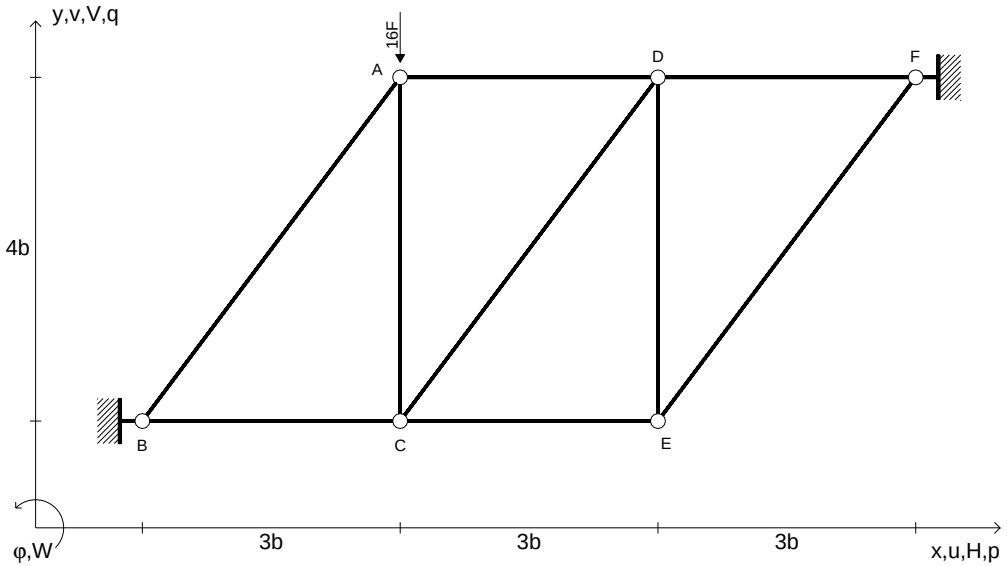
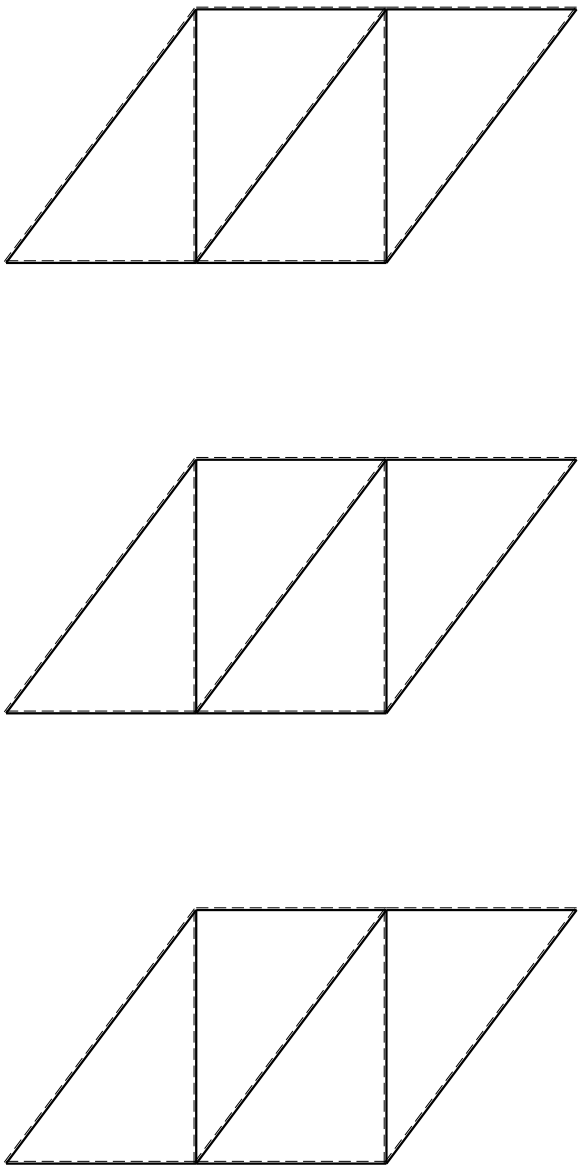
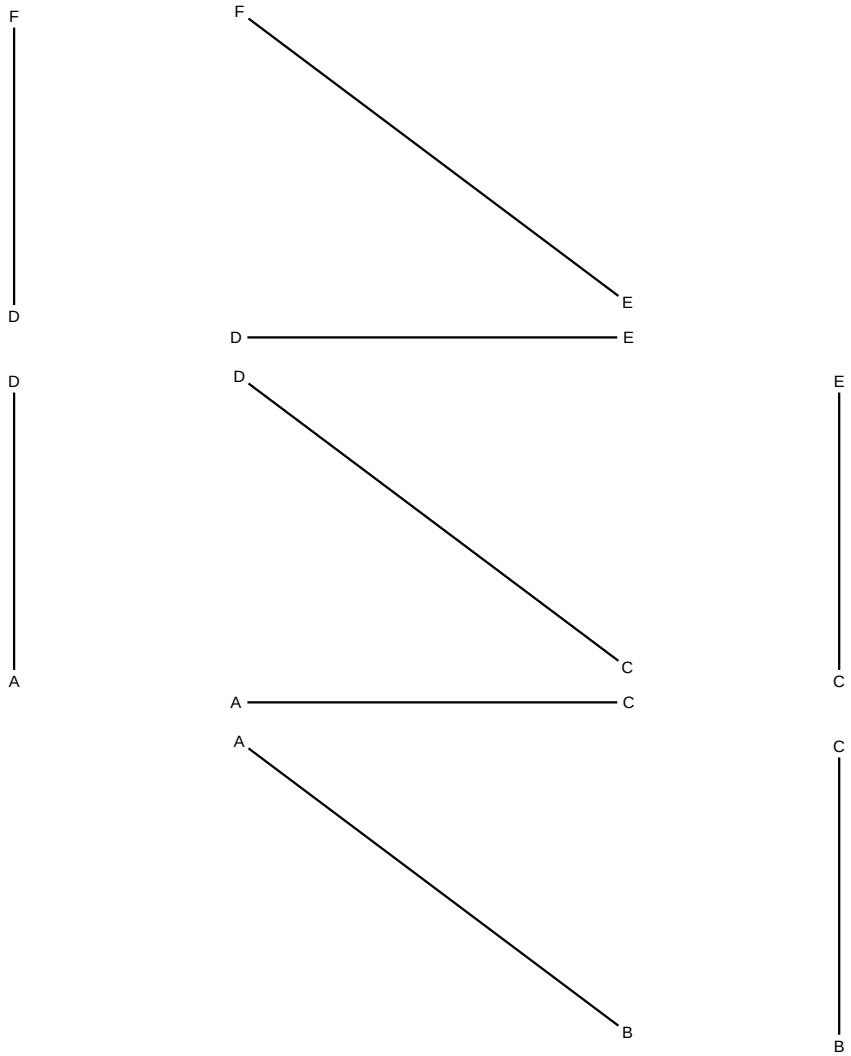


V_A = -16F EA_{CB} = 4EA EA_{DA} = 3EA EA_{EC} = 2EA EA_{DE} = EA
EA_{AB} = 5EA EA_{AC} = 4EA EA_{DC} = 3EA EA_{FE} = 2EA EA_{FD} = EA

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.
Calcolare spostamento e rotazione di tutti i nodi.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.





REAZIONI

H_B = V_B = H_F = V_F =

N_{AB} = N_{CB} = N_{AC} = N_{DA} = N_{DC} =

N_{EC} = N_{FE} = N_{DE} = N_{FD} =

SPOSTAMENTI NODALI

u_A = u_B = u_C = u_D =
v_A = v_B = v_C = v_D =

u_E = u_F =
v_E = v_F =

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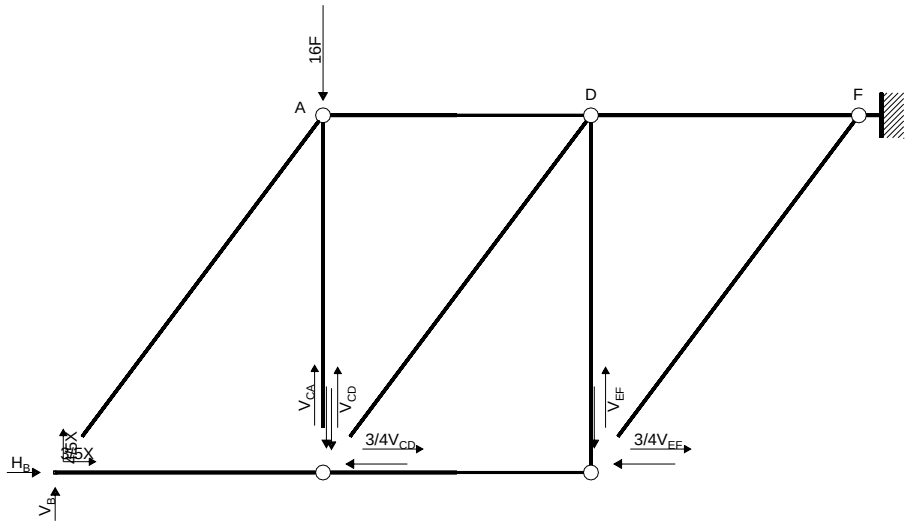


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a F: aste FD DA DC DE AB AC EC CB

