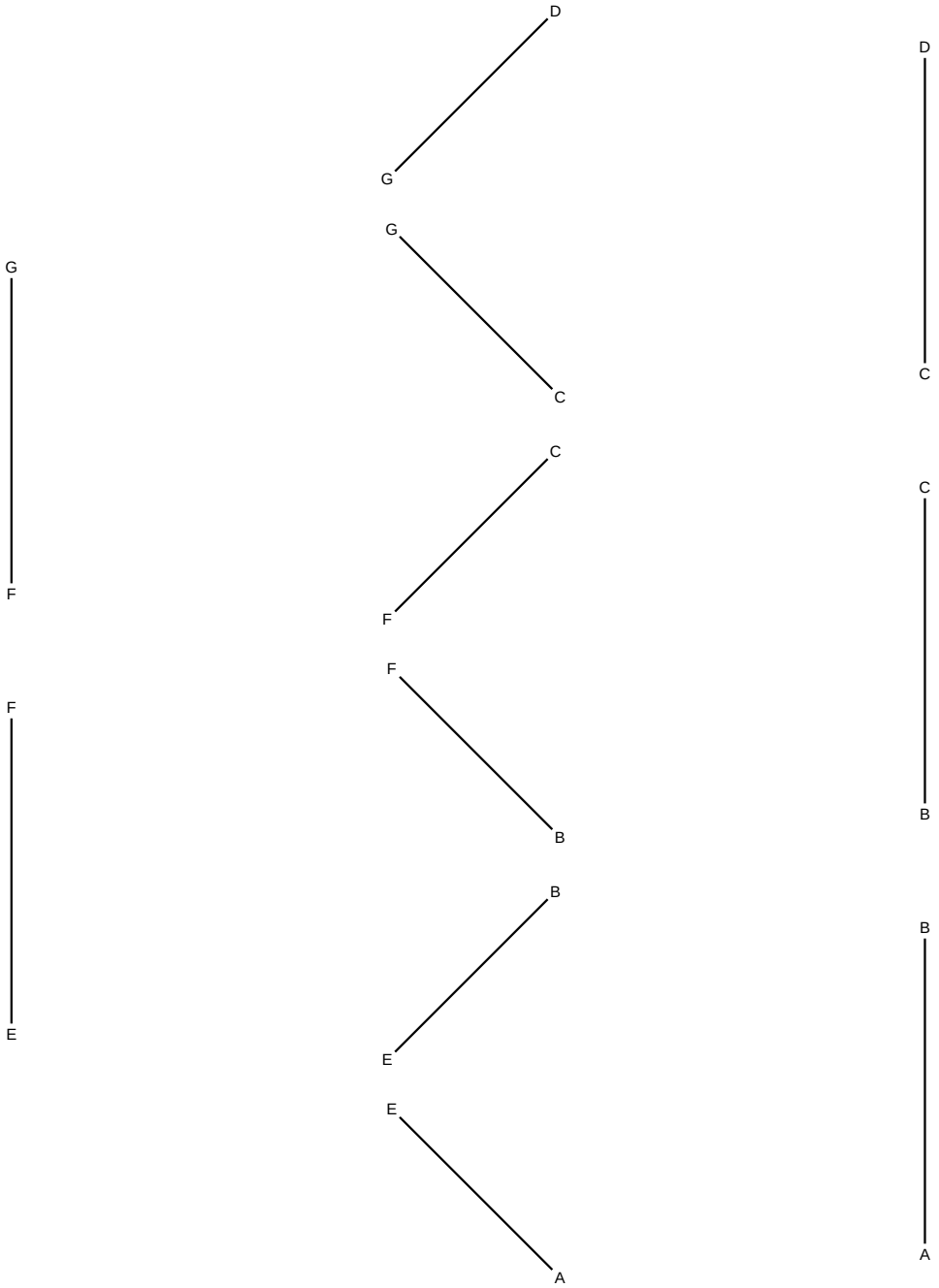
$EA_{BF} = EA$
$EA_{FC} = EA$
$EA_{CG} = EA$
$EA_{GD} = EA$

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

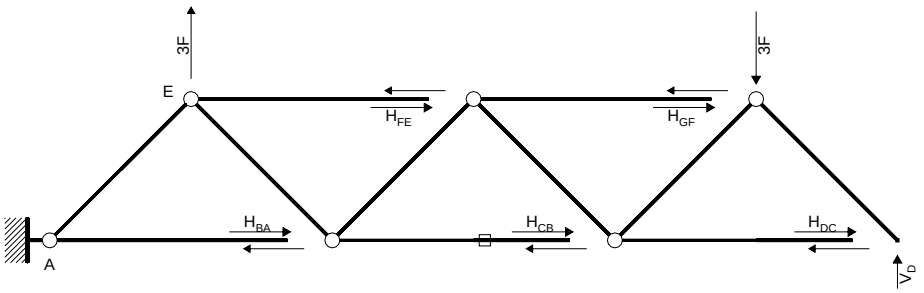
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = 12Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = 12Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = 9Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 6Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = 3Fb$

Rotazione intorno a G: aste GD

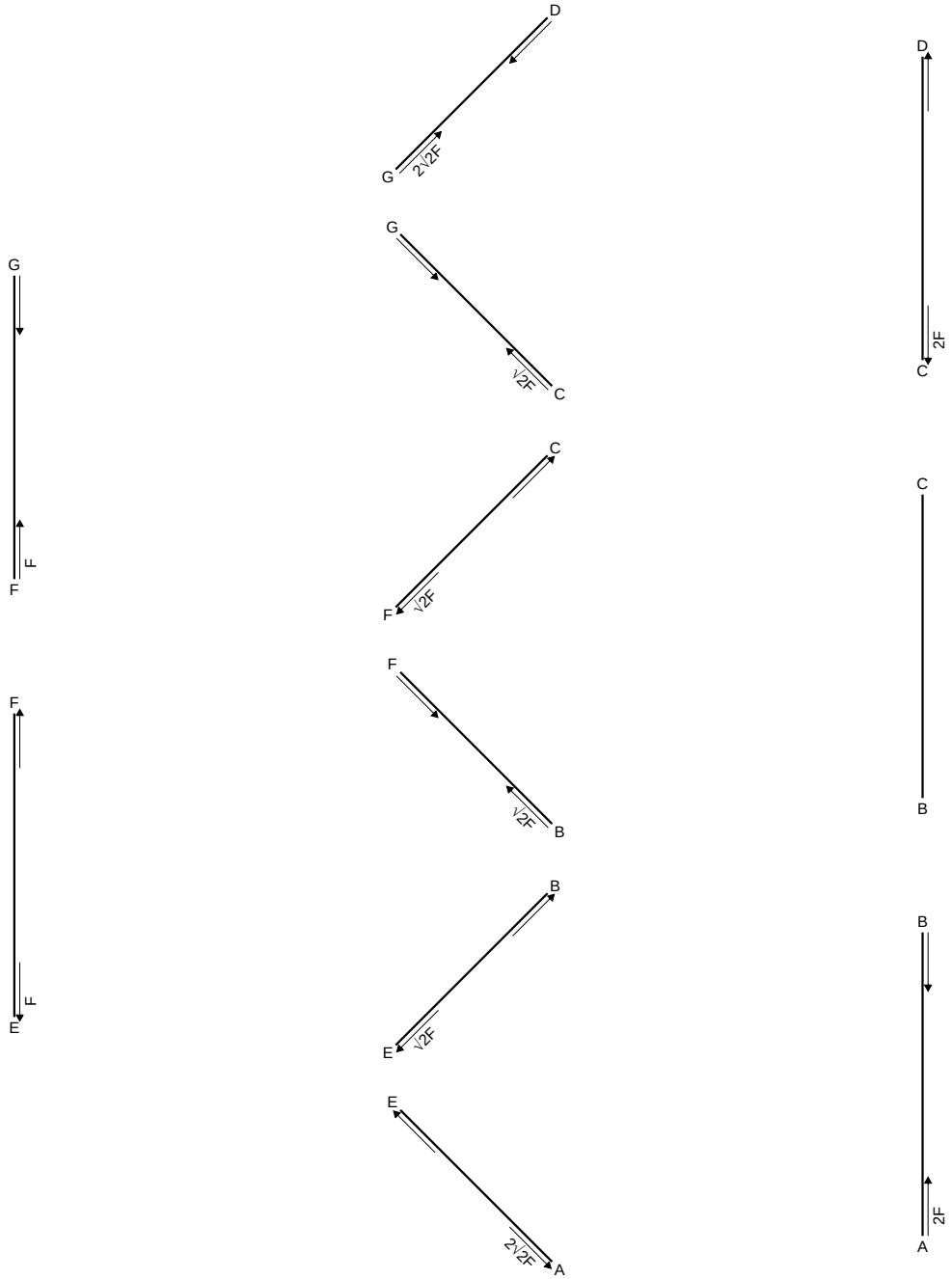
$V_Db - H_{DC}b = 0$

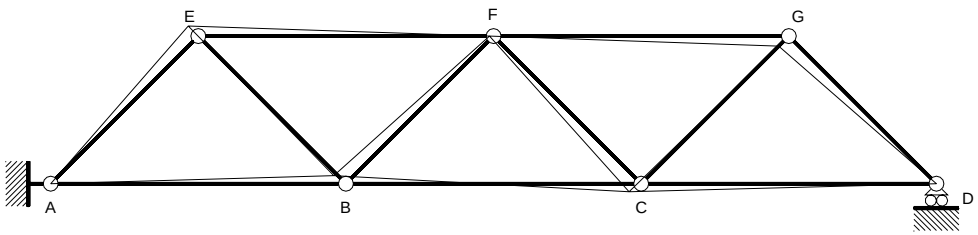
Matrice di equilibrio

	V_Db	$H_{BA}b$	$H_{CB}b$	$H_{DC}b$	$H_{FE}b$	$H_{GF}b$		Fb
φ_{AE}	6	0	0	0	0	0	=	12
φ_{EB}	5	-1	0	0	0	0		12
φ_{BF}	4	0	0	0	1	0		9
φ_{FC}	3	0	-1	0	0	0		6
φ_{CG}	2	0	0	0	0	1		3
φ_{GD}	1	0	0	-1	0	0		0

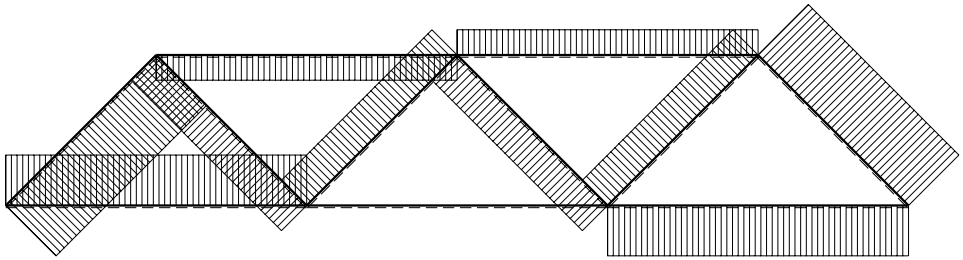
Soluzione del sistema

	Fb
V_Db	2
$H_{BA}b$	-2
$H_{FE}b$	1
$H_{CB}b$	0
$H_{GF}b$	-1
$H_{DC}b$	2





25 Fb/EA



N

3 F

REAZIONI

$H_A = 0$ $V_A = -2F$ $V_D = 2F$

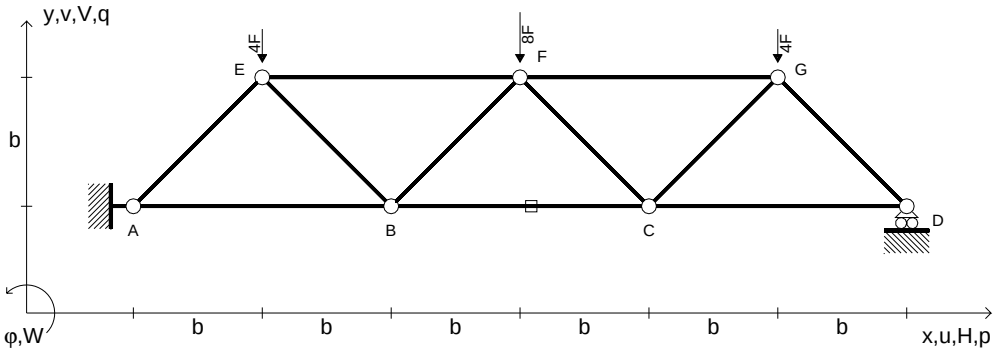
$N_{AB} = -2F$ $N_{BC} = 0$ $N_{CD} = 2F$ $N_{EF} = F$ $N_{FG} = -F$ $N_{AE} = 2\sqrt{2}F$

$N_{EB} = \sqrt{2}F$ $N_{BF} = -\sqrt{2}F$ $N_{FC} = \sqrt{2}F$ $N_{CG} = -\sqrt{2}F$ $N_{GD} = -2\sqrt{2}F$

SPOSTAMENTI ASSOLUTI

$u_F = 2/3(Fb/EA)$

$v_F = -6(Fb/EA)$



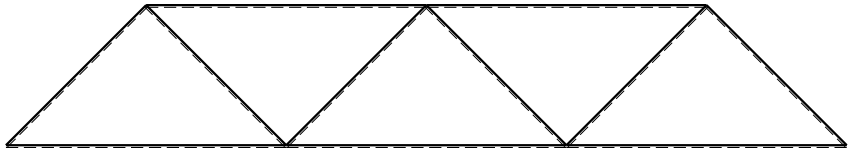
V_E = -4F
V_F = -8F
V_G = -4F
$\varepsilon_{BC} = 2\alpha T = 2F/EA$
u_F = ?

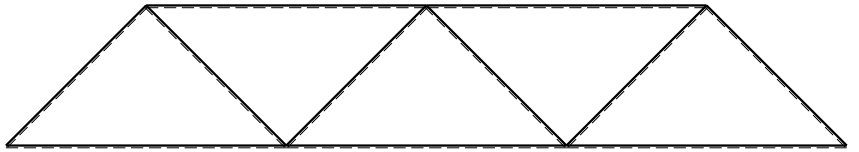
v_F = ?
$EA_{AB} = EA$
$EA_{BC} = 1/3EA$
$EA_{CD} = EA$
$EA_{EF} = EA$

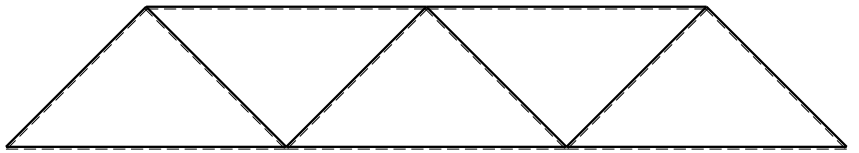
$EA_{FG} = EA$
$EA_{AE} = EA$
$EA_{EB} = EA$
$EA_{BF} = EA$
$EA_{FC} = EA$

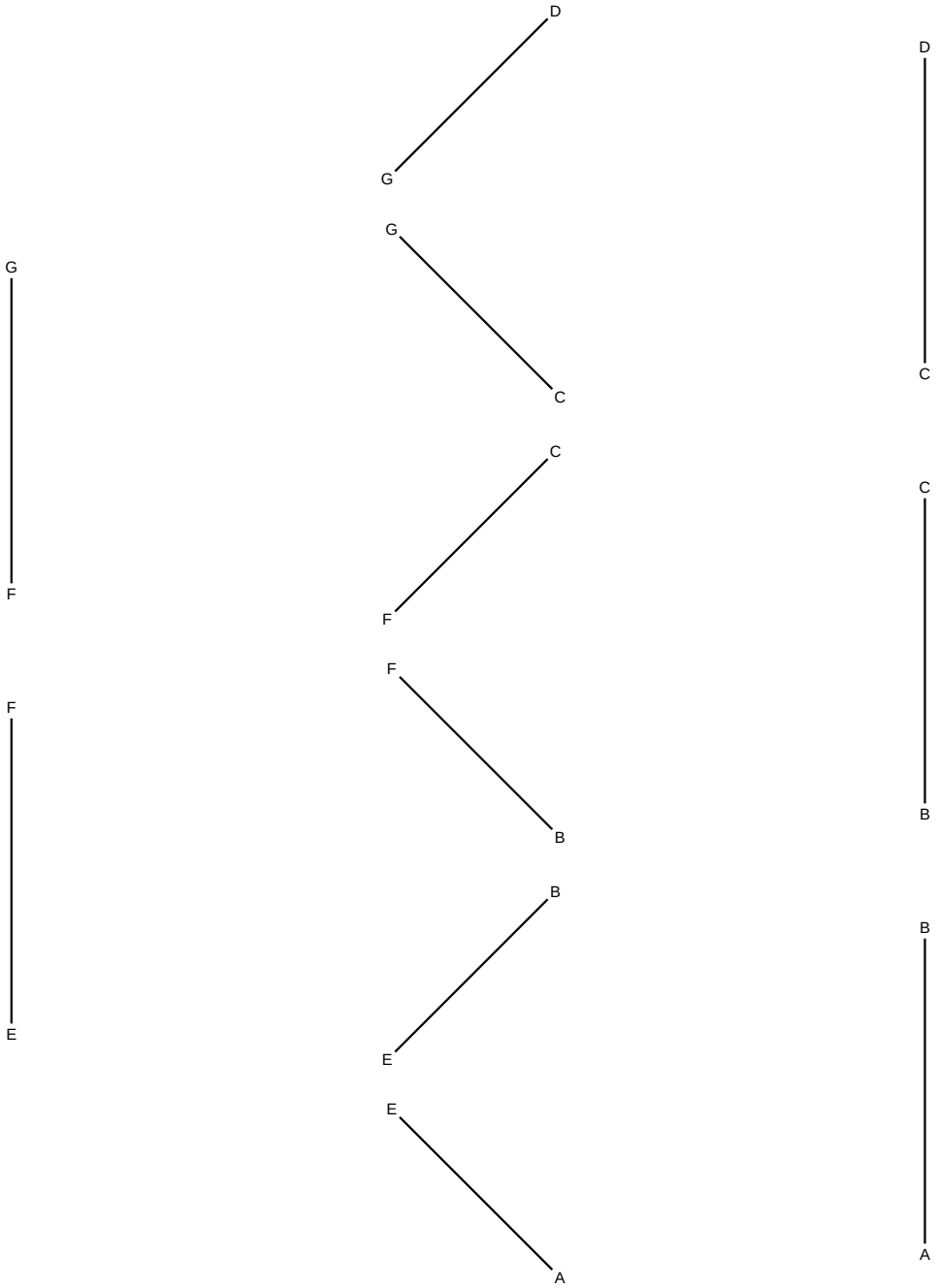
$EA_{CG} = EA$
$EA_{GD} = EA$

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

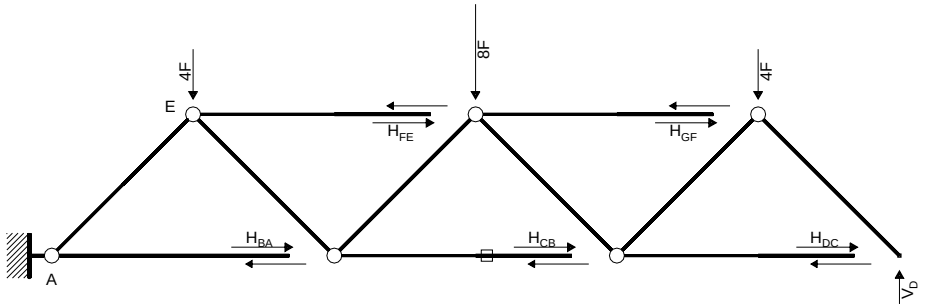
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = 48Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = 32Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = 20Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 8Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = 4Fb$

Rotazione intorno a G: aste GD

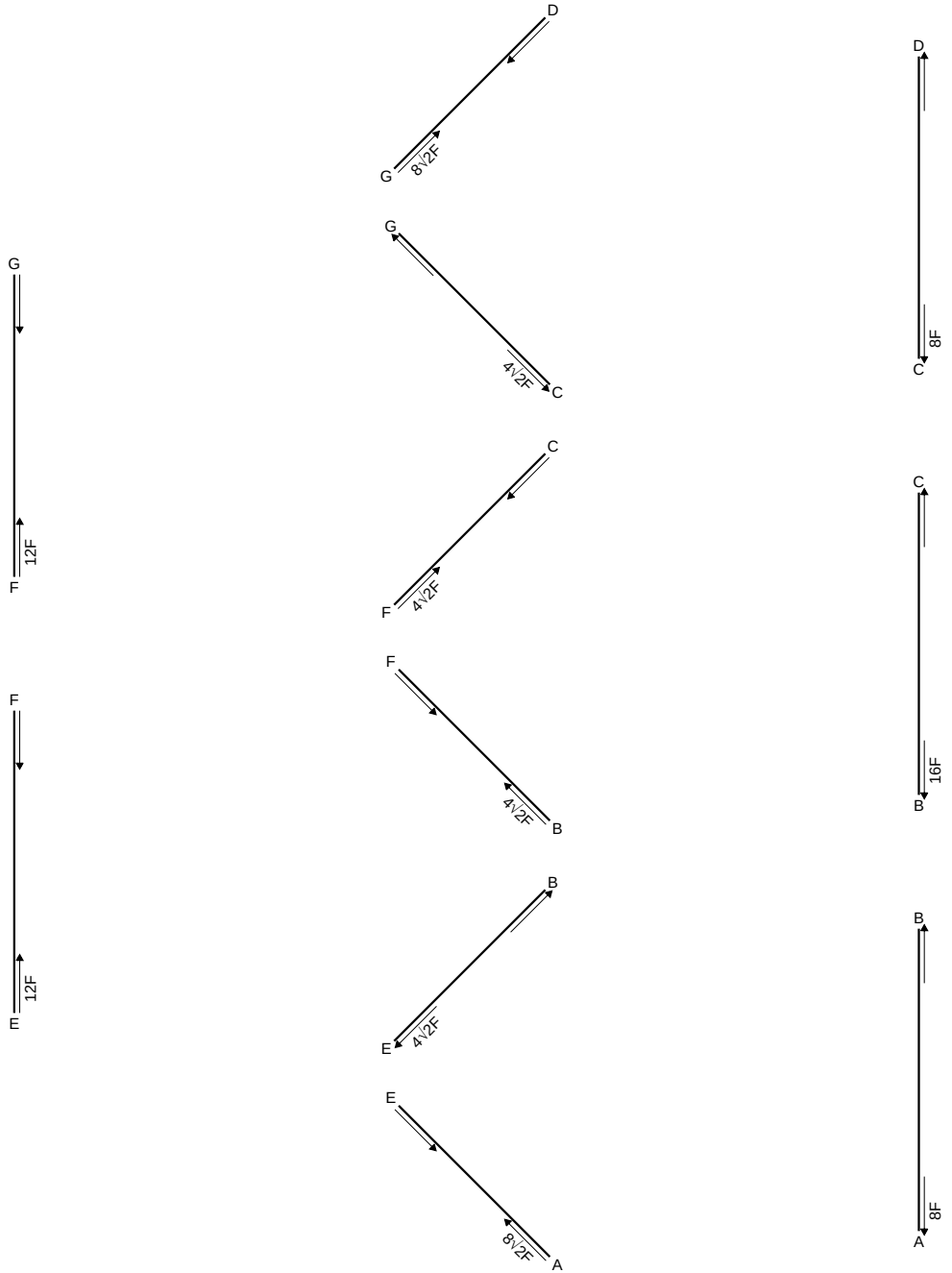
$V_Db - H_{DC}b = 0$

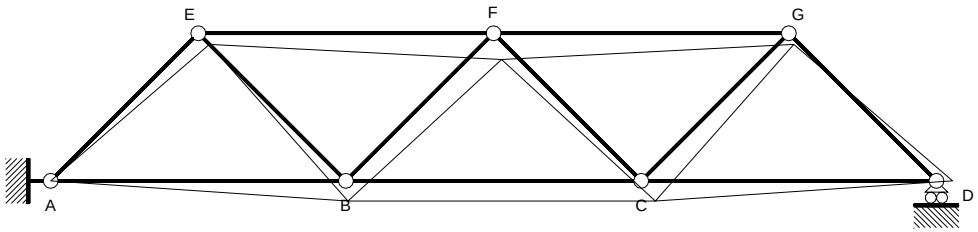
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{AE} \\ \varphi_{EB} \\ \varphi_{BF} \\ \varphi_{FC} \\ \varphi_{CG} \\ \varphi_{GD} \end{array} \begin{bmatrix} V_Db & H_{BA}b & H_{CB}b & H_{DC}b & H_{FE}b & H_{GF}b \\ 6 & 0 & 0 & 0 & 0 & 0 \\ 5 & -1 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 3 & 0 & -1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb \\ 48 \\ 32 \\ 20 \\ 8 \\ 4 \\ 0 \end{bmatrix}$$

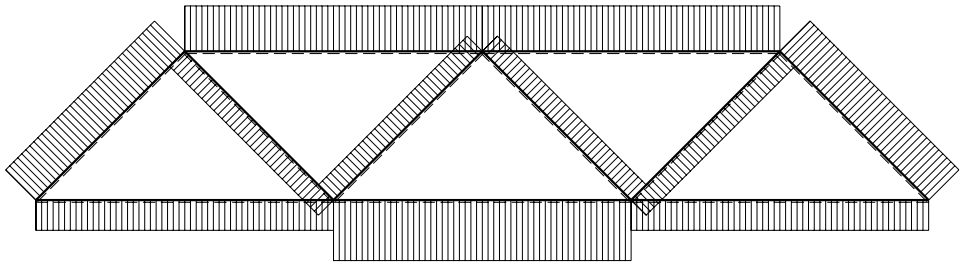
Soluzione del sistema

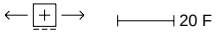
$$\begin{bmatrix} V_Db \\ H_{BA}b \\ H_{FE}b \\ H_{CB}b \\ H_{GF}b \\ H_{DC}b \end{bmatrix} = \begin{bmatrix} Fb \\ 8 \\ 8 \\ -12 \\ 16 \\ -12 \\ 8 \end{bmatrix}$$