$4H_Bb - 9V_Bb = 24/5Xb - 96Fb$

Rotazione intorno a D: aste DA AB AC

$-3V_{CA}b = 12/5Xb - 48Fb$

Rotazione intorno a D: aste DE EC CB

$4H_Bb - 6V_Bb + 3V_{CA}b - 3V_{EF}b = 0$

Rotazione intorno a E: aste EC CB

$-6V_Bb + 3V_{CA}b + 3V_{CD}b = 0$

Rotazione intorno a C: aste CB

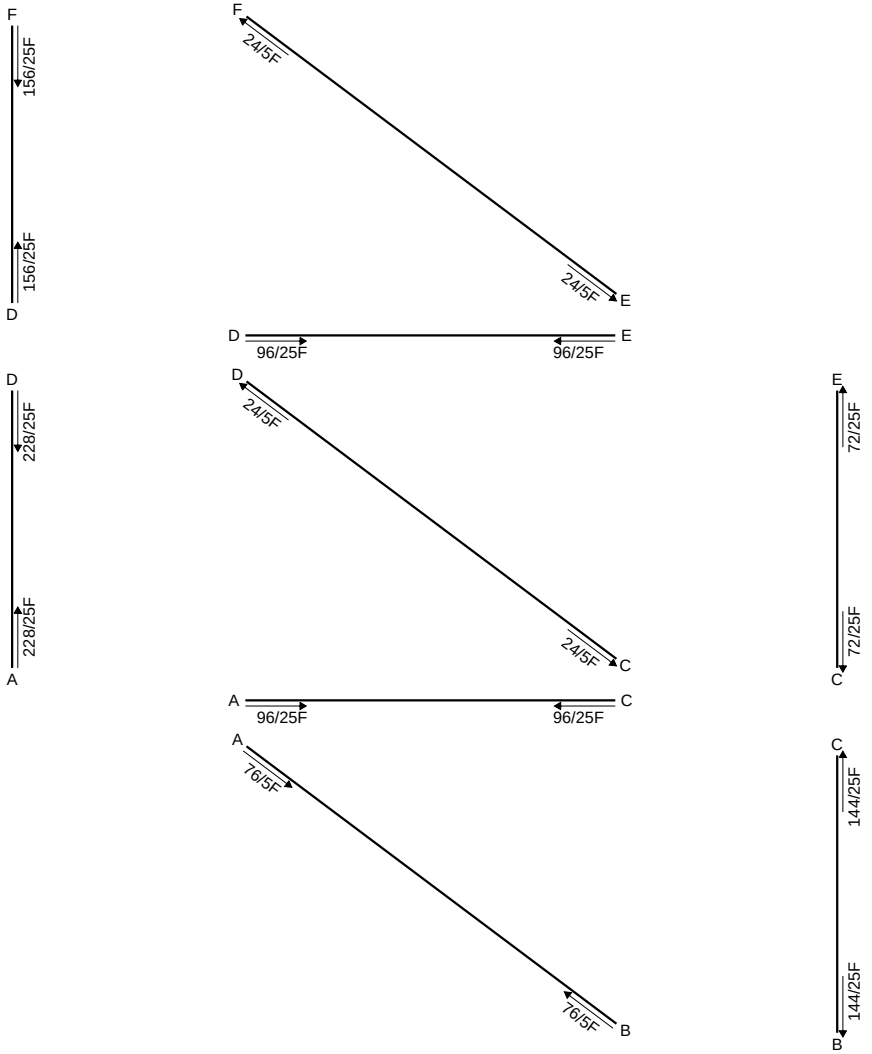
$-3V_Bb = 0$

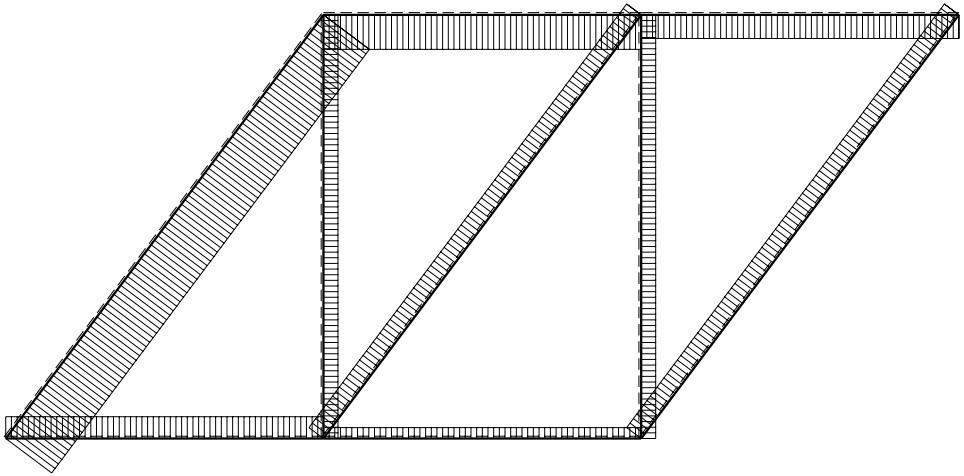
Matrice di equilibrio

	H_Bb	V_Bb	$V_{CA}b$	$V_{CD}b$	$V_{EF}b$		Xb	Fb
φ_{FD}	4	-9	0	0	0	=	24/5	-96
φ_{DA}	0	0	-3	0	0		12/5	-48
φ_{DE}	4	-6	3	0	-3		0	0
φ_{EC}	0	-6	3	3	0		0	0
φ_{CB}	0	-3	0	0	0		0	0

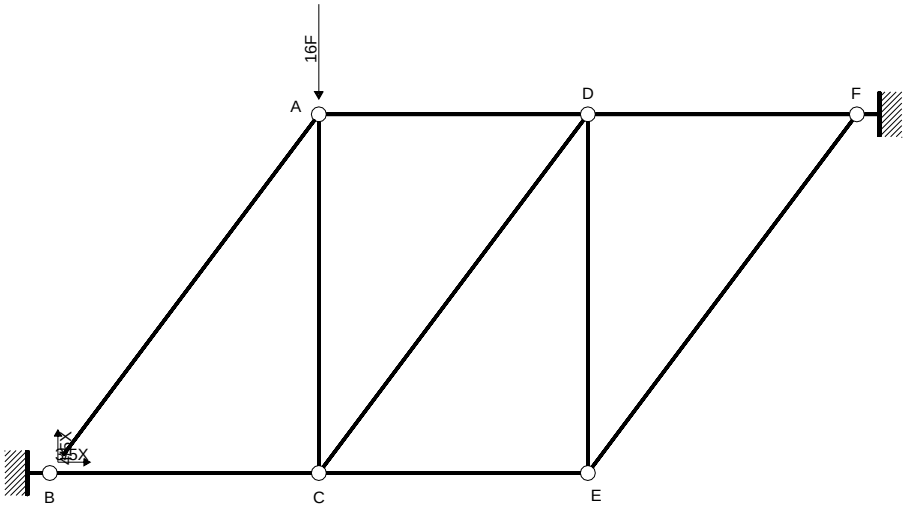
Soluzione del sistema

	Xb	Fb
H_Bb	6/5	-24
$V_{CA}b$	-4/5	16
V_Bb	0	0
$V_{CD}b$	4/5	-16
$V_{EF}b$	4/5	-16





20 F



REAZIONI IPERSTATICHE

$X = V_{BA}$

CALCOLO DELLE REAZIONI IPERSTATICHE

$L^{XX}_{AB} = N^{X}_{AB}\ N^{X}_{AB}\ l_{AB}/EA_{AB} = -1\ (-1)\ 5\ 1/5\ Fb/EA = Fb/EA$

$L^{XX}_{CB} = N^{X}_{CB}\ N^{X}_{CB}\ l_{CB}/EA_{CB} = -6/5\ (-6/5)\ 3\ 1/4\ Fb/EA = 27/25\ Fb/EA$

$L^{XX}_{AC} = N^{X}_{AC}\ N^{X}_{AC}\ l_{AC}/EA_{AC} = 4/5\ 4/5\ 4\ 1/4\ Fb/EA = 16/25\ Fb/EA$

$L^{XX}_{DA} = N^{X}_{DA}\ N^{X}_{DA}\ l_{DA}/EA_{DA} = -3/5\ (-3/5)\ 3\ 1/3\ Fb/EA = 9/25\ Fb/EA$

$L^{XX}_{DC} = N^{X}_{DC}\ N^{X}_{DC}\ l_{DC}/EA_{DC} = -1\ (-1)\ 5\ 1/3\ Fb/EA = 5/3\ Fb/EA$

$L^{XX}_{EC} = N^{X}_{EC}\ N^{X}_{EC}\ l_{EC}/EA_{EC} = -3/5\ (-3/5)\ 3\ 1/2\ Fb/EA = 27/50\ Fb/EA$

$L^{XX}_{FE} = N^{X}_{FE}\ N^{X}_{FE}\ l_{FE}/EA_{FE} = -1\ (-1)\ 5\ 1/2\ Fb/EA = 5/2\ Fb/EA$

$L^{XX}_{DE} = N^{X}_{DE}\ N^{X}_{DE}\ l_{DE}/EA_{DE} = 4/5\ 4/5\ 4\ 1\ Fb/EA = 64/25\ Fb/EA$

$L^{XX}_{FD} = N^{X}_{FD}\ N^{X}_{FD}\ l_{FD}/EA_{FD} = -6/5\ (-6/5)\ 3\ 1\ Fb/EA = 108/25\ Fb/EA$

$L^{Xo}_{CB} = N^{X}_{CB}\ N^{o}_{CB}\ l_{CB}/EA_{CB} = -6/5\ 24\ 3\ 1/4\ Fb/EA = -108/5\ Fb/EA$

$L^{Xo}_{AC} = N^{X}_{AC}\, N^{o}_{AC}\, l_{AC}/EA_{AC} = 4/5\ (-16)\ 4\ 1/4\ Fb/EA = -64/5\ Fb/EA$

$L^{Xo}_{DC} = N^{X}_{DC}\, N^{o}_{DC}\, l_{DC}/EA_{DC} = -\ 1\ 20\ 5\ 1/3\ Fb/EA = -100/3\ Fb/EA$

$L^{Xo}_{EC} = N^{X}_{EC}\, N^{o}_{EC}\, l_{EC}/EA_{EC} = -\ 3/5\ 12\ 3\ 1/2\ Fb/EA = -54/5\ Fb/EA$

$L^{Xo}_{FE} = N^{X}_{FE}\, N^{o}_{FE}\, l_{FE}/EA_{FE} = -\ 1\ 20\ 5\ 1/2\ Fb/EA = -50\ Fb/EA$

$L^{Xo}_{DE} = N^{X}_{DE}\, N^{o}_{DE}\, l_{DE}/EA_{DE} = 4/5\ (-16)\ 4\ 1\ Fb/EA = -256/5\ Fb/EA$

$L^{Xo}_{FD} = N^{X}_{FD}\, N^{o}_{FD}\, l_{FD}/EA_{FD} = -\ 6/5\ 12\ 3\ 1\ Fb/EA = -216/5\ Fb/EA$

Contributi nulli elementi
$L^{Xo}_{AB}\quad L^{Xo}_{DA}$

Contributi nulli nodi vincolati
$L^{XX}_{B}\quad L^{XX}_{F}\quad L^{Xo}_{B}\quad L^{Xo}_{F}$

Espressione risolvente

$$\left(L^{XX}_{AB} + L^{XX}_{CB} + L^{XX}_{AC} + L^{XX}_{DA} + L^{XX}_{DC} + L^{XX}_{EC} + L^{XX}_{FE} + L^{XX}_{DE} + L^{XX}_{FD} \right) X = -\left(L^{Xo}_{CB} + L^{Xo}_{AC} + L^{Xo}_{DC} + L^{Xo}_{EC} + L^{Xo}_{FE} + L^{Xo}_{DE} + L^{Xo}_{FD} \right)$$

$$\left(1 + 27/25 + 16/25 + 9/25 + 5/3 + 27/50 + 5/2 + 64/25 + 108/25 \right) X = \left(108/5 + 64/5 + 100/3 + 54/5 + 50 + 256/5 + 216/5 \right) F$$

$44/3\ X = 3344/15\ F$

Soluzione
$X = 304/25\ F$

REAZIONI
$H_B = 84/25F \qquad V_B = 304/25F \qquad H_F = -84/25F \qquad V_F = 96/25F$

$N_{AB} = -76/5F \qquad N_{CB} = 144/25F \qquad N_{AC} = -96/25F \qquad N_{DA} = -228/25F \qquad N_{DC} = 24/5F$

$N_{EC} = 72/25F \qquad N_{FE} = 24/5F \qquad N_{DE} = -96/25F \qquad N_{FD} = -156/25F$

PROCEDIMENTO E RISULTATI Nome: Es.N.035

SPOSTAMENTI NODALI

$u_A = 696/25(Fb/EA) \qquad u_B = 0 \qquad u_C = 108/25(Fb/EA) \qquad u_D = 468/25(Fb/EA)$
$v_A = -997/25(Fb/EA) \qquad v_B = 0 \qquad v_C = -901/25(Fb/EA) \qquad v_D = -921/25(Fb/EA)$

$u_E = 216/25(Fb/EA) \qquad u_F = 0$
$v_E = -537/25(Fb/EA) \qquad v_F = 0$

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Es.N.035

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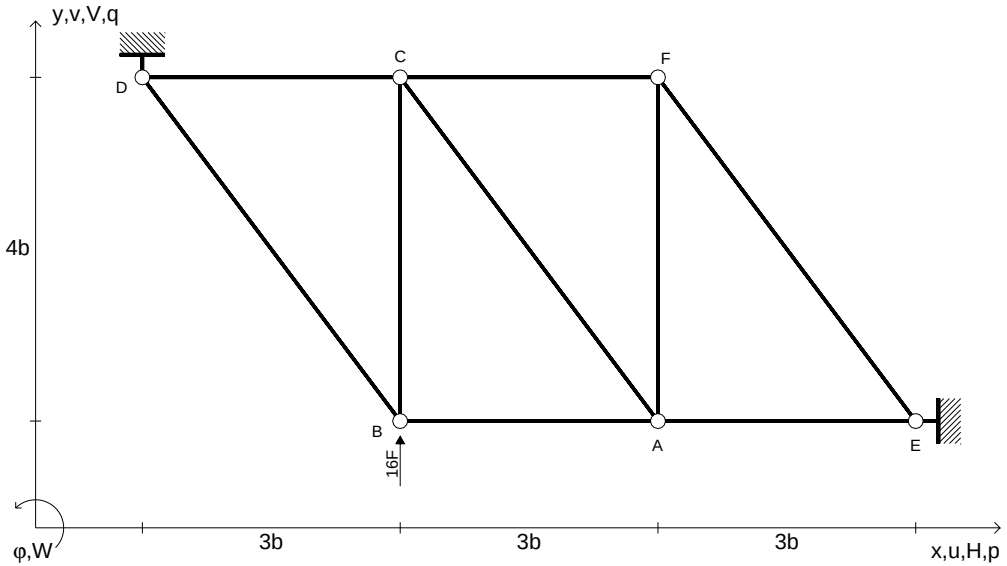
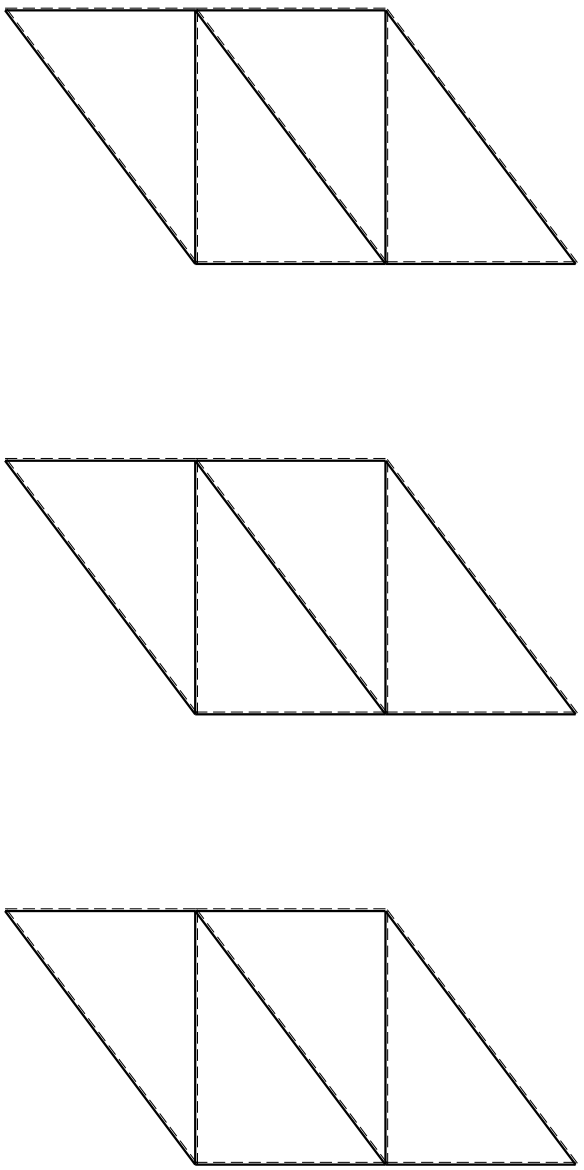


$V_B = 16F$ $EA_{BC} = 4EA$ $EA_{BD} = 5EA$ $EA_{AF} = EA$ $EA_{FC} = 2EA$
$EA_{AB} = 3EA$ $EA_{CD} = 4EA$ $EA_{EA} = EA$ $EA_{EF} = 2EA$ $EA_{AC} = 3EA$

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.
Calcolare spostamento e rotazione di tutti i nodi.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.



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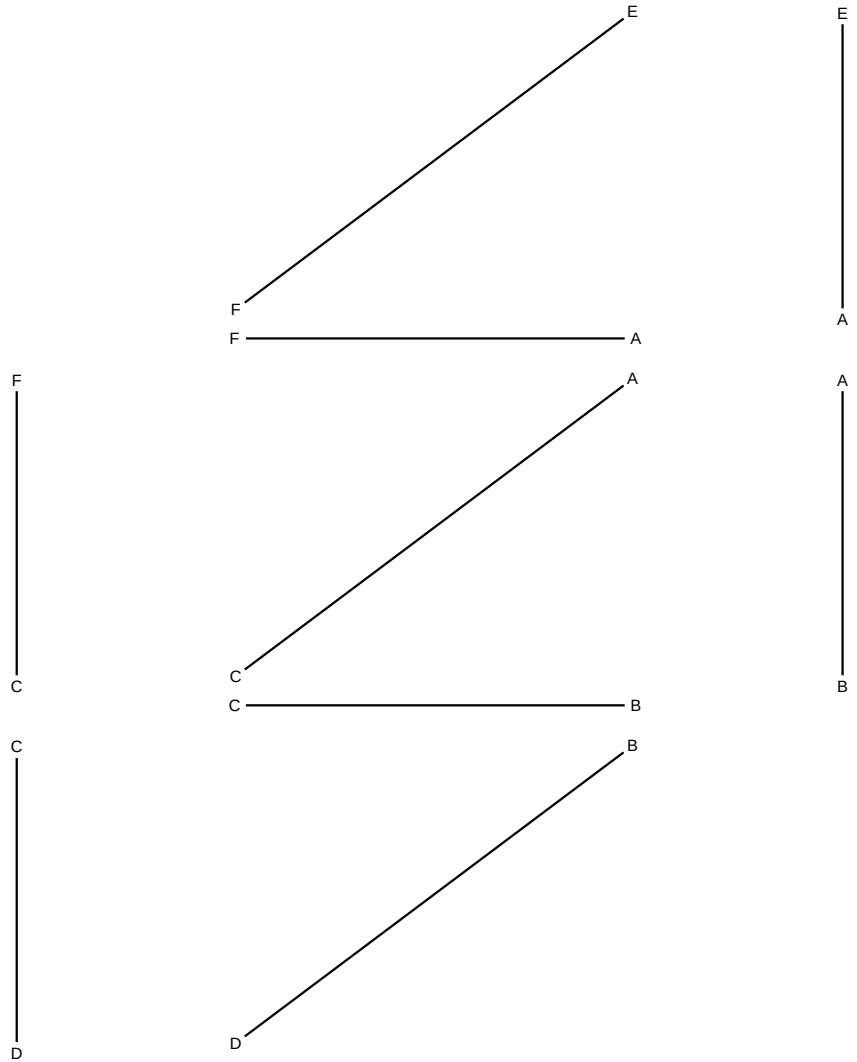

REAZIONI

H_D = V_D = H_E = V_E =

N_{AB} = N_{BC} = N_{CD} = N_{BD} = N_{EA} =

N_{AF} = N_{EF} = N_{FC} = N_{AC} =

SPOSTAMENTI NODALI

u_A = u_B = u_C = u_D =
v_A = v_B = v_C = v_D =

u_E = u_F =
v_E = v_F =

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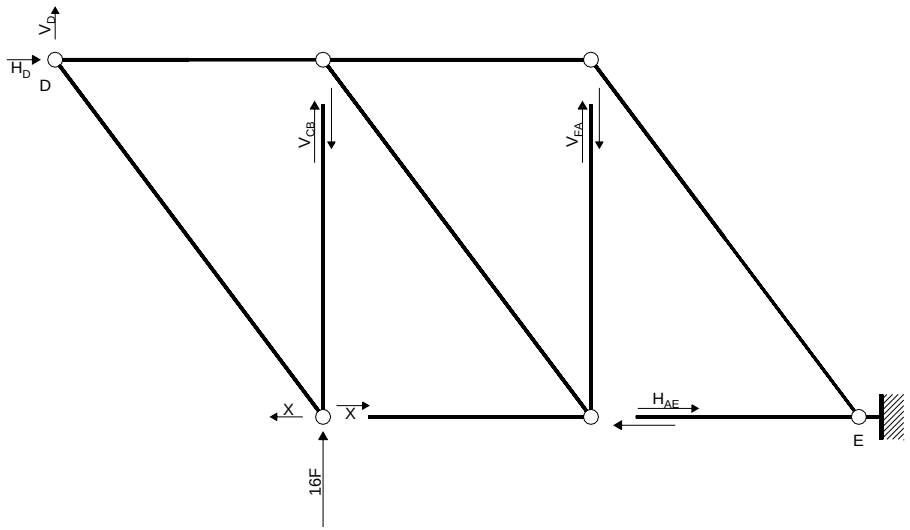


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a E: aste EF FC CD CA AB DB AF BC