600 Fb/EA





REAZIONI

$H_A = 0$ $V_A = 8F$ $V_D = 8F$

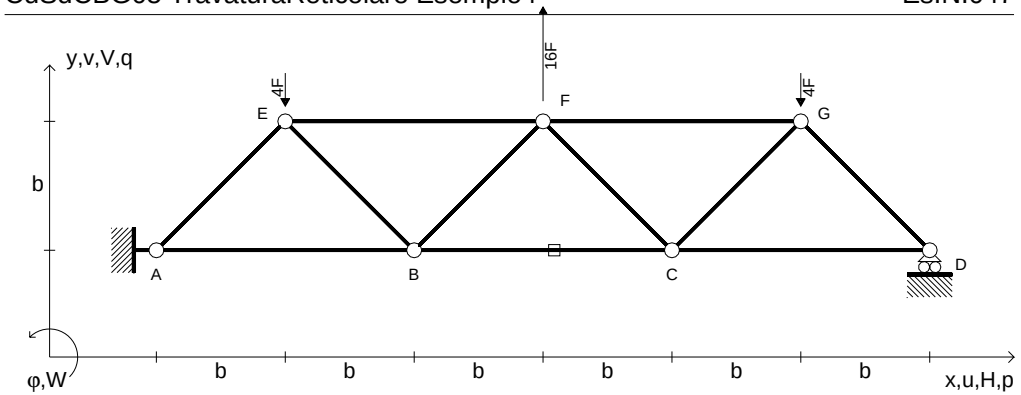
$N_{AB} = 8F$ $N_{BC} = 16F$ $N_{CD} = 8F$ $N_{EF} = -12F$ $N_{FG} = -12F$ $N_{AE} = -8\sqrt{2}F$

$N_{EB} = 4\sqrt{2}F$ $N_{BF} = -4\sqrt{2}F$ $N_{FC} = -4\sqrt{2}F$ $N_{CG} = 4\sqrt{2}F$ $N_{GD} = -8\sqrt{2}F$

SPOSTAMENTI ASSOLUTI

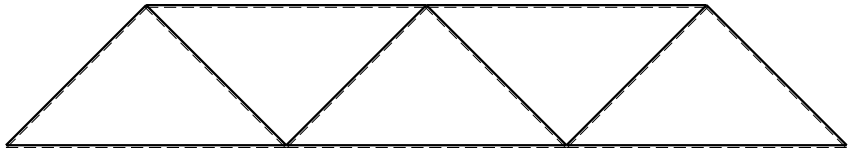
$u_F = 66(Fb/EA)$

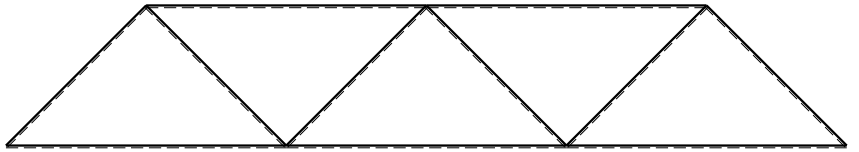
$v_F = -(214+32\sqrt{2})(Fb/EA)$

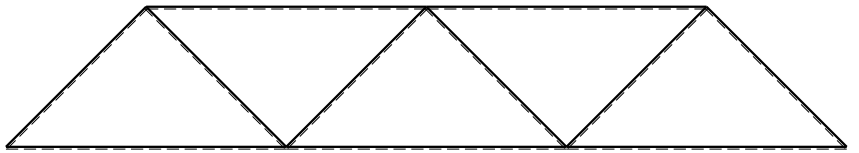


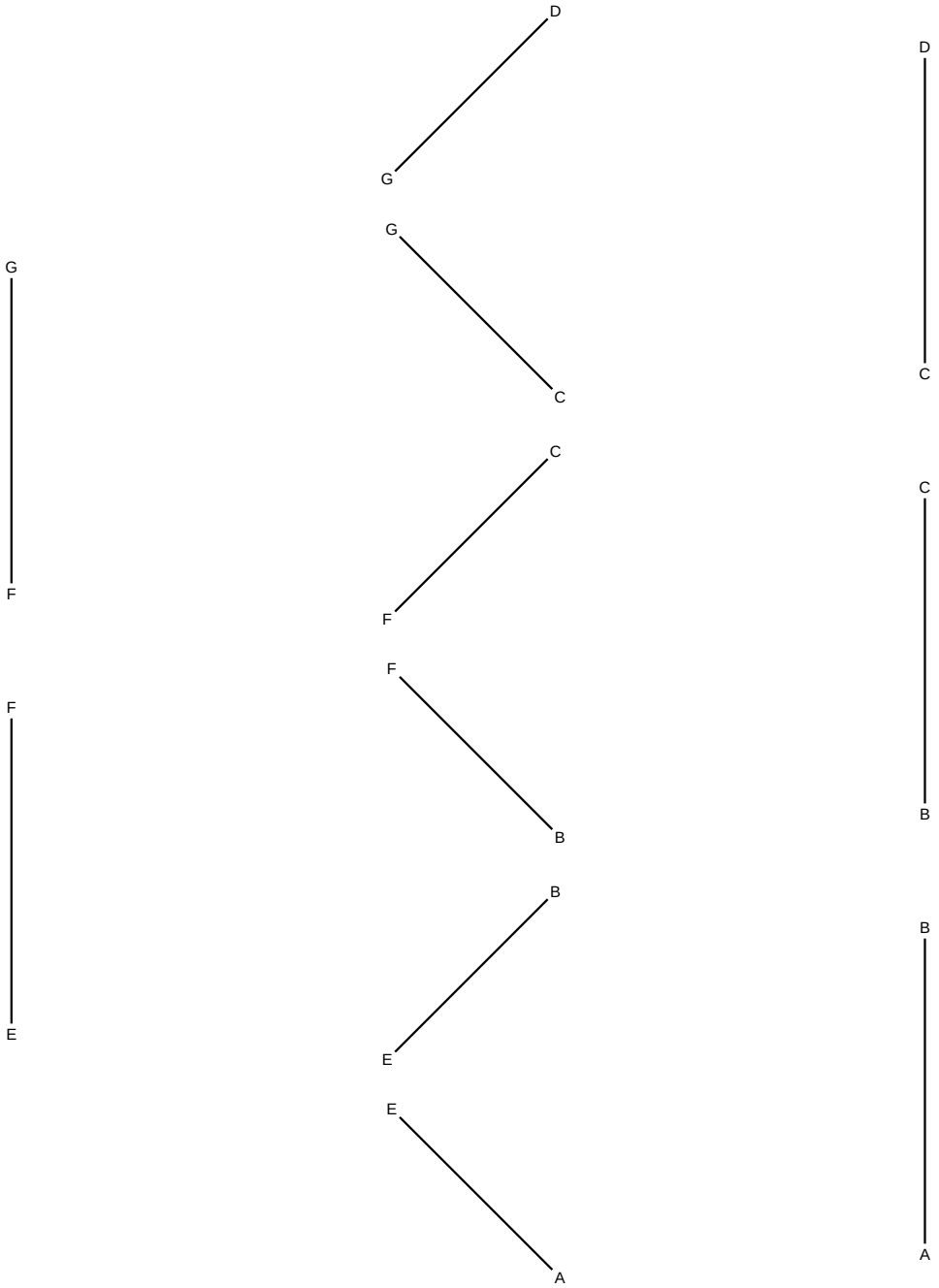
V_E = -4F	v_F = ?	EA_{FG} = EA	EA_{CG} = EA
V_F = 16F	EA_{AB} = EA	EA_{AE} = EA	EA_{GD} = EA
V_G = -4F	EA_{BC} = 1/2EA	EA_{EB} = EA	
$\varepsilon_{BC} = 2\alpha T = 2F/EA$	EA_{CD} = EA	EA_{BF} = EA	
u_F = ?	EA_{EF} = EA	EA_{FC} = EA	

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

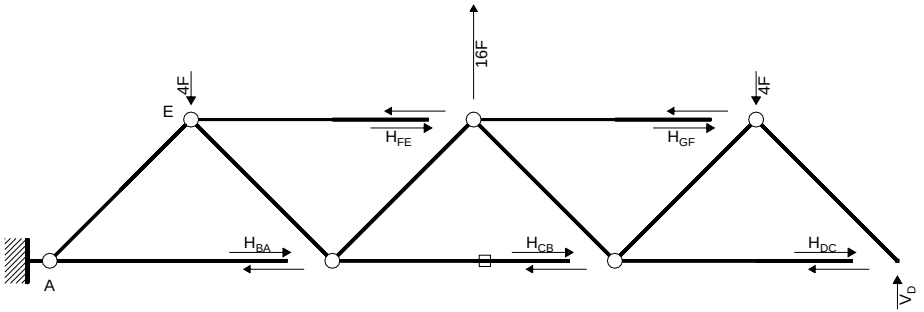
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = -24Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = -16Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = -4Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 8Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = 4Fb$

Rotazione intorno a G: aste GD

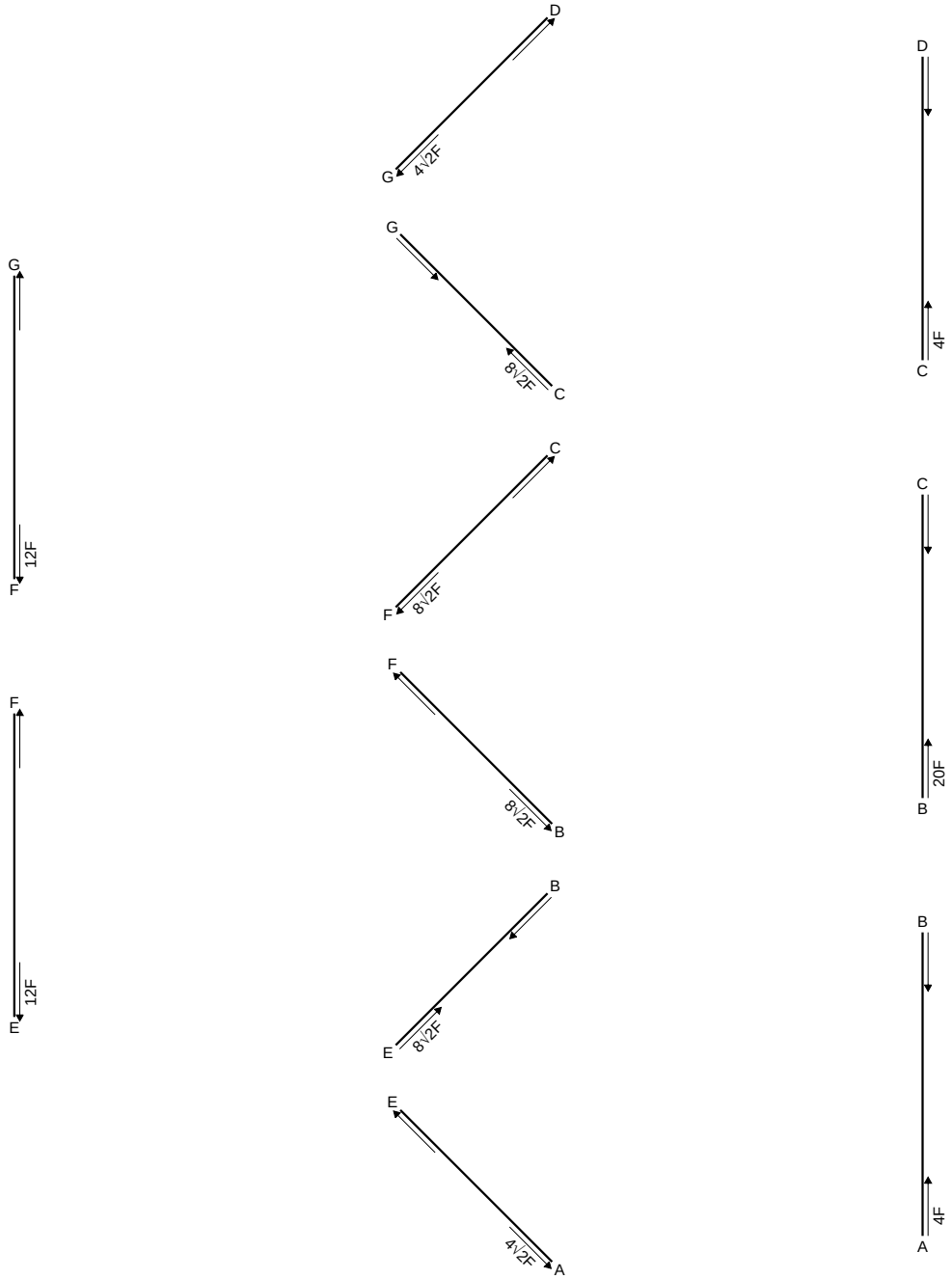
$V_Db - H_{DC}b = 0$

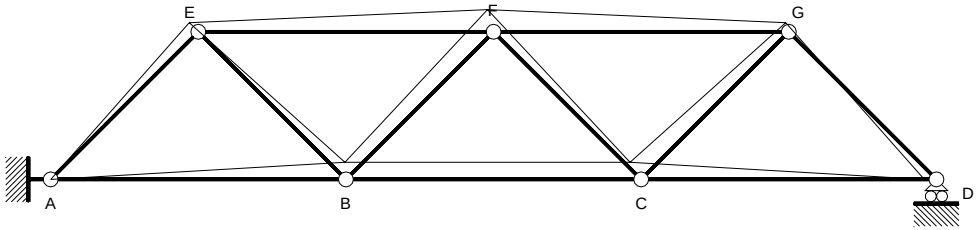
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{AE} \\ \varphi_{EB} \\ \varphi_{BF} \\ \varphi_{FC} \\ \varphi_{CG} \\ \varphi_{GD} \end{array} \begin{bmatrix} V_Db & H_{BA}b & H_{CB}b & H_{DC}b & H_{FE}b & H_{GF}b \\ 6 & 0 & 0 & 0 & 0 & 0 \\ 5 & -1 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 3 & 0 & -1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb \\ -24 \\ -16 \\ -4 \\ 8 \\ 4 \\ 0 \end{bmatrix}$$