$-4H_Db -9V_Db = 96Fb$

Rotazione intorno a F: aste FC CD CA AB DB AF BC

$-6V_Db -4H_{AE}b = 48Fb$

Rotazione intorno a C: aste CD DB BC

$-3V_Db = 4Xb$

Rotazione intorno a C: aste CA AB AF

$-4H_{AE}b +3V_{FA}b = -4Xb$

Rotazione intorno a D: aste DB BC

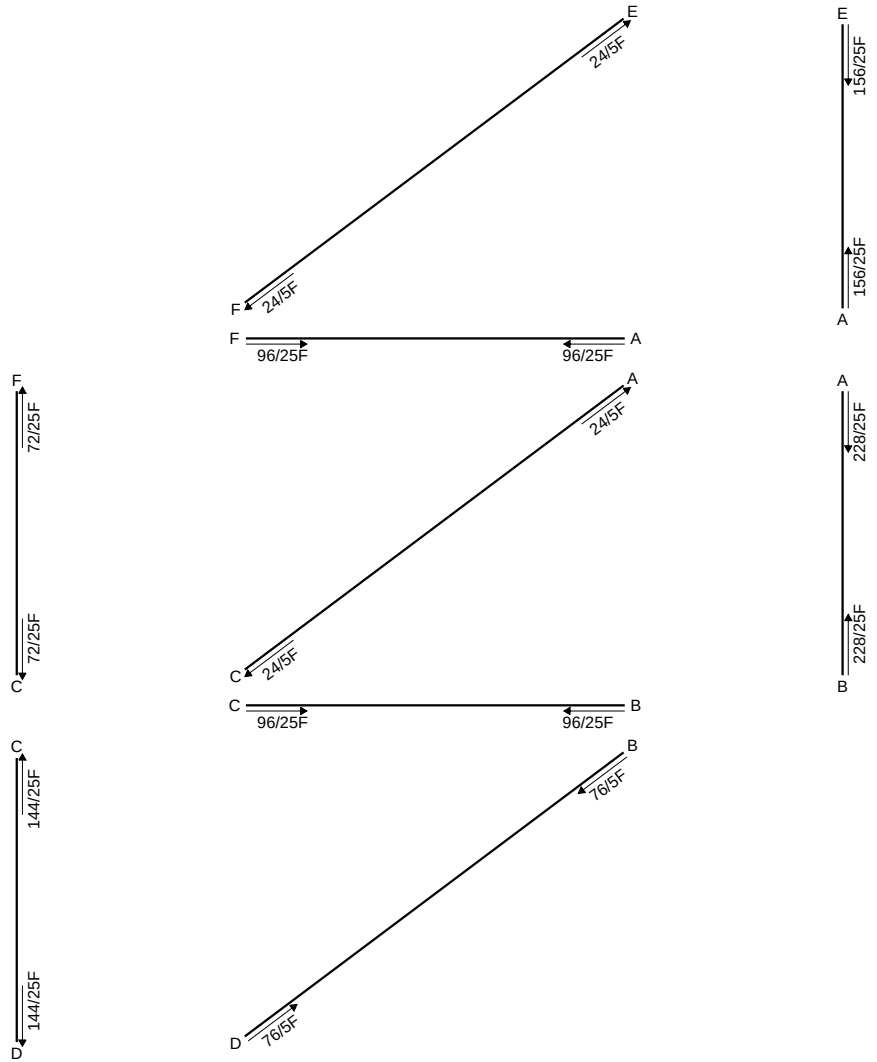
$3V_{CB}b = 4Xb -48Fb$

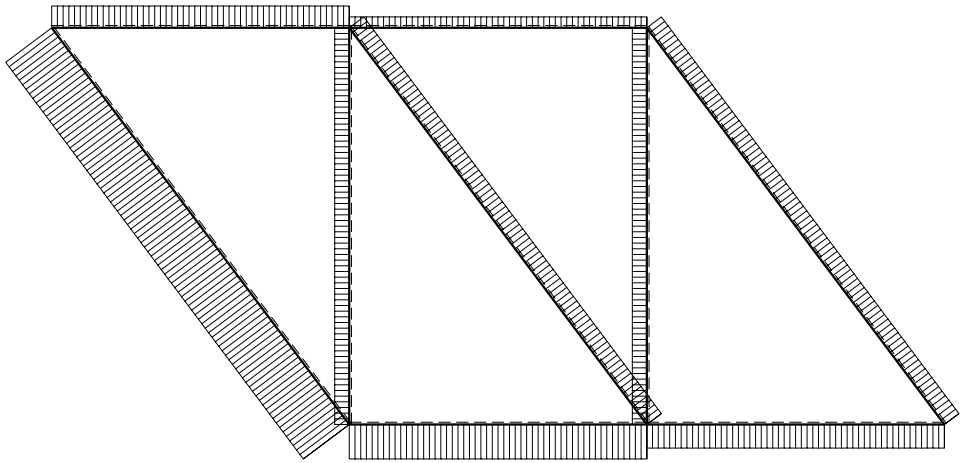
Matrice di equilibrio

	H_Db	V_Db	$V_{CB}b$	$H_{AE}b$	$V_{FA}b$		Xb	Fb
φ_{EF}	-4	-9	0	0	0	=	0	96
φ_{FC}	0	-6	0	-4	0		0	48
φ_{CD}	0	-3	0	0	0		4	0
φ_{CA}	0	0	0	-4	3		-4	0
φ_{DB}	0	0	3	0	0		4	-48

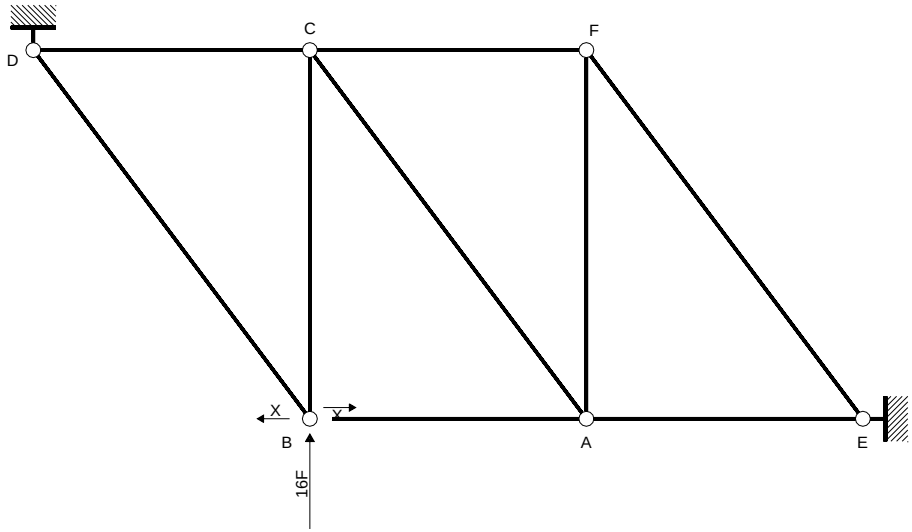
Soluzione del sistema

		Xb	Fb
H_Db		3	-24
V_Db		-4/3	0
$H_{AE}b$	=	2	-12
$V_{FA}b$		4/3	-16
$V_{CB}b$		4/3	-16





20 F



REAZIONI IPERSTATICHE

$X = H_{BA}$

CALCOLO DELLE REAZIONI IPERSTATICHE

$L_{AB}^{XX} = N_{AB}^{X}\ N_{AB}^{X}\ l_{AB}/EA_{AB} = -1\ (-1)\ 3\ 1/3\ Fb/EA = Fb/EA$

$L_{BC}^{XX} = N_{BC}^{X}\ N_{BC}^{X}\ l_{BC}/EA_{BC} = 4/3\ 4/3\ 4\ 1/4\ Fb/EA = 16/9\ Fb/EA$

$L_{CD}^{XX} = N_{CD}^{X}\ N_{CD}^{X}\ l_{CD}/EA_{CD} = -2\ (-2)\ 3\ 1/4\ Fb/EA = 3\ Fb/EA$

$L_{BD}^{XX} = N_{BD}^{X}\ N_{BD}^{X}\ l_{BD}/EA_{BD} = -5/3\ (-5/3)\ 5\ 1/5\ Fb/EA = 25/9\ Fb/EA$

$L_{EA}^{XX} = N_{EA}^{X}\ N_{EA}^{X}\ l_{EA}/EA_{EA} = -2\ (-2)\ 3\ 1\ Fb/EA = 12\ Fb/EA$

$L_{AF}^{XX} = N_{AF}^{X}\ N_{AF}^{X}\ l_{AF}/EA_{AF} = 4/3\ 4/3\ 4\ 1\ Fb/EA = 64/9\ Fb/EA$

$L_{EF}^{XX} = N_{EF}^{X}\ N_{EF}^{X}\ l_{EF}/EA_{EF} = -5/3\ (-5/3)\ 5\ 1/2\ Fb/EA = 125/18\ Fb/EA$

$L_{FC}^{XX} = N_{FC}^{X}\ N_{FC}^{X}\ l_{FC}/EA_{FC} = -1\ (-1)\ 3\ 1/2\ Fb/EA = 3/2\ Fb/EA$

$L_{AC}^{XX} = N_{AC}^{X}\ N_{AC}^{X}\ l_{AC}/EA_{AC} = -5/3\ (-5/3)\ 5\ 1/3\ Fb/EA = 125/27\ Fb/EA$

$L_{BC}^{Xo} = N_{BC}^{X}\ N_{BC}^{o}\ l_{BC}/EA_{BC} = 4/3\ (-16)\ 4\ 1/4\ Fb/EA = -64/3\ Fb/EA$

$L^{Xo}_{CD} = N^{X}_{CD}\, N^{o}_{CD}\, l_{CD}/EA_{CD} = -2\ \ 24\ \ 3\ \ 1/4\ \ Fb/EA = -36\ \ Fb/EA$

$L^{Xo}_{EA} = N^{X}_{EA}\, N^{o}_{EA}\, l_{EA}/EA_{EA} = -2\ \ 12\ \ 3\ \ 1\ \ Fb/EA = -72\ \ Fb/EA$

$L^{Xo}_{AF} = N^{X}_{AF}\, N^{o}_{AF}\, l_{AF}/EA_{AF} = 4/3\ \ (-16)\ \ 4\ \ 1\ \ Fb/EA = -256/3\ \ Fb/EA$

$L^{Xo}_{EF} = N^{X}_{EF}\, N^{o}_{EF}\, l_{EF}/EA_{EF} = -5/3\ \ 20\ \ 5\ \ 1/2\ \ Fb/EA = -250/3\ \ Fb/EA$

$L^{Xo}_{FC} = N^{X}_{FC}\, N^{o}_{FC}\, l_{FC}/EA_{FC} = -1\ \ 12\ \ 3\ \ 1/2\ \ Fb/EA = -18\ \ Fb/EA$

$L^{Xo}_{AC} = N^{X}_{AC}\, N^{o}_{AC}\, l_{AC}/EA_{AC} = -5/3\ \ 20\ \ 5\ \ 1/3\ \ Fb/EA = -500/9\ \ Fb/EA$

Contributi nulli elementi
$L^{Xo}_{AB}\ \ L^{Xo}_{BD}$

Contributi nulli nodi vincolati
$L^{XX}_{D}\ \ L^{XX}_{E}\ \ L^{Xo}_{D}\ \ L^{Xo}_{E}$

Espressione risolvente

$$\left(L^{XX}_{AB} + L^{XX}_{BC} + L^{XX}_{CD} + L^{XX}_{BD} + L^{XX}_{EA} + L^{XX}_{AF} + L^{XX}_{EF} + L^{XX}_{FC} + L^{XX}_{AC} \right) X = -\left(L^{Xo}_{BC} + L^{Xo}_{CD} + L^{Xo}_{EA} + L^{Xo}_{AF} + L^{Xo}_{EF} + L^{Xo}_{FC} + L^{Xo}_{AC} \right)$$

$$\left(1 + 16/9 + 3 + 25/9 + 12 + 64/9 + 125/18 + 3/2 + 125/27 \right) X = \left(64/3 + 36 + 72 + 256/3 + 250/3 + 18 + 500/9 \right) F$$

$1100/27\ X = 3344/9\ F$

Soluzione
$X = 228/25\ F$

REAZIONI
$H_D = 84/25F$ $V_D = -304/25F$ $H_E = -84/25F$ $V_E = -96/25F$

$N_{AB} = -228/25F$ $N_{BC} = -96/25F$ $N_{CD} = 144/25F$ $N_{BD} = -76/5F$ $N_{EA} = -156/25F$

$N_{AF} = -96/25F$ $N_{EF} = 24/5F$ $N_{FC} = 72/25F$ $N_{AC} = 24/5F$

SPOSTAMENTI NODALI

$u_A = 468/25(Fb/EA)$ $u_B = 696/25(Fb/EA)$ $u_C = 108/25(Fb/EA)$ $u_D = 0$
$v_A = 921/25(Fb/EA)$ $v_B = 997/25(Fb/EA)$ $v_C = 901/25(Fb/EA)$ $v_D = 0$

PROCEDIMENTO E RISULTATI Nome: Es.N.036

$u_E = 0$ $u_F = 216/25(Fb/EA)$
$v_E = 0$ $v_F = 537/25(Fb/EA)$

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Es.N.036

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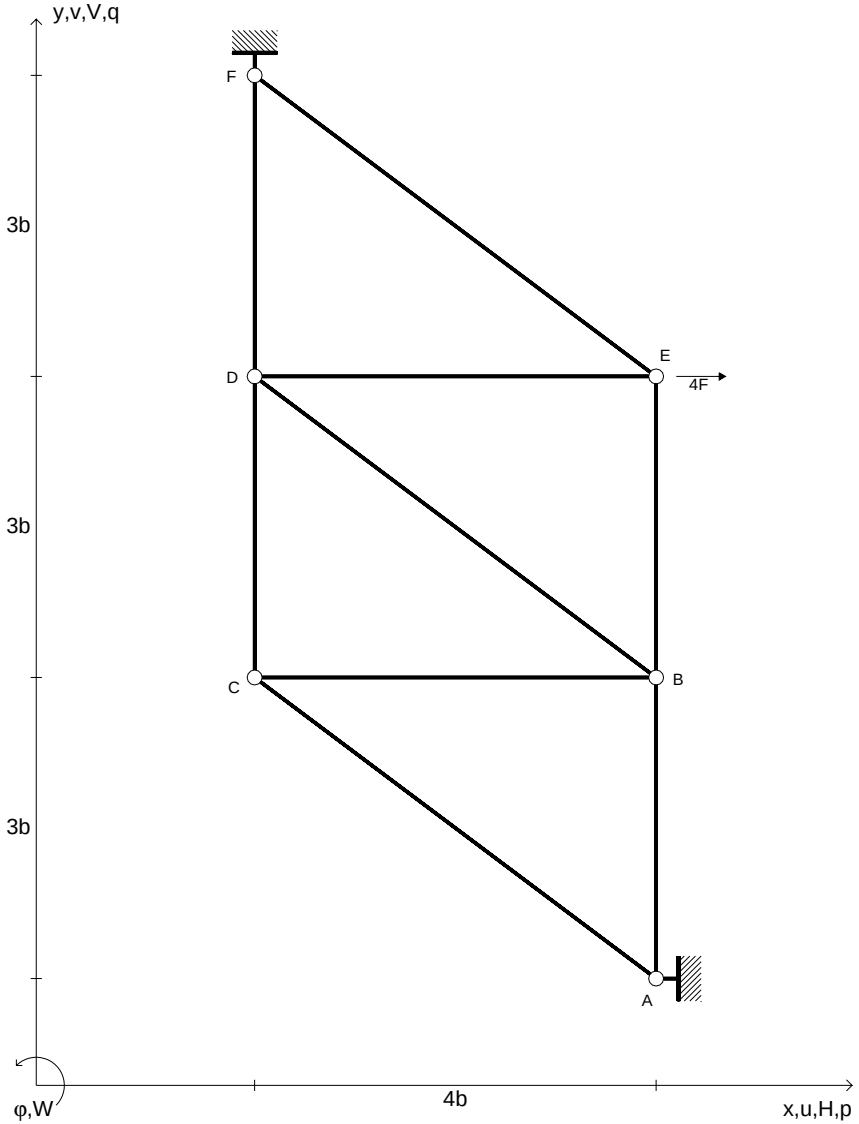
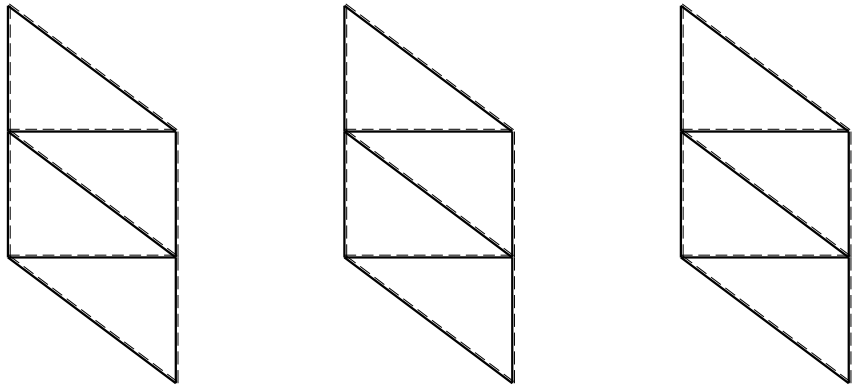
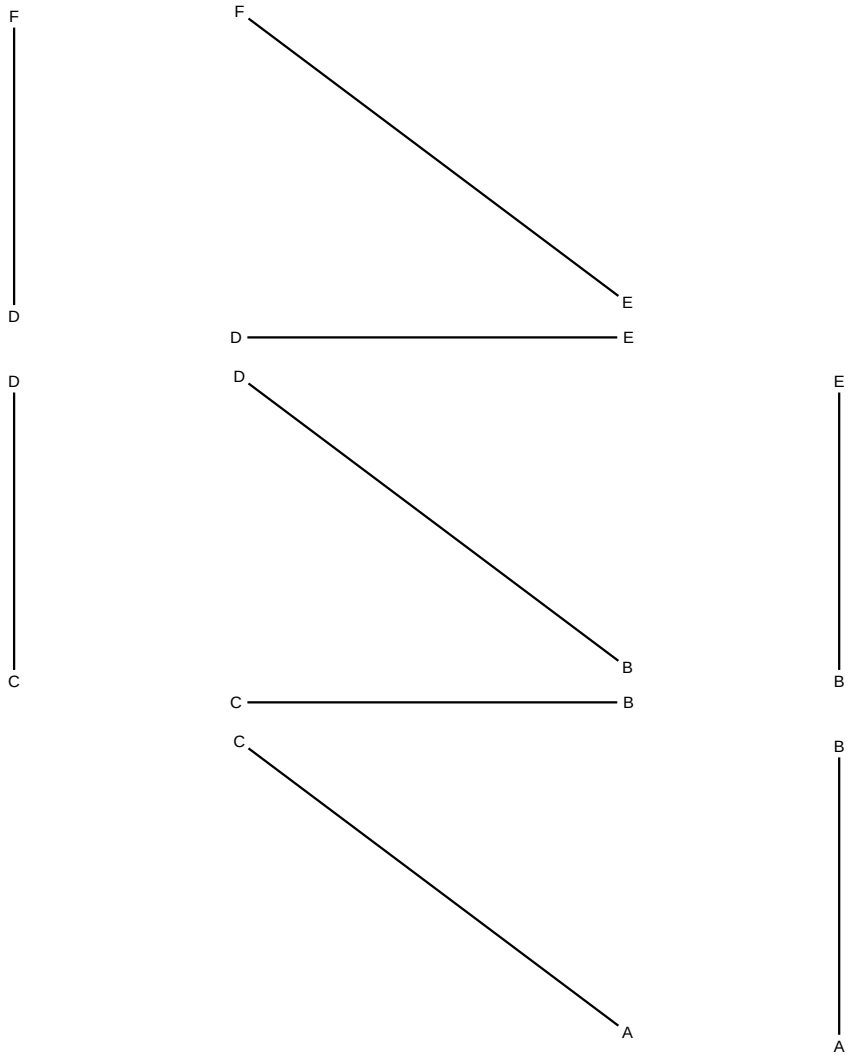
$H_E = 4F$
$EA_{AB} = EA$
$EA_{BC} = EA$
$EA_{AC} = 2EA$
$EA_{CD} = 2EA$
$EA_{BD} = 3EA$
$EA_{BE} = 3EA$
$EA_{ED} = 4EA$
$EA_{DF} = 4EA$
$EA_{EF} = 5EA$



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.
Calcolare spostamento e rotazione di tutti i nodi.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.





REAZIONI

H_A = V_A = H_F = V_F =

N_{AB} = N_{BC} = N_{AC} = N_{CD} = N_{BD} = N_{BE} =

N_{ED} = N_{DF} = N_{EF} =

SPOSTAMENTI NODALI

u_A = u_B = u_C = u_D =
v_A = v_B = v_C = v_D =

u_E = u_F =
v_E = v_F =

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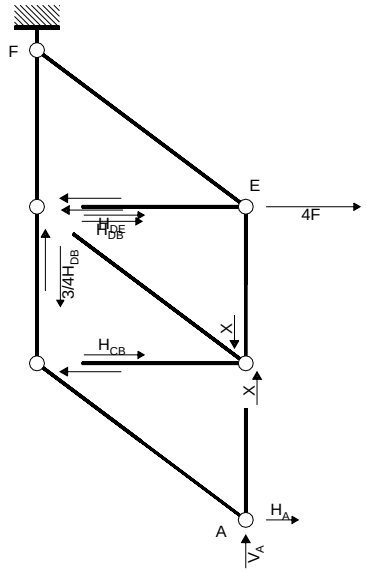