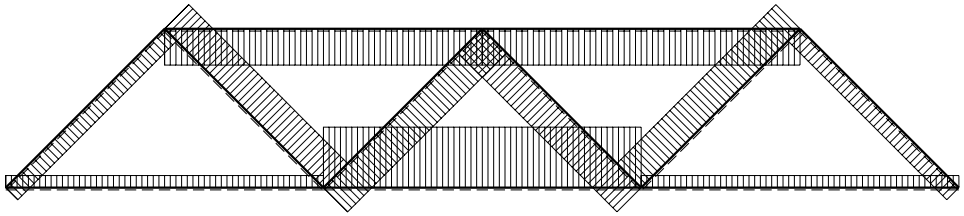
Soluzione del sistema

$$\begin{bmatrix} V_Db \\ H_{BA}b \\ H_{FE}b \\ H_{CB}b \\ H_{GF}b \\ H_{DC}b \end{bmatrix} = \begin{bmatrix} Fb \\ -4 \\ -4 \\ 12 \\ -20 \\ 12 \\ -4 \end{bmatrix}$$





600 Fb/EA



25 F

REAZIONI

$H_A = 0$ $V_A = -4F$ $V_D = -4F$

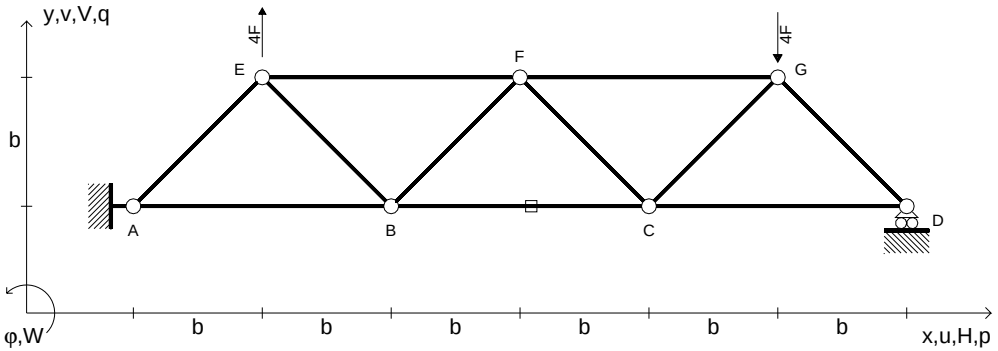
$N_{AB} = -4F$ $N_{BC} = -20F$ $N_{CD} = -4F$ $N_{EF} = 12F$ $N_{FG} = 12F$ $N_{AE} = 4\sqrt{2}F$

$N_{EB} = -8\sqrt{2}F$ $N_{BF} = 8\sqrt{2}F$ $N_{FC} = 8\sqrt{2}F$ $N_{CG} = -8\sqrt{2}F$ $N_{GD} = 4\sqrt{2}F$

SPOSTAMENTI ASSOLUTI

$u_F = -46(Fb/EA)$

$v_F = (170+40\sqrt{2})(Fb/EA)$



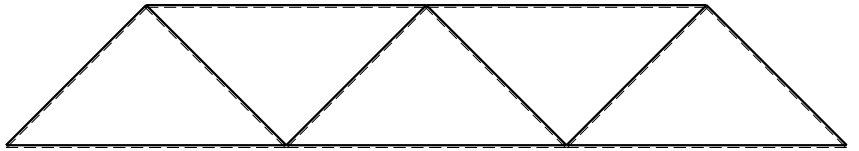
$V_E = 4F$
$V_G = -4F$
$\varepsilon_{BC} = 2\alpha T = 2F/EA$
$u_F = ?$

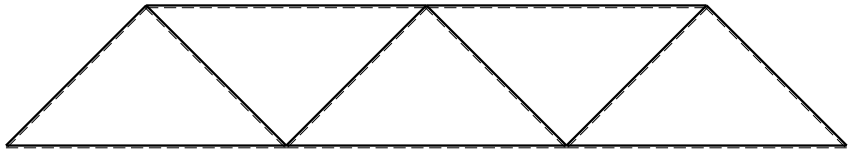
$v_F = ?$
$EA_{AB} = EA$
$EA_{BC} = 2/3EA$
$EA_{CD} = EA$

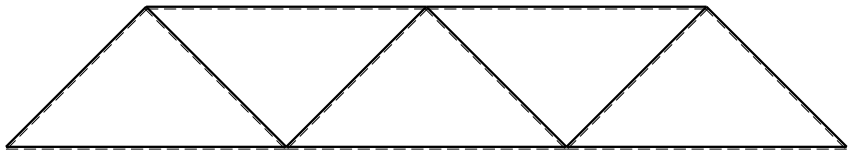
$EA_{EF} = EA$
$EA_{FG} = EA$
$EA_{AE} = EA$
$EA_{EB} = EA$

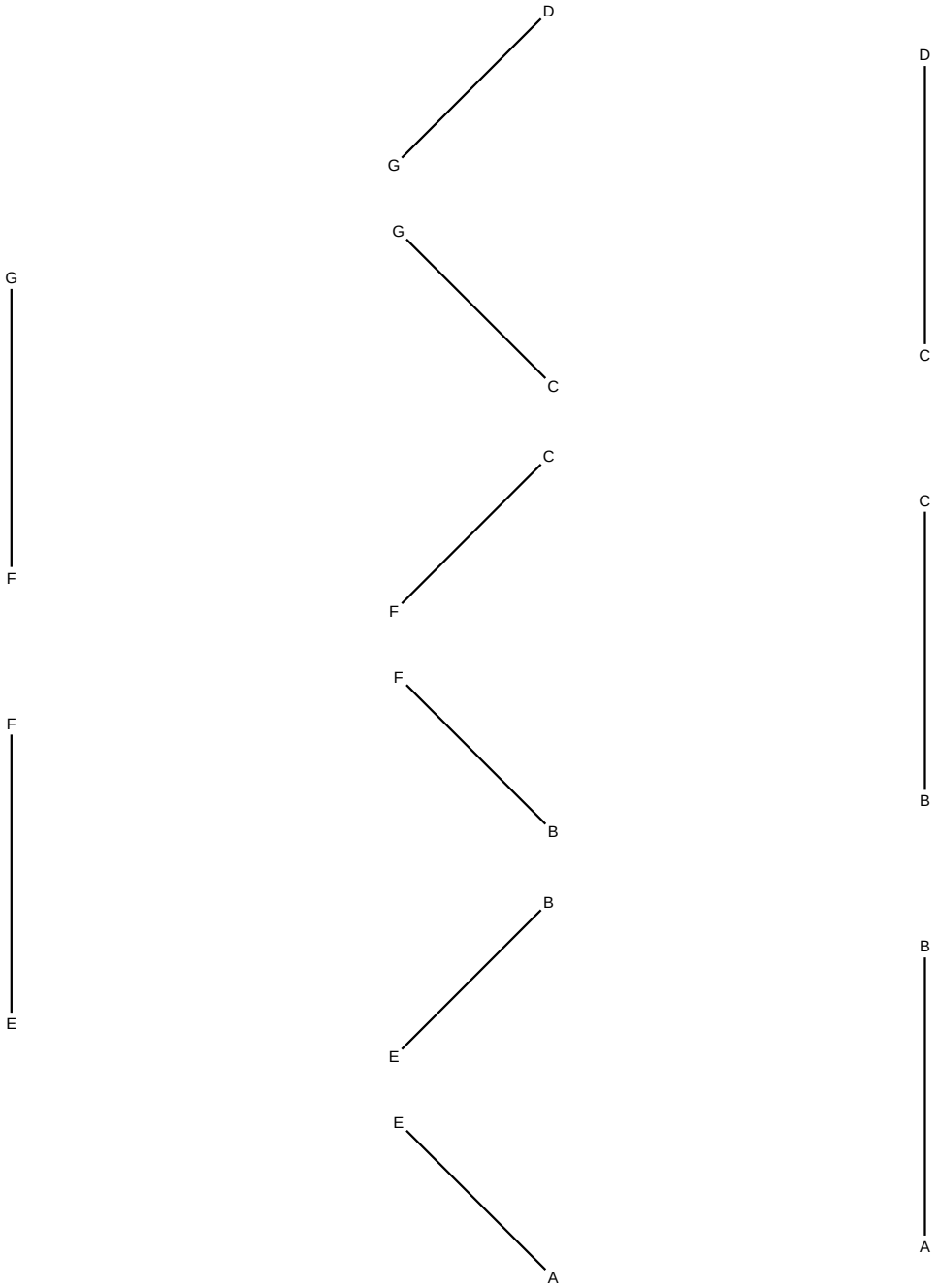
$EA_{BF} = EA$
$EA_{FC} = EA$
$EA_{CG} = EA$
$EA_{GD} = EA$

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

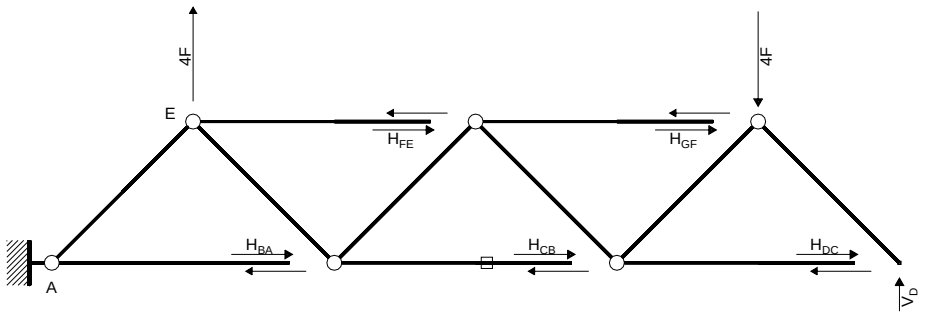
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = 16Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = 16Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = 12Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 8Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = 4Fb$

Rotazione intorno a G: aste GD

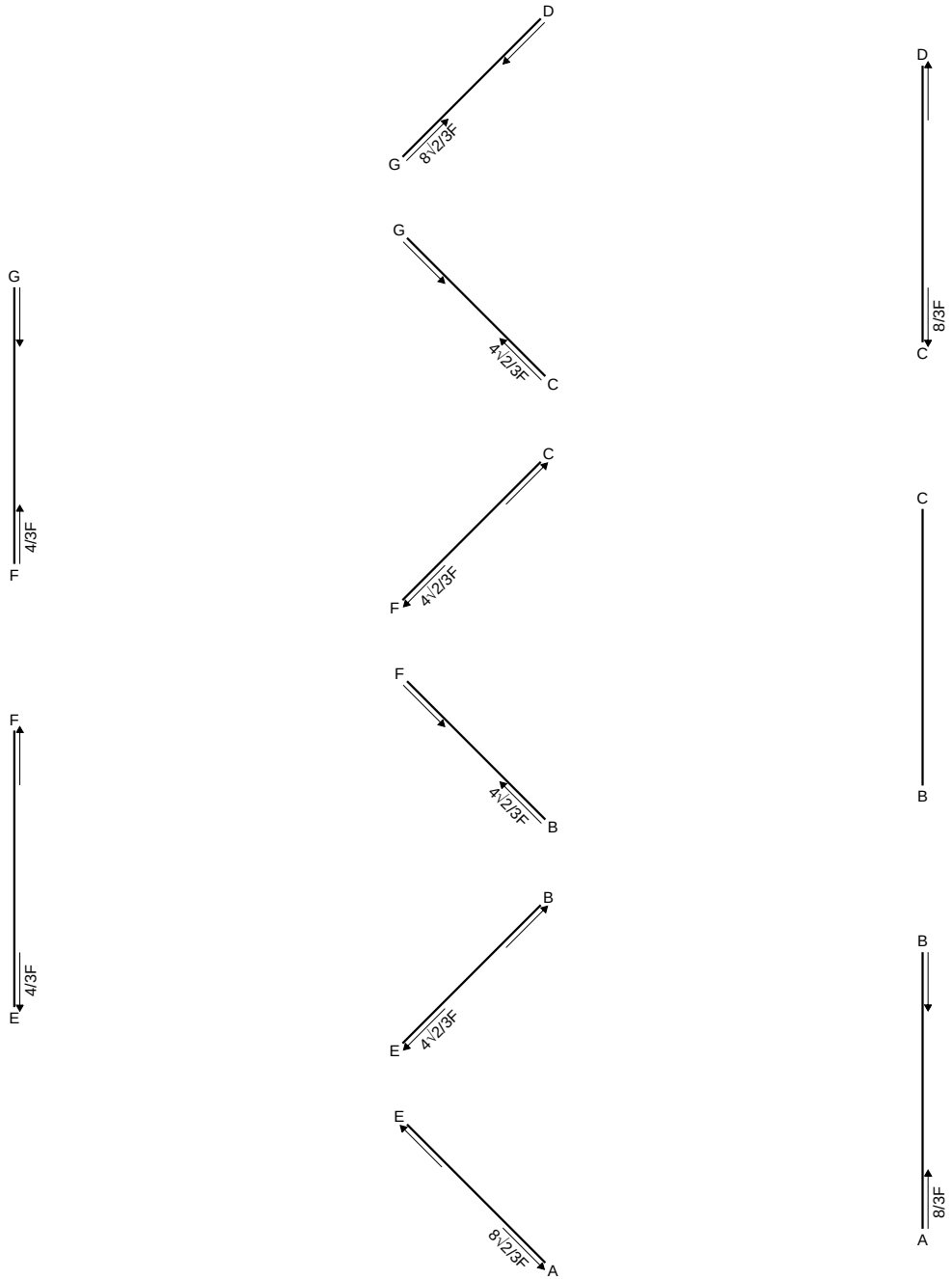
$V_Db - H_{DC}b = 0$

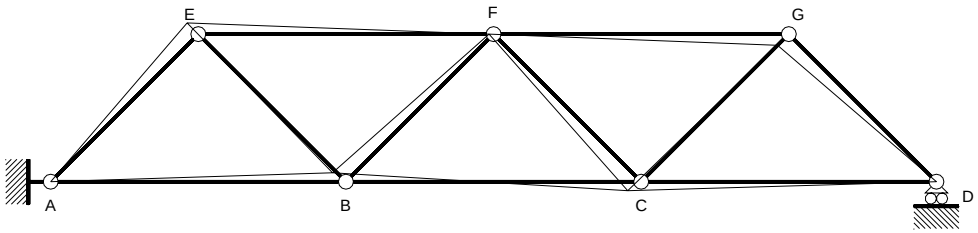
Matrice di equilibrio

	V_Db	$H_{BA}b$	$H_{CB}b$	$H_{DC}b$	$H_{FE}b$	$H_{GF}b$		Fb
φ_{AE}	6	0	0	0	0	0		16
φ_{EB}	5	-1	0	0	0	0		16
φ_{BF}	4	0	0	0	1	0	=	12
φ_{FC}	3	0	-1	0	0	0		8
φ_{CG}	2	0	0	0	0	1		4
φ_{GD}	1	0	0	-1	0	0		0

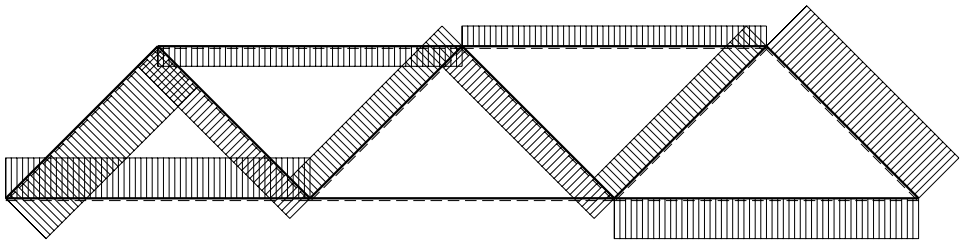
Soluzione del sistema

		Fb
V_Db		8/3
$H_{BA}b$		-8/3
$H_{FE}b$		4/3
$H_{CB}b$	=	0
$H_{GF}b$		-4/3
$H_{DC}b$		8/3





30 Fb/EA



5 F

REAZIONI

$H_A = 0$ $V_A = -8/3F$ $V_D = 8/3F$

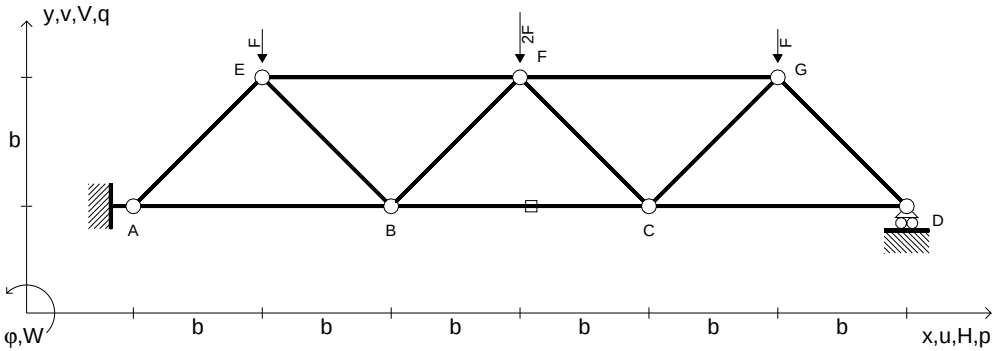
$N_{AB} = -8/3F$ $N_{BC} = 0$ $N_{CD} = 8/3F$ $N_{EF} = 4/3F$ $N_{FG} = -4/3F$ $N_{AE} = 8\sqrt{2}/3F$

$N_{EB} = 4\sqrt{2}/3F$ $N_{BF} = -4\sqrt{2}/3F$ $N_{FC} = 4\sqrt{2}/3F$ $N_{CG} = -4\sqrt{2}/3F$ $N_{GD} = -8\sqrt{2}/3F$

SPOSTAMENTI ASSOLUTI

$u_F = 2/9(Fb/EA)$

$v_F = -6(Fb/EA)$



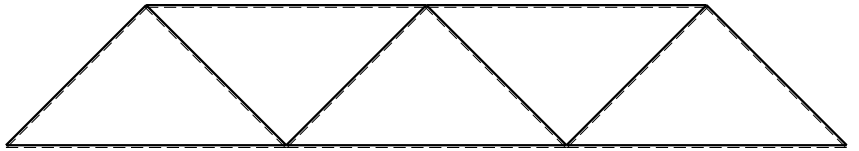
V_E = -F
V_F = -2F
V_G = -F
ε_{BC} = -3αT = -3F/EA
u_F = ?

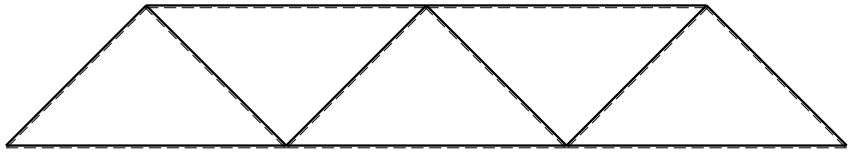
v_F = ?
EA_{AB} = EA
EA_{BC} = 3/4EA
EA_{CD} = EA
EA_{EF} = EA

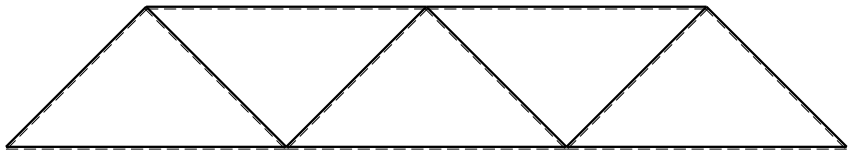
EA_{FG} = EA
EA_{AE} = EA
EA_{EB} = EA
EA_{BF} = EA
EA_{FC} = EA

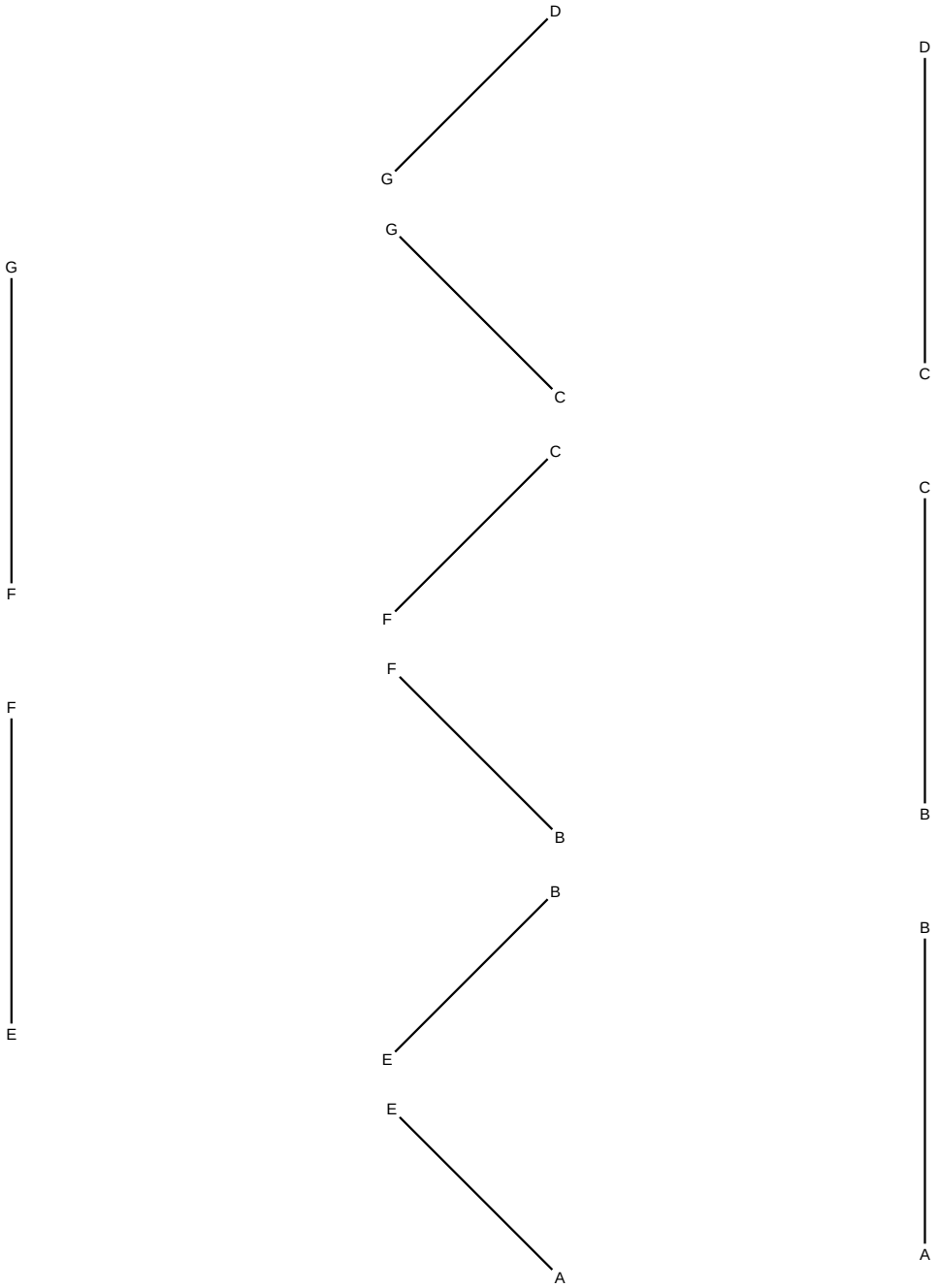
EA_{CG} = EA
EA_{GD} = EA

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

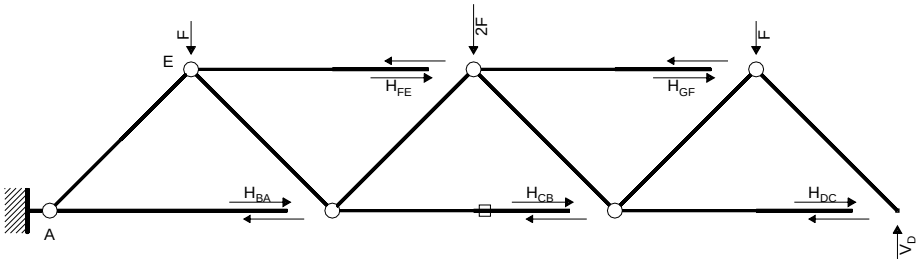
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = 12Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = 8Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = 5Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 2Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = Fb$