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a F: aste FD DC CA AB

$9H_Ab + 4V_Ab - 6H_{CB}b - 3H_{DB}b - 3H_{DE}b = -4Xb$

Rotazione intorno a F: aste FE EB ED BC BD

$6H_{CB}b + 3H_{DB}b + 3H_{DE}b = 4Xb - 12Fb$

Rotazione intorno a D: aste DC CA AB

$6H_Ab + 4V_Ab - 3H_{CB}b = -4Xb$

Rotazione intorno a E: aste EB BC BD

$3H_{CB}b + 3H_{DB}b = 0$

Rotazione intorno a C: aste CA AB

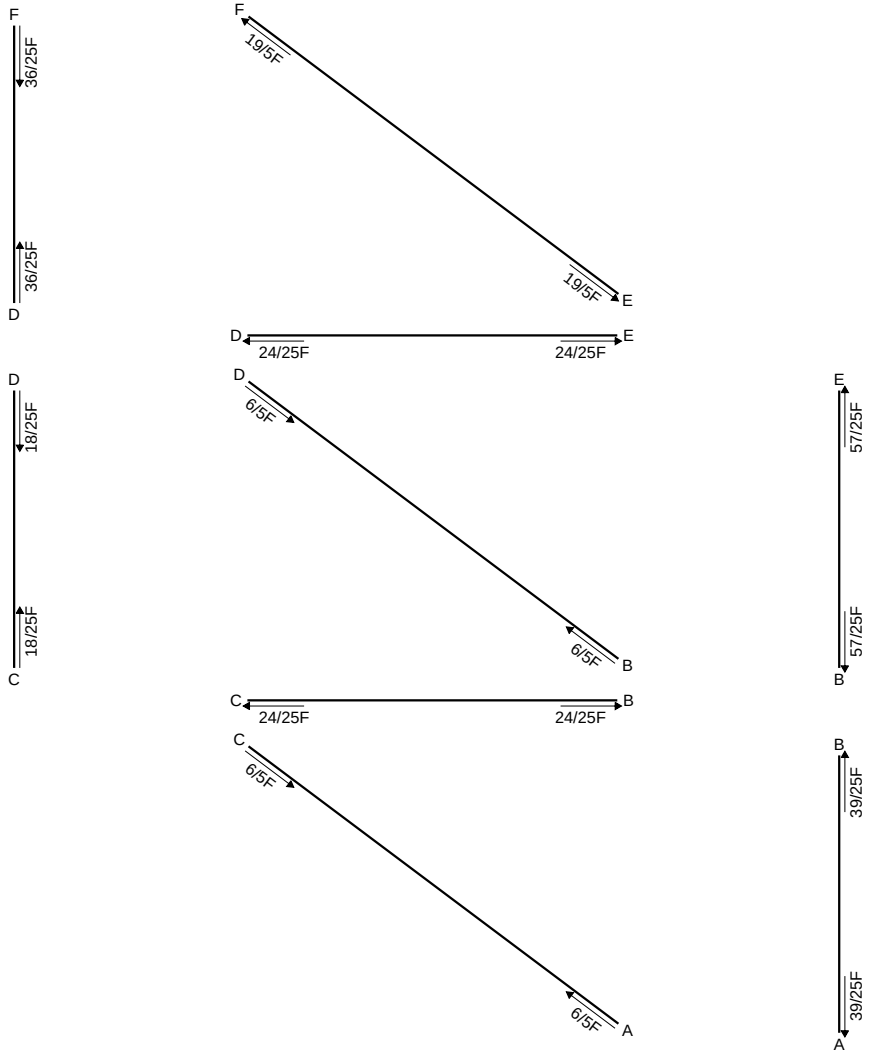
$3H_Ab + 4V_Ab = -4Xb$

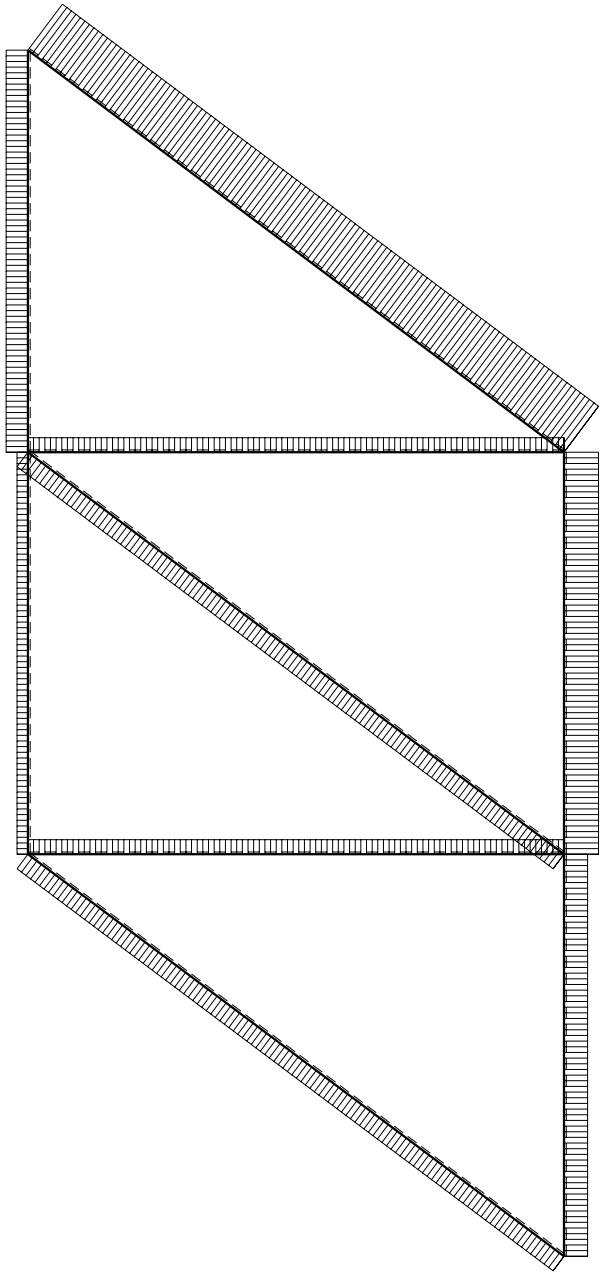
Matrice di equilibrio

	H_Ab	V_Ab	$H_{CB}b$	$H_{DB}b$	$H_{DE}b$		Xb	Fb
φ_{FD}	9	4	-6	-3	-3			
φ_{FE}	0	0	6	3	3		4	-12
φ_{DC}	6	4	-3	0	0	=	-4	0
φ_{EB}	0	0	3	3	0		0	0
φ_{CA}	3	4	0	0	0		-4	0

Soluzione del sistema

		Xb	Fb
H_Ab		2/3	-2
$H_{CB}b$		2/3	-2
V_Ab	=	-3/2	3/2
$H_{DB}b$		-2/3	2
$H_{DE}b$		2/3	-2





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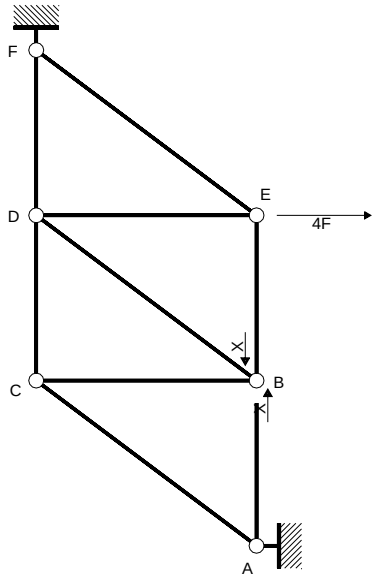

REAZIONI IPERSTATICHE

$X = V_{BA}$

CALCOLO DELLE REAZIONI IPERSTATICHE

$L^{XX}_{AB} = N^{X}_{AB}\ N^{X}_{AB}\ l_{AB}/EA_{AB} = 1\ 1\ 3\ 1\ Fb/EA = 3\ Fb/EA$

$L^{XX}_{BC} = N^{X}_{BC}\ N^{X}_{BC}\ l_{BC}/EA_{BC} = -2/3\ (-2/3)\ 4\ 1\ Fb/EA = 16/9\ Fb/EA$

$L^{XX}_{AC} = N^{X}_{AC}\ N^{X}_{AC}\ l_{AC}/EA_{AC} = 5/6\ 5/6\ 5\ 1/2\ Fb/EA = 125/72\ Fb/EA$

$L^{XX}_{CD} = N^{X}_{CD}\ N^{X}_{CD}\ l_{CD}/EA_{CD} = 1/2\ 1/2\ 3\ 1/2\ Fb/EA = 3/8\ Fb/EA$

$L^{XX}_{BD} = N^{X}_{BD}\ N^{X}_{BD}\ l_{BD}/EA_{BD} = 5/6\ 5/6\ 5\ 1/3\ Fb/EA = 125/108\ Fb/EA$

$L^{XX}_{BE} = N^{X}_{BE}\ N^{X}_{BE}\ l_{BE}/EA_{BE} = 1/2\ 1/2\ 3\ 1/3\ Fb/EA = 1/4\ Fb/EA$

$L^{XX}_{ED} = N^{X}_{ED}\ N^{X}_{ED}\ l_{ED}/EA_{ED} = -2/3\ (-2/3)\ 4\ 1/4\ Fb/EA = 4/9\ Fb/EA$

$L^{XX}_{DF} = N^{X}_{DF}\ N^{X}_{DF}\ l_{DF}/EA_{DF} = 1\ 1\ 3\ 1/4\ Fb/EA = 3/4\ Fb/EA$

$L^{XX}_{EF} = N^{X}_{EF}\ N^{X}_{EF}\ l_{EF}/EA_{EF} = 5/6\ 5/6\ 5\ 1/5\ Fb/EA = 25/36\ Fb/EA$

$L^{Xo}_{BC} = N^{X}_{BC}\, N^{o}_{BC}\, l_{BC}/EA_{BC} = -2/3\ \ 2\ \ 4\ \ 1\ \ Fb/EA = -16/3\ \ Fb/EA$

$L^{Xo}_{AC} = N^{X}_{AC}\, N^{o}_{AC}\, l_{AC}/EA_{AC} = 5/6\ \ (-5/2)\ \ 5\ \ 1/2\ \ Fb/EA = -125/24\ \ Fb/EA$

$L^{Xo}_{CD} = N^{X}_{CD}\, N^{o}_{CD}\, l_{CD}/EA_{CD} = 1/2\ \ (-3/2)\ \ 3\ \ 1/2\ \ Fb/EA = -9/8\ \ Fb/EA$

$L^{Xo}_{BD} = N^{X}_{BD}\, N^{o}_{BD}\, l_{BD}/EA_{BD} = 5/6\ \ (-5/2)\ \ 5\ \ 1/3\ \ Fb/EA = -125/36\ \ Fb/EA$

$L^{Xo}_{BE} = N^{X}_{BE}\, N^{o}_{BE}\, l_{BE}/EA_{BE} = 1/2\ \ 3/2\ \ 3\ \ 1/3\ \ Fb/EA = 3/4\ \ Fb/EA$

$L^{Xo}_{ED} = N^{X}_{ED}\, N^{o}_{ED}\, l_{ED}/EA_{ED} = -2/3\ \ 2\ \ 4\ \ 1/4\ \ Fb/EA = -4/3\ \ Fb/EA$

$L^{Xo}_{DF} = N^{X}_{DF}\, N^{o}_{DF}\, l_{DF}/EA_{DF} = 1\ \ (-3)\ \ 3\ \ 1/4\ \ Fb/EA = -9/4\ \ Fb/EA$

$L^{Xo}_{EF} = N^{X}_{EF}\, N^{o}_{EF}\, l_{EF}/EA_{EF} = 5/6\ \ 5/2\ \ 5\ \ 1/5\ \ Fb/EA = 25/12\ \ Fb/EA$

Contributi nulli elementi
L^{Xo}_{AB}

Contributi nulli nodi vincolati
$L^{XX}_{A}\ \ L^{XX}_{F}\ \ L^{Xo}_{A}\ \ L^{Xo}_{F}$

Espressione risolvente
$$\left(L^{XX}_{AB} + L^{XX}_{BC} + L^{XX}_{AC} + L^{XX}_{CD} + L^{XX}_{BD} + L^{XX}_{BE} + L^{XX}_{ED} + L^{XX}_{DF} + L^{XX}_{EF} \right) X = -\left(L^{Xo}_{BC} + L^{Xo}_{AC} + L^{Xo}_{CD} + L^{Xo}_{BD} + L^{Xo}_{BE} + L^{Xo}_{ED} + L^{Xo}_{DF} + L^{Xo}_{EF} \right)$$

$$\left(3 + 16/9 + 125/72 + 3/8 + 125/108 + 1/4 + 4/9 + 3/4 + 25/36 \right) X = \left(16/3 + 125/24 + 9/8 + 125/36 - 3/4 + 4/3 + 9/4 - 25/12 \right) F$$

$275/27\ X = 143/9\ F$

Soluzione
$X = 39/25\ F$

REAZIONI
$H_A = -24/25F$ $V_A = -21/25F$ $H_F = -76/25F$ $V_F = 21/25F$

$N_{AB} = 39/25F$ $N_{BC} = 24/25F$ $N_{AC} = -6/5F$ $N_{CD} = -18/25F$ $N_{BD} = -6/5F$ $N_{BE} = 57/25F$

$N_{ED} = 24/25F$ $N_{DF} = -36/25F$ $N_{EF} = 19/5F$

PROCEDIMENTO E RISULTATI Nome: Es.N.037

SPOSTAMENTI NODALI

$u_A = 0$	$u_B = 921/100(Fb/EA)$	$u_C = 537/100(Fb/EA)$	$u_D = 901/100(Fb/EA)$
$v_A = 0$	$v_B = 117/25(Fb/EA)$	$v_C = 54/25(Fb/EA)$	$v_D = 27/25(Fb/EA)$
$u_E = 997/100(Fb/EA)$	$u_F = 0$		
$v_E = 174/25(Fb/EA)$	$v_F = 0$		