Rotazione intorno a G: aste GD

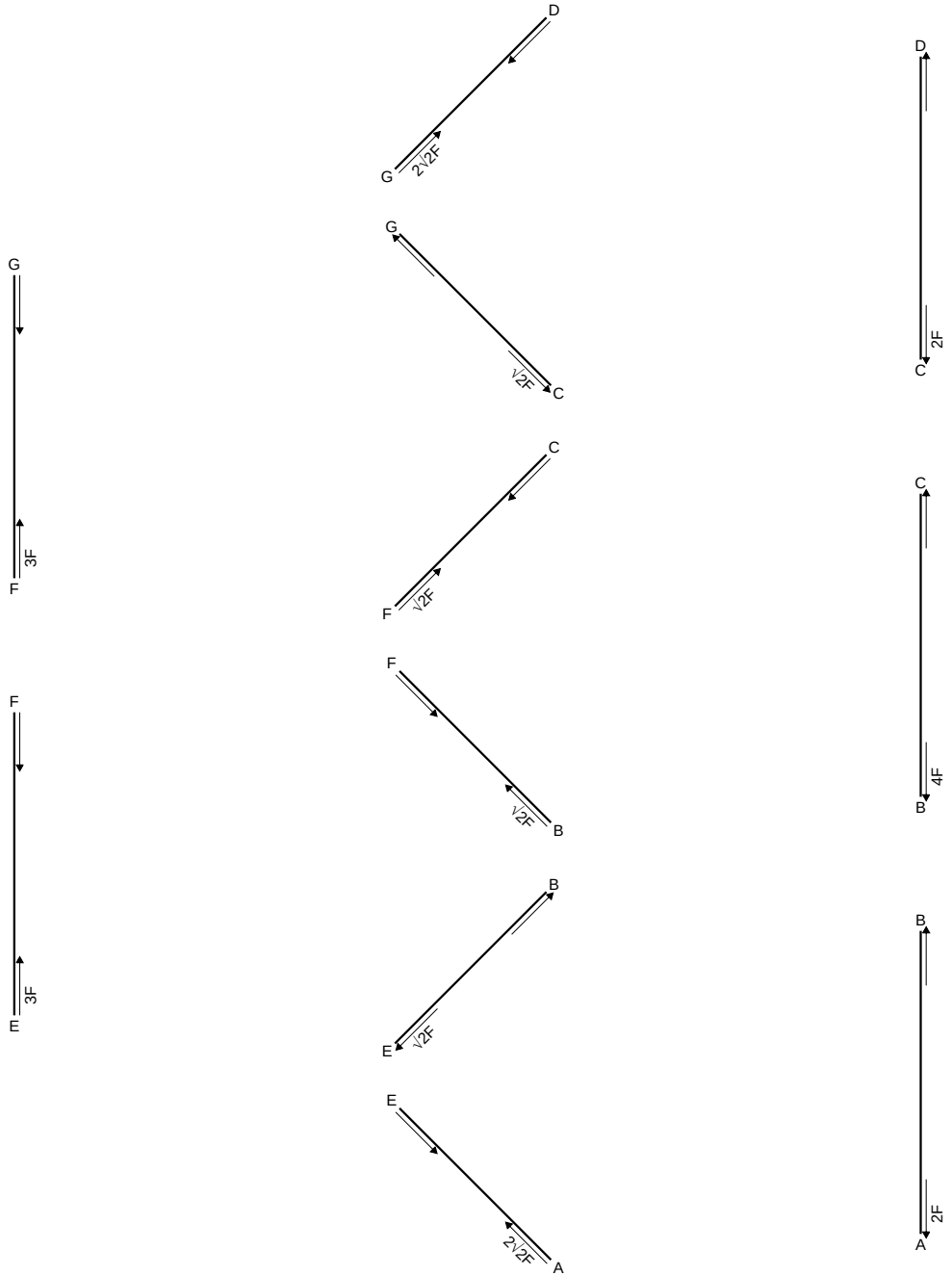
$V_Db - H_{DC}b = 0$

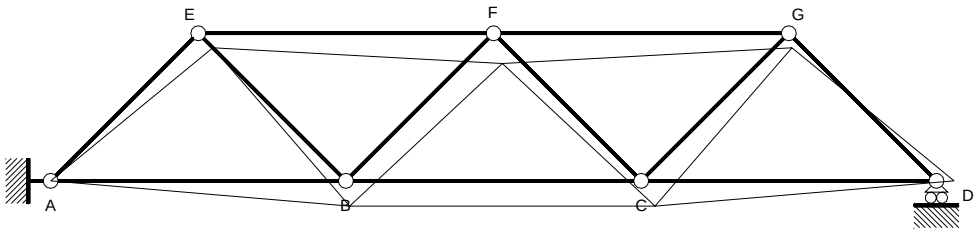
Matrice di equilibrio

	V_Db	$H_{BA}b$	$H_{CB}b$	$H_{DC}b$	$H_{FE}b$	$H_{GF}b$		$[Fb]$
φ_{AE}	6	0	0	0	0	0		12
φ_{EB}	5	-1	0	0	0	0		8
φ_{BF}	4	0	0	0	1	0	=	5
φ_{FC}	3	0	-1	0	0	0		2
φ_{CG}	2	0	0	0	0	1		1
φ_{GD}	1	0	0	-1	0	0		0

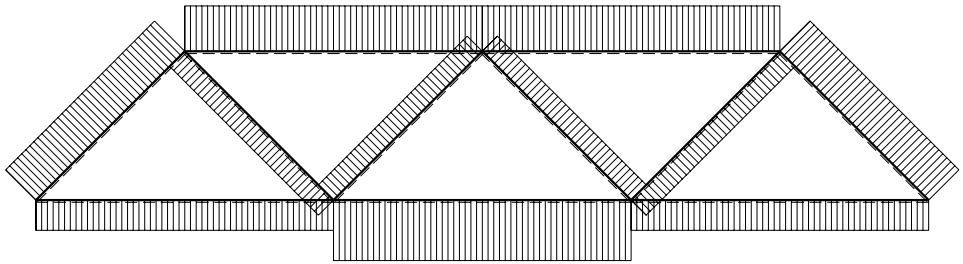
Soluzione del sistema

	$[Fb]$
V_Db	2
$H_{BA}b$	2
$H_{FE}b$	-3
$H_{CB}b$	= 4
$H_{GF}b$	-3
$H_{DC}b$	2





80 Fb/EA



5 F

REAZIONI

$H_A = 0$ $V_A = 2F$ $V_D = 2F$

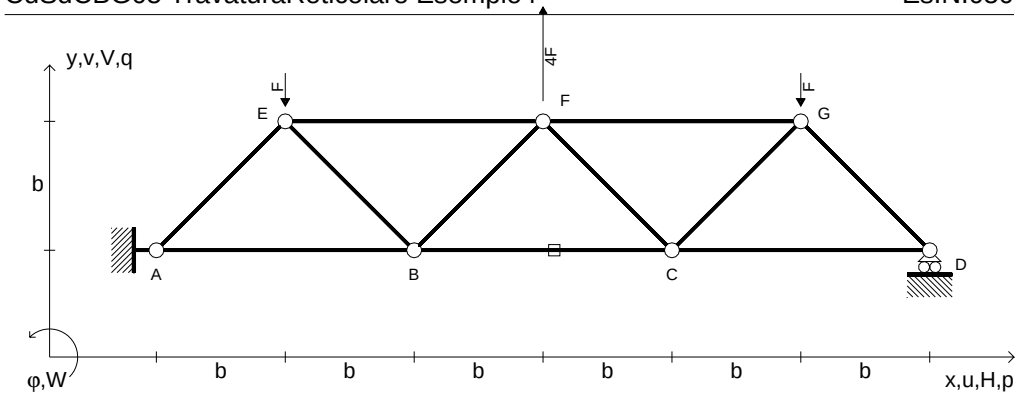
$N_{AB} = 2F$ $N_{BC} = 4F$ $N_{CD} = 2F$ $N_{EF} = -3F$ $N_{FG} = -3F$ $N_{AE} = -2\sqrt{2}F$

$N_{EB} = \sqrt{2}F$ $N_{BF} = -\sqrt{2}F$ $N_{FC} = -\sqrt{2}F$ $N_{CG} = \sqrt{2}F$ $N_{GD} = -2\sqrt{2}F$

SPOSTAMENTI ASSOLUTI

$u_F = 19/3(Fb/EA)$

$v_F = -(23+8\sqrt{2})(Fb/EA)$



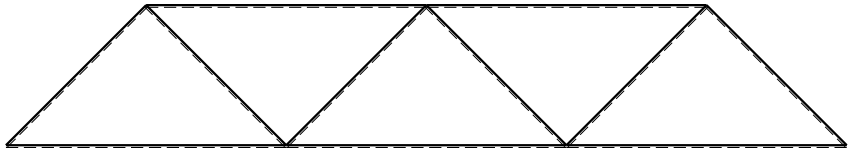
V_E = -F
V_F = 4F
V_G = -F
ε_{BC} = -3αT = -3F/EA
u_F = ?

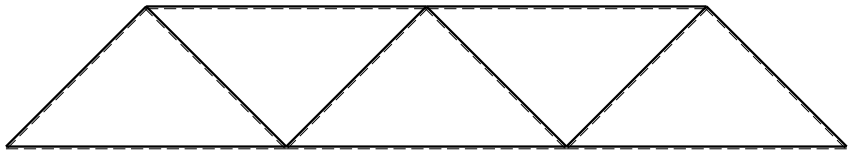
v_F = ?
EA_{AB} = EA
EA_{BC} = EA
EA_{CD} = EA
EA_{EF} = EA

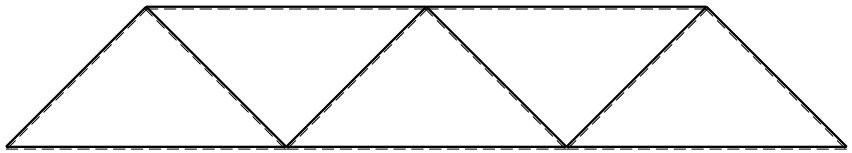
EA_{FG} = EA
EA_{AE} = EA
EA_{EB} = EA
EA_{BF} = EA
EA_{FC} = EA

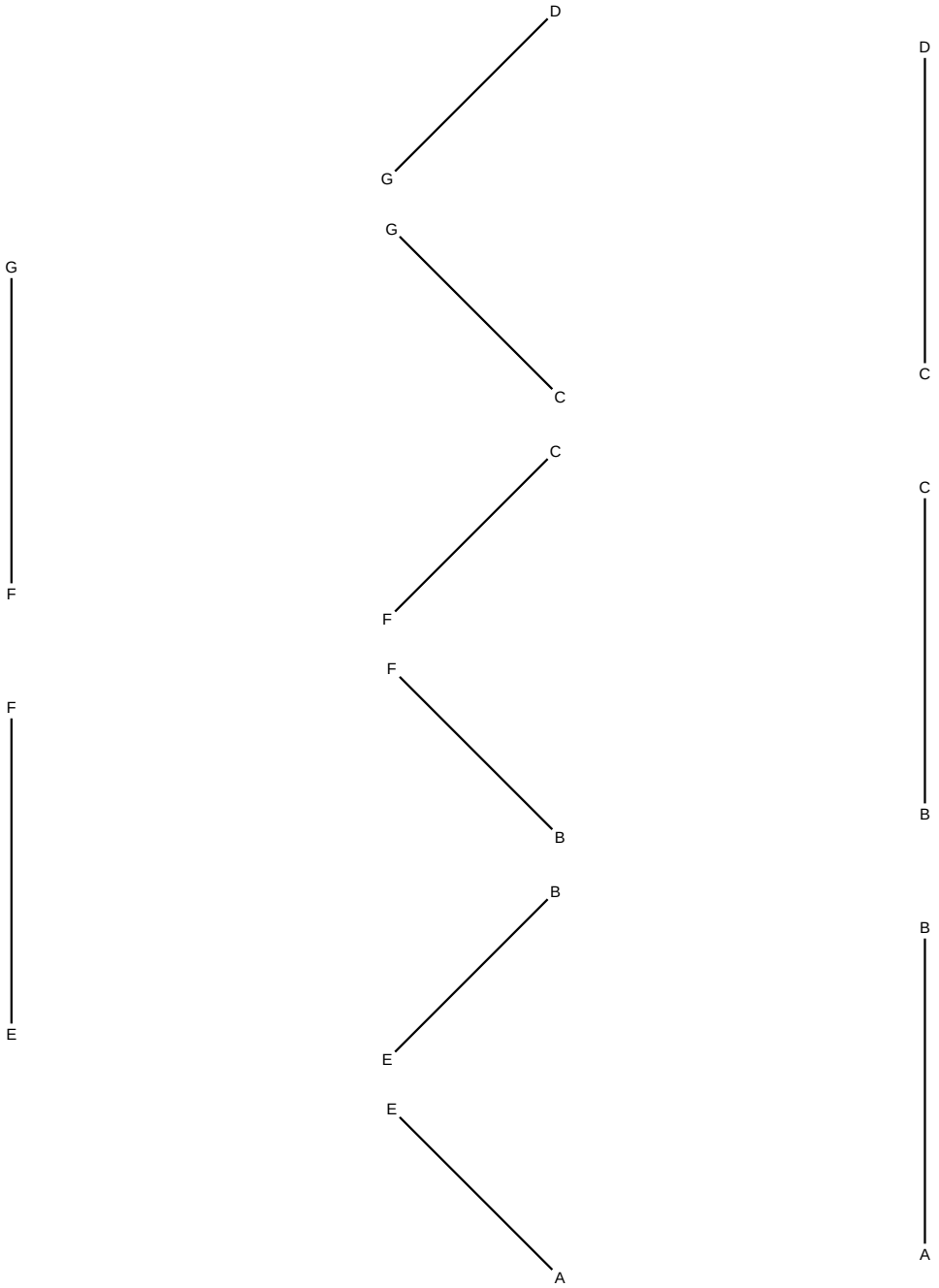
EA_{CG} = EA
EA_{GD} = EA

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

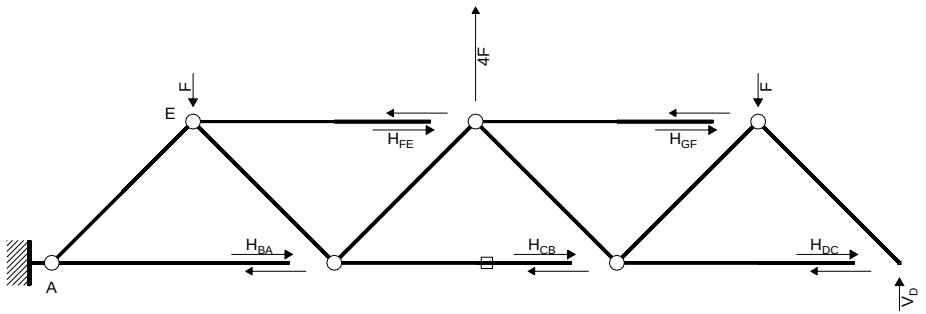
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = -6Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = -4Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = -Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = 2Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = Fb$

Rotazione intorno a G: aste GD

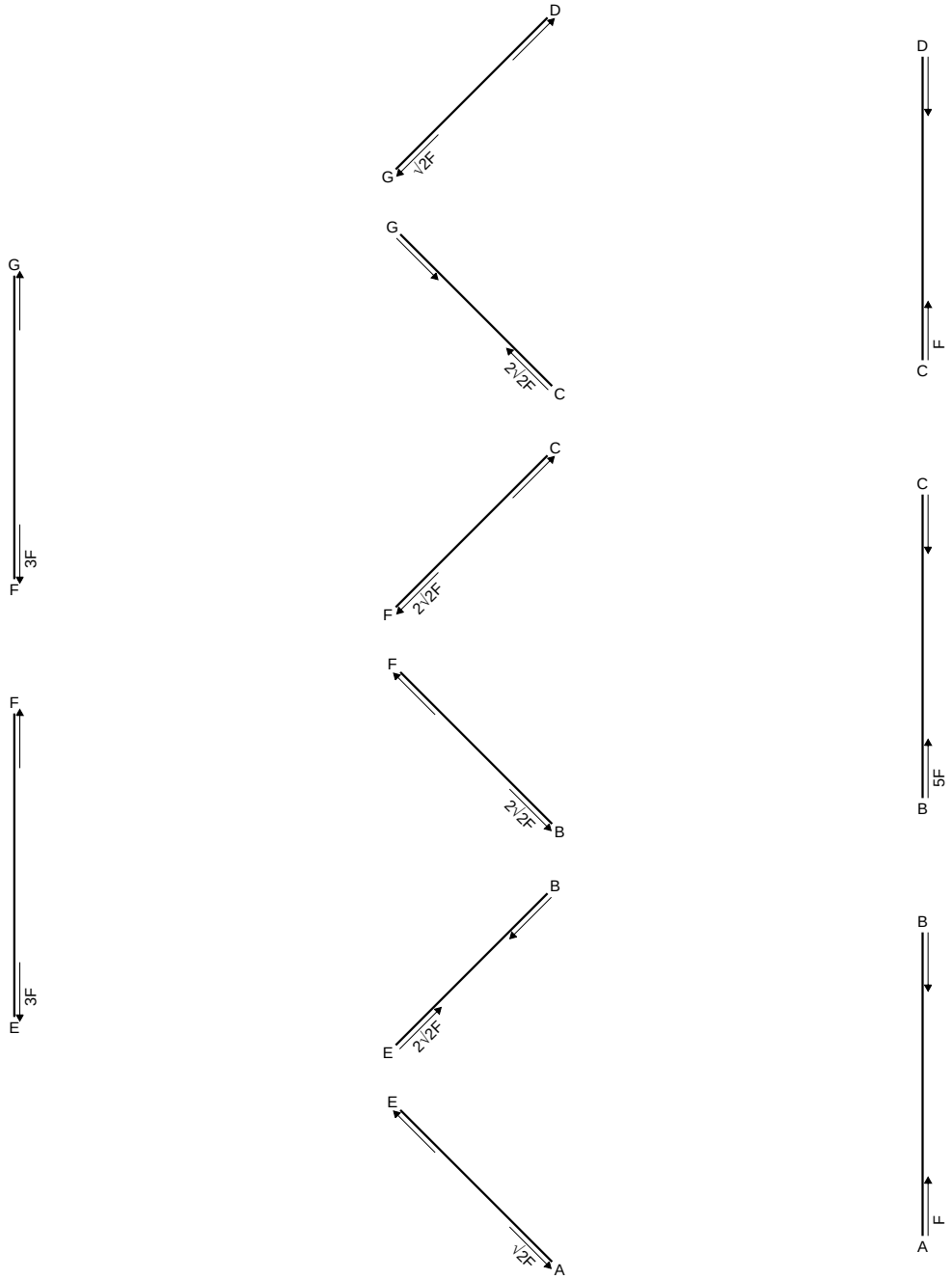
$V_Db - H_{DC}b = 0$

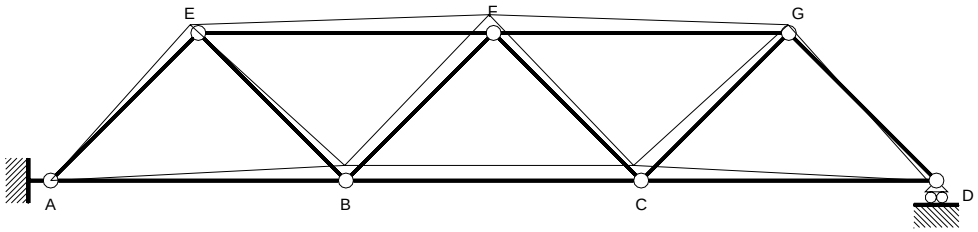
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{AE} \\ \varphi_{EB} \\ \varphi_{BF} \\ \varphi_{FC} \\ \varphi_{CG} \\ \varphi_{GD} \end{array} \begin{bmatrix} V_Db & H_{BA}b & H_{CB}b & H_{DC}b & H_{FE}b & H_{GF}b \\ 6 & 0 & 0 & 0 & 0 & 0 \\ 5 & -1 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 3 & 0 & -1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb \\ -6 \\ -4 \\ -1 \\ 2 \\ 1 \\ 0 \end{bmatrix}$$

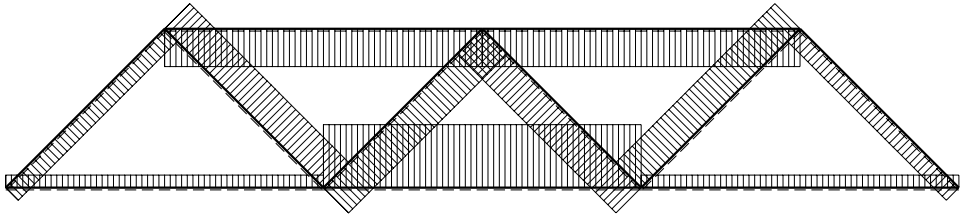
Soluzione del sistema

$$\begin{bmatrix} V_Db \\ H_{BA}b \\ H_{FE}b \\ H_{CB}b \\ H_{GF}b \\ H_{DC}b \end{bmatrix} = \begin{bmatrix} Fb \\ -1 \\ -1 \\ 3 \\ -5 \\ 3 \\ -1 \end{bmatrix}$$





120 Fb/EA



6 F

REAZIONI

$H_A = 0$ $V_A = -F$ $V_D = -F$

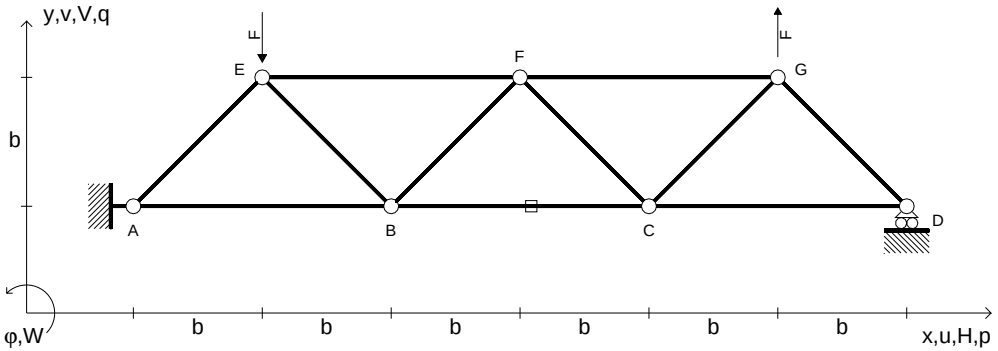
$N_{AB} = -F$ $N_{BC} = -5F$ $N_{CD} = -F$ $N_{EF} = 3F$ $N_{FG} = 3F$ $N_{AE} = \sqrt{2}F$

$N_{EB} = -2\sqrt{2}F$ $N_{BF} = 2\sqrt{2}F$ $N_{FC} = 2\sqrt{2}F$ $N_{CG} = -2\sqrt{2}F$ $N_{GD} = \sqrt{2}F$

SPOSTAMENTI ASSOLUTI

$u_F = -10(Fb/EA)$

$v_F = (38+10\sqrt{2})(Fb/EA)$



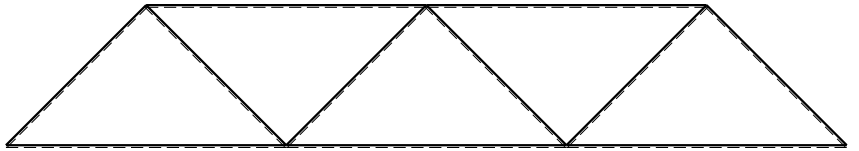
$V_E = -F$
$V_G = F$
$\varepsilon_{BC} = -3\alpha T = -3F/EA$
$u_F = ?$

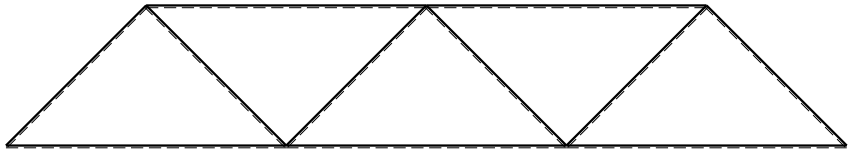
$v_F = ?$
$EA_{AB} = EA$
$EA_{BC} = 3/2EA$
$EA_{CD} = EA$

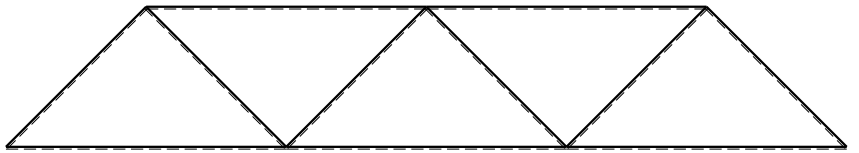
$EA_{EF} = EA$
$EA_{FG} = EA$
$EA_{AE} = EA$
$EA_{EB} = EA$