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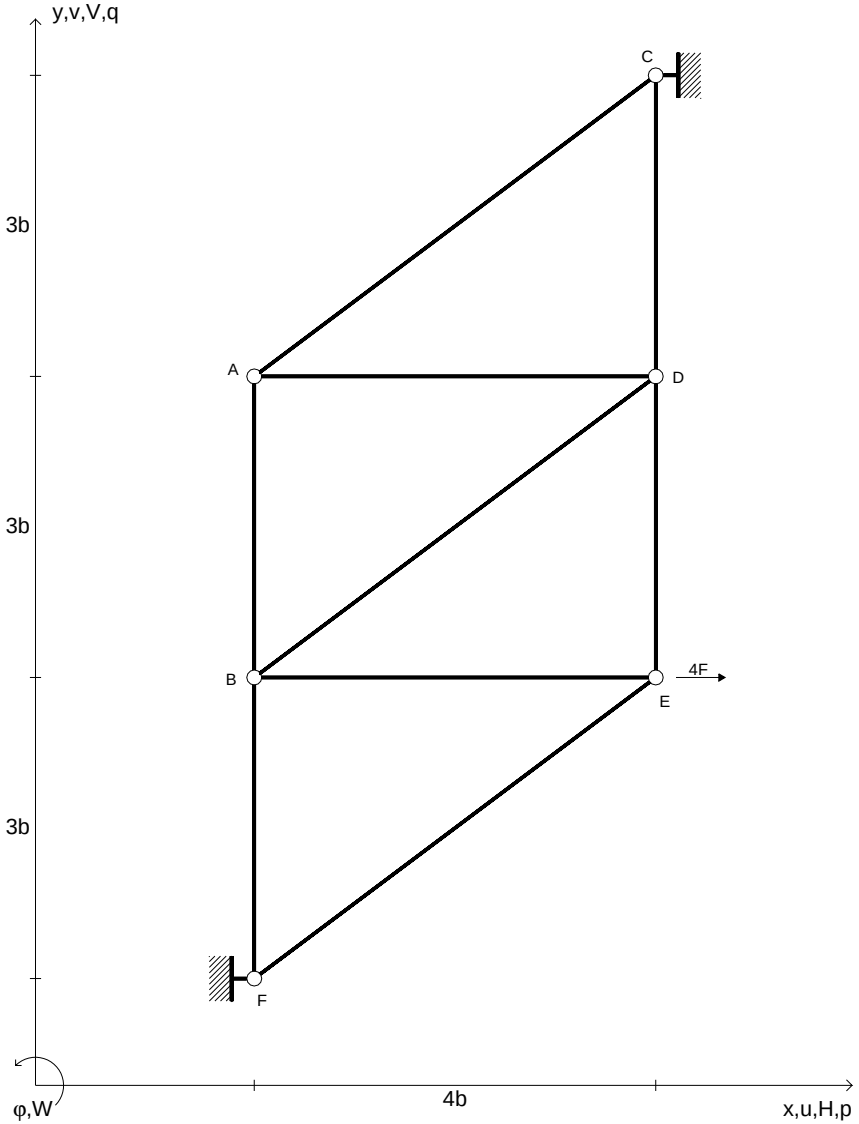
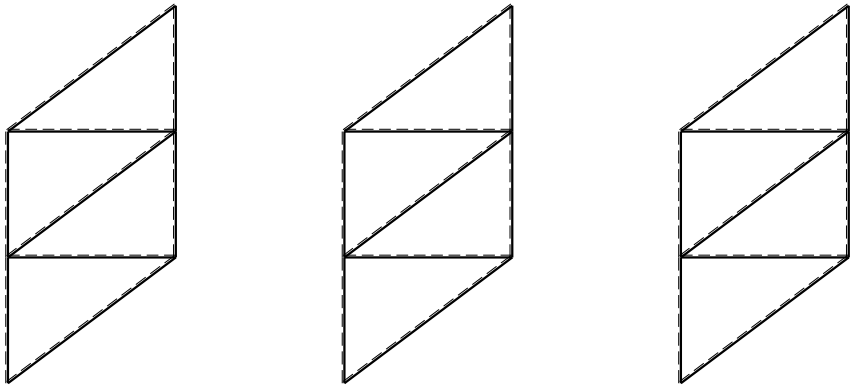
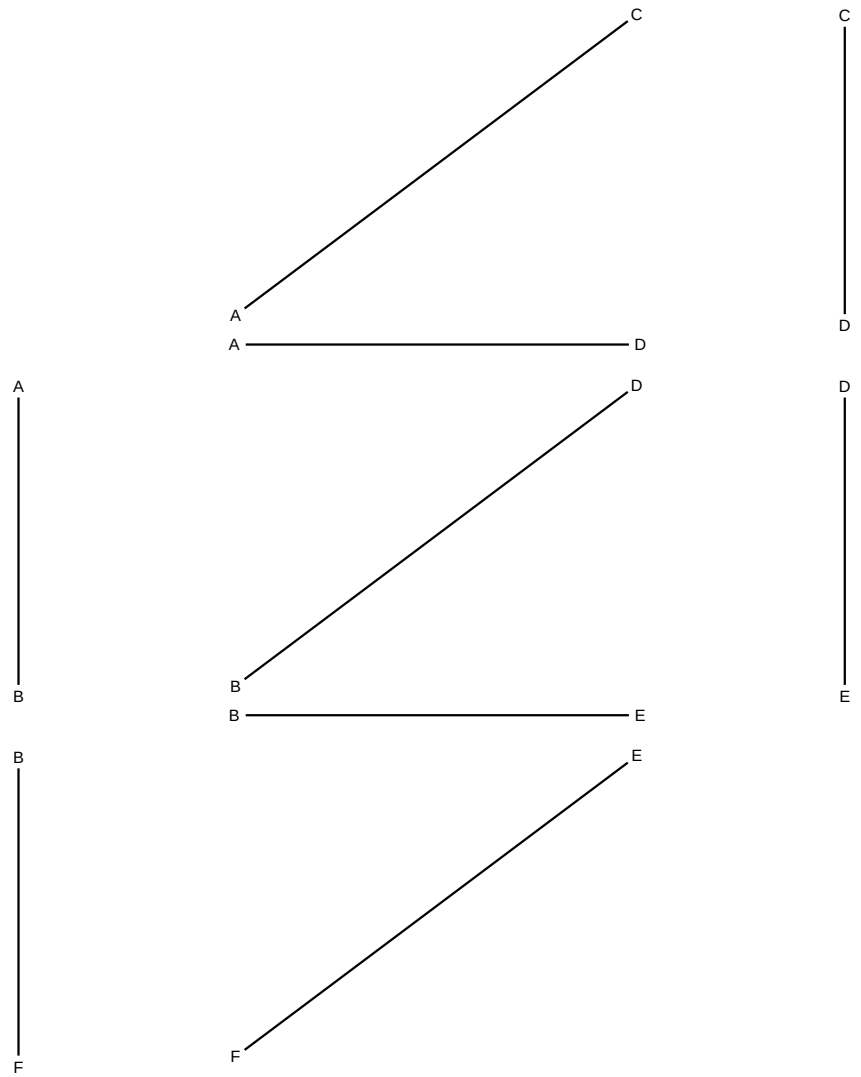
$H_E = 4F$
$EA_{AB} = 2EA$
$EA_{CA} = 2EA$
$EA_{DA} = EA$
$EA_{CD} = EA$
$EA_{EF} = 5EA$
$EA_{BF} = 4EA$
$EA_{EB} = 4EA$
$EA_{DE} = 3EA$
$EA_{DB} = 3EA$



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.
Calcolare spostamento e rotazione di tutti i nodi.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.





REAZIONI

H_C = V_C = H_F = V_F =

N_{AB} = N_{CA} = N_{DA} = N_{CD} = N_{EF} = N_{BF} =

N_{EB} = N_{DE} = N_{DB} =

SPOSTAMENTI NODALI

u_A = u_B = u_C = u_D =
v_A = v_B = v_C = v_D =

u_E = u_F =
v_E = v_F =

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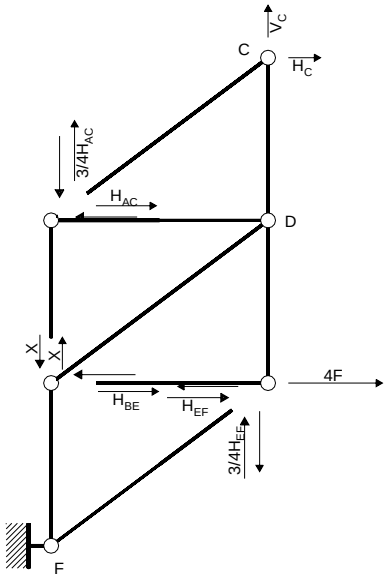


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a F: aste FB BD DA DC DE AB CA EB