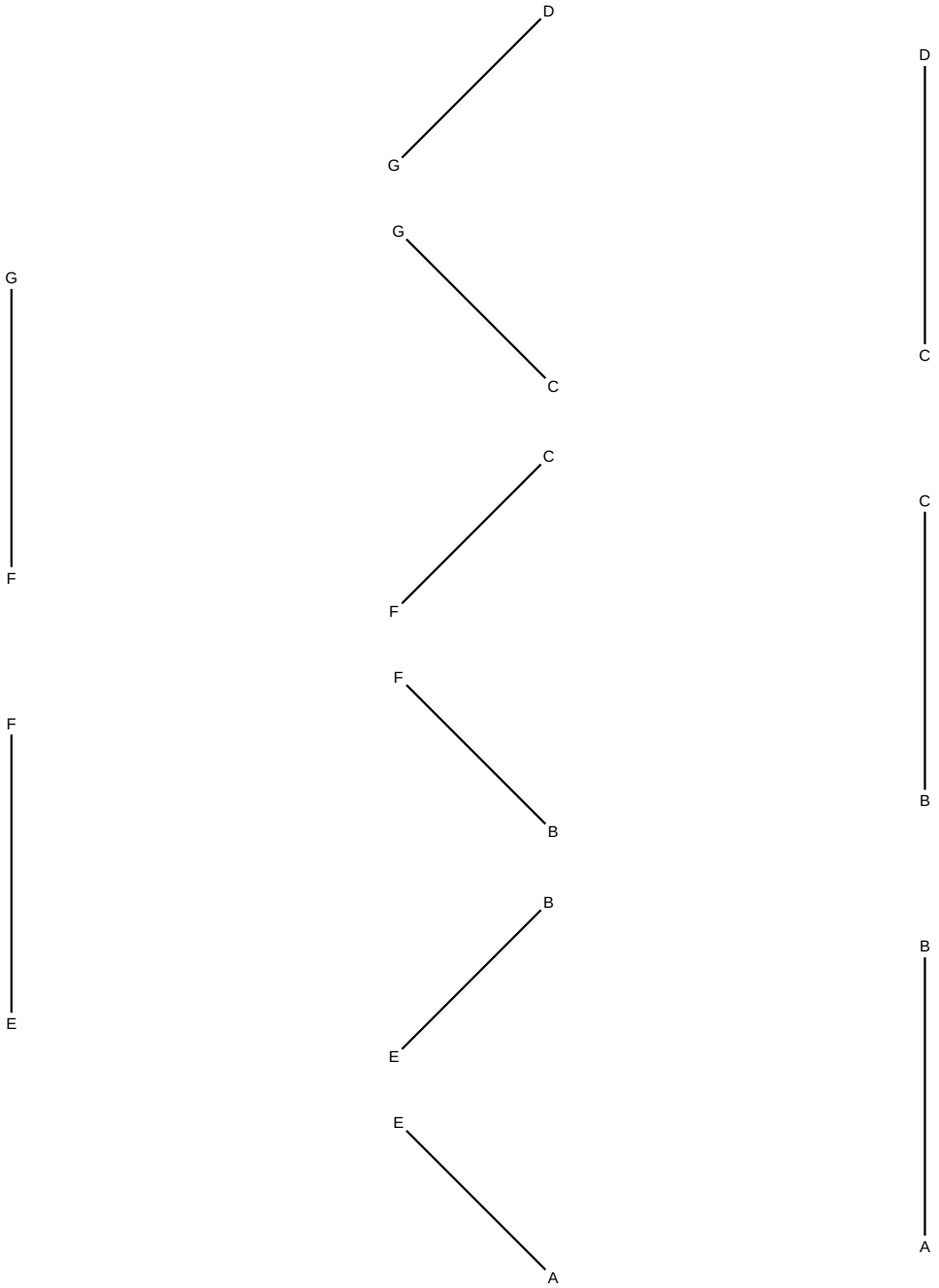
$EA_{BF} = EA$
$EA_{FC} = EA$
$EA_{CG} = EA$
$EA_{GD} = EA$

Svolgere l'analisi cinematica.
Riportare la soluzione su questo foglio.
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi delle azioni interne nelle aste.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Allungamento termico assegnato ε su asta BC.
Calcolare lo spostamento orizzont. del nodo F
Calcolare lo spostamento verticale del nodo F









REAZIONI

H_A = V_A = V_D =

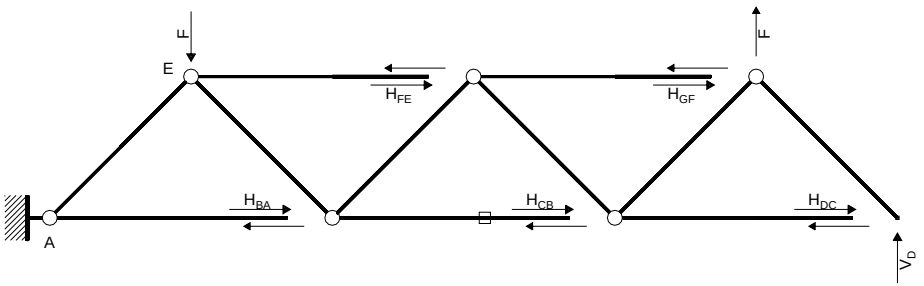
N_{AB} = N_{BC} = N_{CD} = N_{EF} = N_{FG} = N_{AE} =

N_{EB} = N_{BF} = N_{FC} = N_{CG} = N_{GD} =

SPOSTAMENTI ASSOLUTI

u_F =

v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a A: aste AE EF EB BC BF FG FC CD CG GD

$6V_Db = -4Fb$

Rotazione intorno a E: aste EB BC BF FG FC CD CG GD

$5V_Db - H_{BA}b = -4Fb$

Rotazione intorno a B: aste BF FG FC CD CG GD

$4V_Db + H_{FE}b = -3Fb$

Rotazione intorno a F: aste FC CD CG GD

$3V_Db - H_{CB}b = -2Fb$

Rotazione intorno a C: aste CG GD

$2V_Db + H_{GF}b = -Fb$

Rotazione intorno a G: aste GD

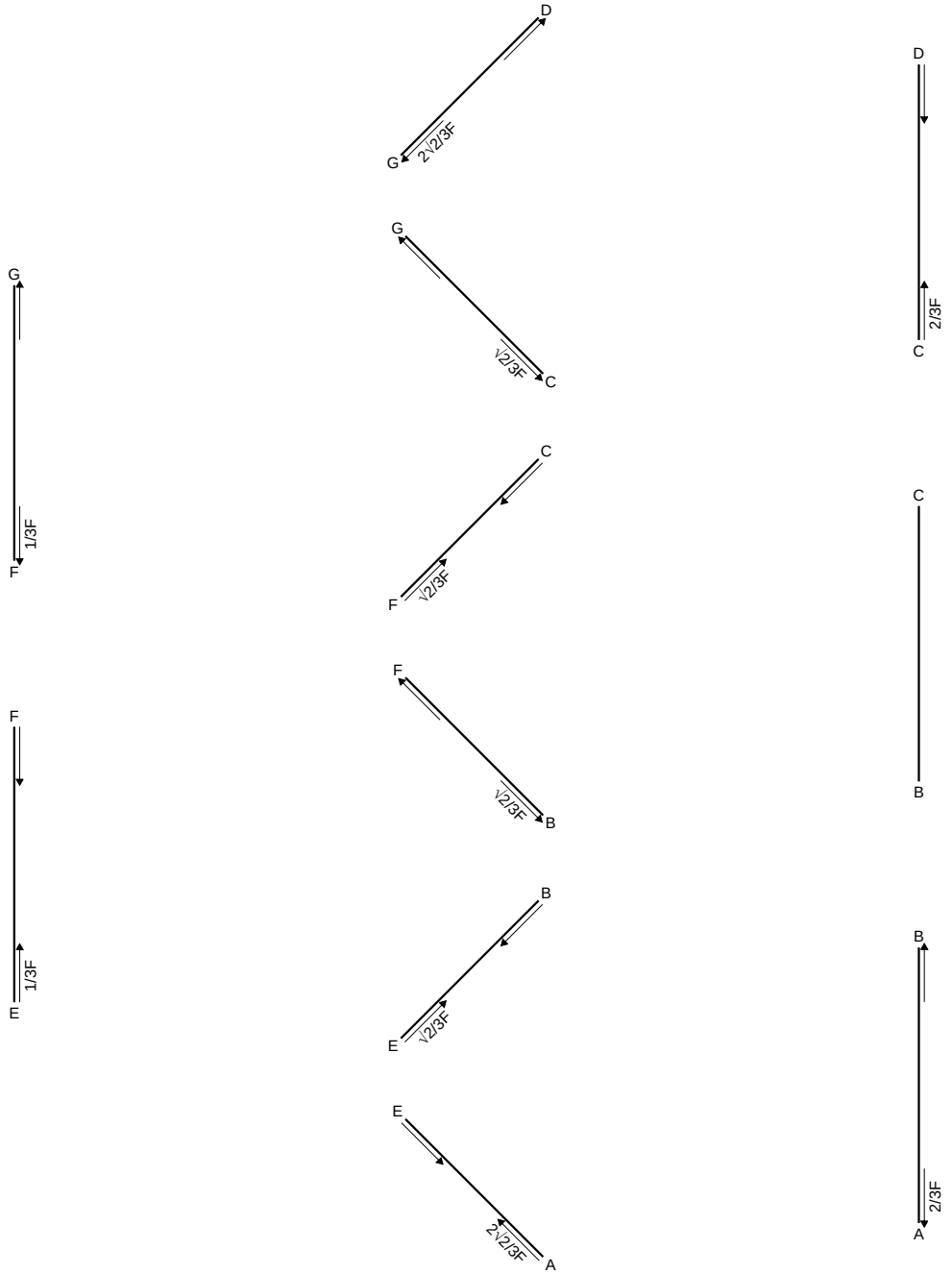
$V_Db - H_{DC}b = 0$

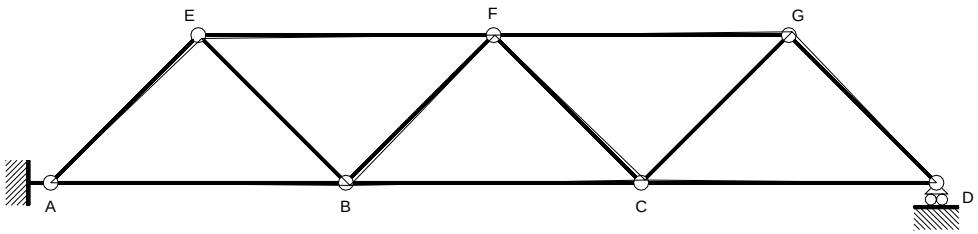
Matrice di equilibrio

$$\begin{array}{c} \\ \varphi_{AE} \\ \varphi_{EB} \\ \varphi_{BF} \\ \varphi_{FC} \\ \varphi_{CG} \\ \varphi_{GD} \end{array} \begin{bmatrix} V_Db & H_{BA}b & H_{CB}b & H_{DC}b & H_{FE}b & H_{GF}b \\ 6 & 0 & 0 & 0 & 0 & 0 \\ 5 & -1 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 1 & 0 \\ 3 & 0 & -1 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Fb \\ -4 \\ -4 \\ -3 \\ -2 \\ -1 \\ 0 \end{bmatrix}$$

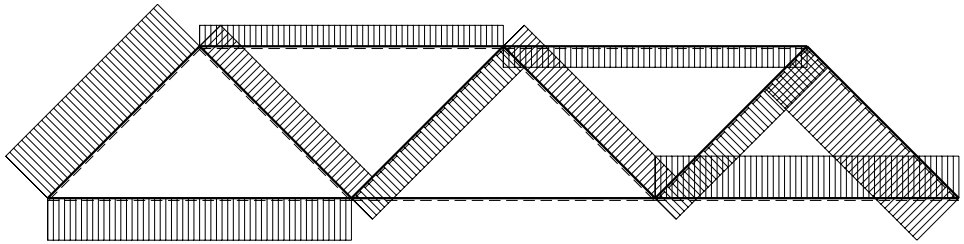
Soluzione del sistema

$$\begin{bmatrix} V_Db \\ H_{BA}b \\ H_{FE}b \\ H_{CB}b \\ H_{GF}b \\ H_{DC}b \end{bmatrix} = \begin{bmatrix} Fb \\ -2/3 \\ 2/3 \\ -1/3 \\ 0 \\ 1/3 \\ -2/3 \end{bmatrix}$$





25 Fb/EA



1.2 F

REAZIONI

$H_A = 0$ $V_A = 2/3F$ $V_D = -2/3F$

$N_{AB} = 2/3F$ $N_{BC} = 0$ $N_{CD} = -2/3F$ $N_{EF} = -1/3F$ $N_{FG} = 1/3F$ $N_{AE} = -2\sqrt{2}/3F$

$N_{EB} = -\sqrt{2}/3F$ $N_{BF} = \sqrt{2}/3F$ $N_{FC} = -\sqrt{2}/3F$ $N_{CG} = \sqrt{2}/3F$ $N_{GD} = 2\sqrt{2}/3F$

SPOSTAMENTI ASSOLUTI

$u_F = -23/9(Fb/EA)$

$v_F = 9(Fb/EA)$