$-9H_Cb +4V_Cb = 12Fb$

Rotazione intorno a B: aste BD DA DC DE AB CA EB

$-6H_Cb +4V_Cb -3H_{EF}b = 0$

Rotazione intorno a D: aste DA AB

$3H_{AC}b = 4Xb$

Rotazione intorno a D: aste DC CA

$-3H_Cb -3H_{AC}b = 0$

Rotazione intorno a D: aste DE EB

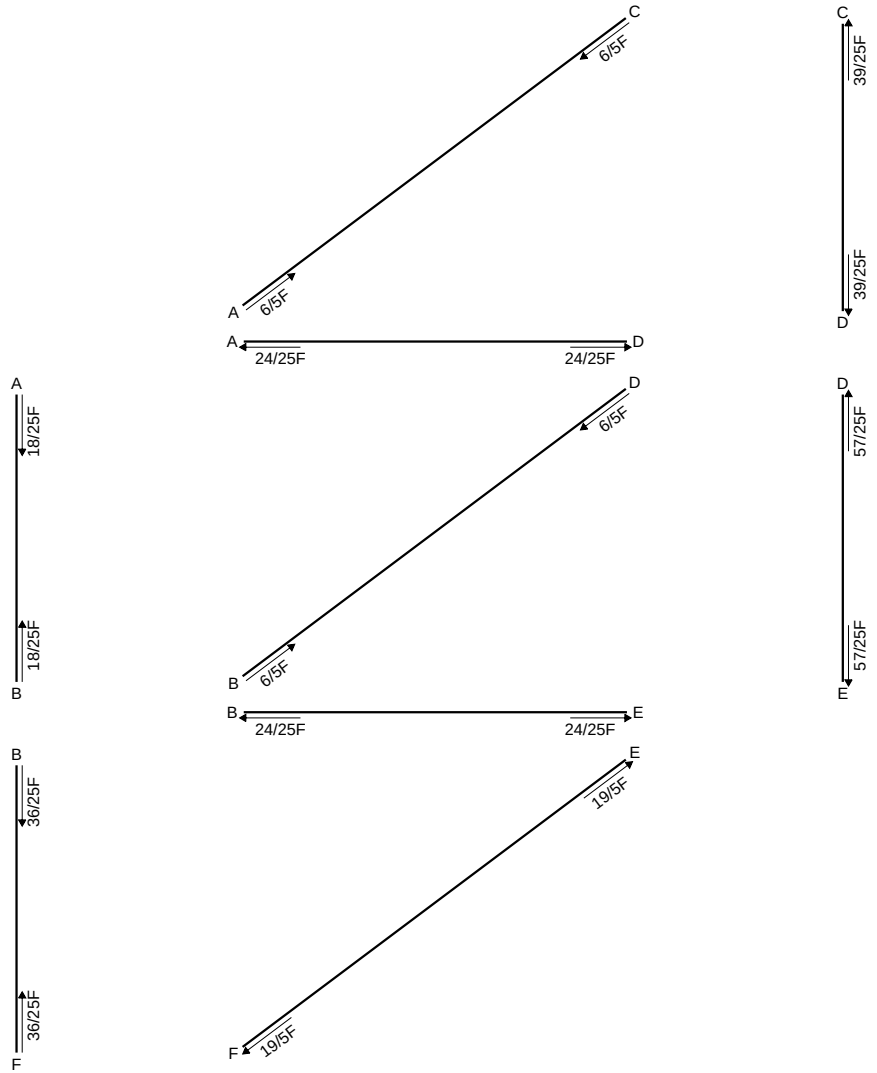
$-3H_{EF}b +3H_{BE}b = -12Fb$

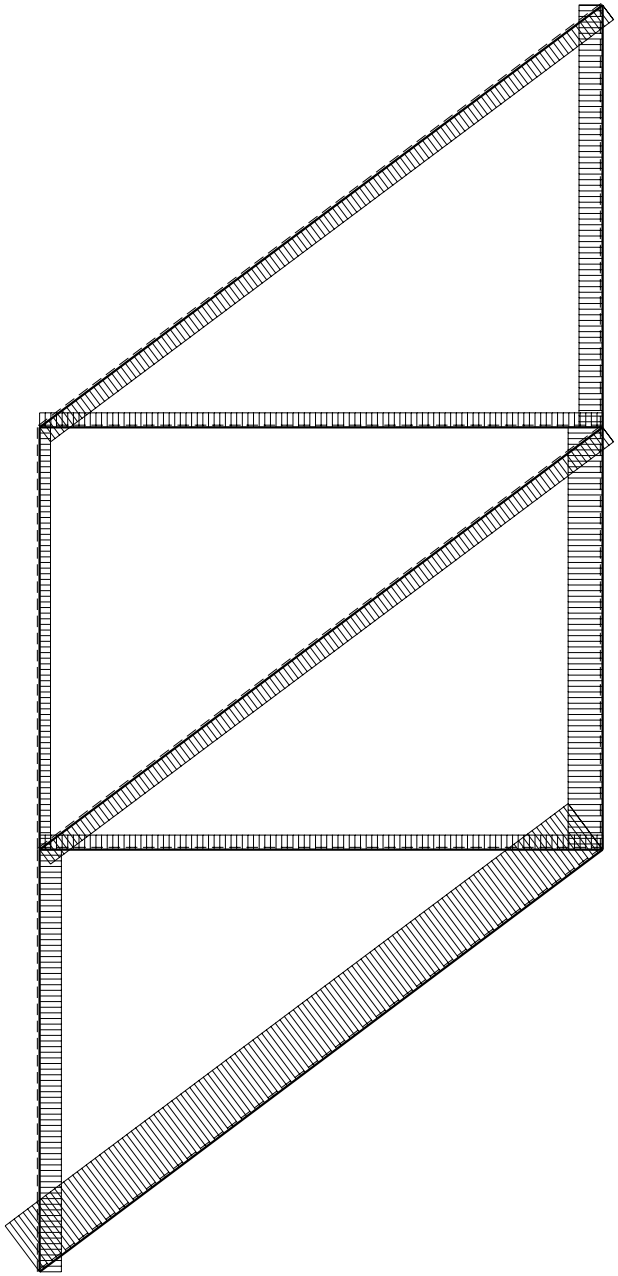
Matrice di equilibrio

	H_Cb	V_Cb	$H_{AC}b$	$H_{EF}b$	$H_{BE}b$		Xb	Fb
φ_{FB}	-9	4	0	0	0		0	12
φ_{BD}	-6	4	0	-3	0		0	0
φ_{DA}	0	0	3	0	0	=	4	0
φ_{DC}	-3	0	-3	0	0		0	0
φ_{DE}	0	0	0	-3	3		0	-12

Soluzione del sistema

		Xb	Fb
H_Cb		-4/3	0
V_Cb		-3	3
$H_{AC}b$	=	4/3	0
$H_{EF}b$		-4/3	4
$H_{BE}b$		-4/3	0





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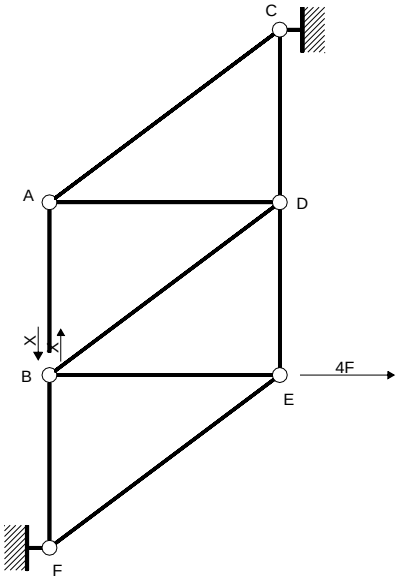

REAZIONI IPERSTATICHE

$X = V_{BA}$

CALCOLO DELLE REAZIONI IPERSTATICHE

$L^{XX}_{AB} = N^{X}_{AB}\ N^{X}_{AB}\ l_{AB}/EA_{AB} = -1\ (-1)\ 3\ 1/2\ Fb/EA = 3/2\ Fb/EA$

$L^{XX}_{CA} = N^{X}_{CA}\ N^{X}_{CA}\ l_{CA}/EA_{CA} = -5/3\ (-5/3)\ 5\ 1/2\ Fb/EA = 125/18\ Fb/EA$

$L^{XX}_{DA} = N^{X}_{DA}\ N^{X}_{DA}\ l_{DA}/EA_{DA} = 4/3\ 4/3\ 4\ 1\ Fb/EA = 64/9\ Fb/EA$

$L^{XX}_{CD} = N^{X}_{CD}\ N^{X}_{CD}\ l_{CD}/EA_{CD} = -2\ (-2)\ 3\ 1\ Fb/EA = 12\ Fb/EA$

$L^{XX}_{EF} = N^{X}_{EF}\ N^{X}_{EF}\ l_{EF}/EA_{EF} = -5/3\ (-5/3)\ 5\ 1/5\ Fb/EA = 25/9\ Fb/EA$

$L^{XX}_{BF} = N^{X}_{BF}\ N^{X}_{BF}\ l_{BF}/EA_{BF} = -2\ (-2)\ 3\ 1/4\ Fb/EA = 3\ Fb/EA$

$L^{XX}_{EB} = N^{X}_{EB}\ N^{X}_{EB}\ l_{EB}/EA_{EB} = 4/3\ 4/3\ 4\ 1/4\ Fb/EA = 16/9\ Fb/EA$

$L^{XX}_{DE} = N^{X}_{DE}\ N^{X}_{DE}\ l_{DE}/EA_{DE} = -1\ (-1)\ 3\ 1/3\ Fb/EA =\ Fb/EA$

$L^{XX}_{DB} = N^{X}_{DB}\ N^{X}_{DB}\ l_{DB}/EA_{DB} = -5/3\ (-5/3)\ 5\ 1/3\ Fb/EA = 125/27\ Fb/EA$

$L_{CD}^{Xo} = N_{CD}^{X} N_{CD}^{o} \; l_{CD}/EA_{CD} = -2 \; 3 \; 3 \; 1 \; Fb/EA = -18 \; Fb/EA$

$L_{EF}^{Xo} = N_{EF}^{X} N_{EF}^{o} \; l_{EF}/EA_{EF} = -5/3 \; 5 \; 5 \; 1/5 \; Fb/EA = -25/3 \; Fb/EA$

$L_{DE}^{Xo} = N_{DE}^{X} N_{DE}^{o} \; l_{DE}/EA_{DE} = -1 \; 3 \; 3 \; 1/3 \; Fb/EA = -3 \; Fb/EA$

Contributi nulli elementi
$L_{AB}^{Xo} \quad L_{CA}^{Xo} \quad L_{DA}^{Xo} \quad L_{BF}^{Xo} \quad L_{EB}^{Xo} \quad L_{DB}^{Xo}$

Contributi nulli nodi vincolati
$L_{C}^{XX} \quad L_{F}^{XX} \quad L_{C}^{Xo} \quad L_{F}^{Xo}$

Espressione risolvente
$\left(L_{AB}^{XX} + L_{CA}^{XX} + L_{DA}^{XX} + L_{CD}^{XX} + L_{EF}^{XX} + L_{BF}^{XX} + L_{EB}^{XX} + L_{DE}^{XX} + L_{DB}^{XX} \right) X = - \left(L_{CD}^{Xo} + L_{EF}^{Xo} + L_{DE}^{Xo} \right)$

$\left(3/2 + 125/18 + 64/9 + 12 + 25/9 + 3 + 16/9 + 1 + 125/27 \right) X = \left(18 + 25/3 + 3 \right) F$

$1100/27 \; X = 88/3 \; F$

Soluzione
$X = 18/25 \; F$

REAZIONI
$H_C = -24/25F \quad V_C = 21/25F \quad H_F = -76/25F \quad V_F = -21/25F$

$N_{AB} = -18/25F \quad N_{CA} = -6/5F \quad N_{DA} = 24/25F \quad N_{CD} = 39/25F \quad N_{EF} = 19/5F \quad N_{BF} = -36/25F$

$N_{EB} = 24/25F \quad N_{DE} = 57/25F \quad N_{DB} = -6/5F$

SPOSTAMENTI NODALI

$u_A = 537/100(Fb/EA) \quad u_B = 901/100(Fb/EA) \quad u_C = 0 \quad u_D = 921/100(Fb/EA)$
$v_A = -54/25(Fb/EA) \quad v_B = -27/25(Fb/EA) \quad v_C = 0 \quad v_D = -117/25(Fb/EA)$

$u_E = 997/100(Fb/EA) \quad u_F = 0$
$v_E = -174/25(Fb/EA) \quad v_F = 0$

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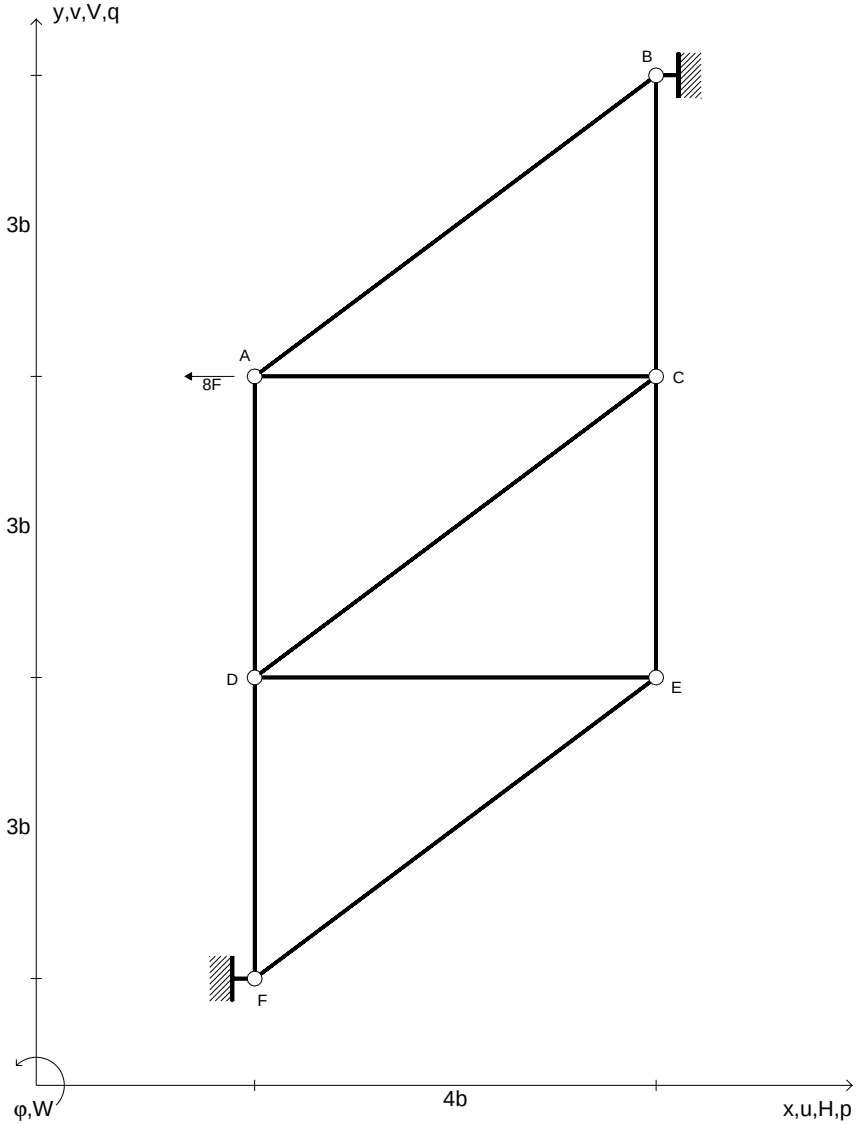
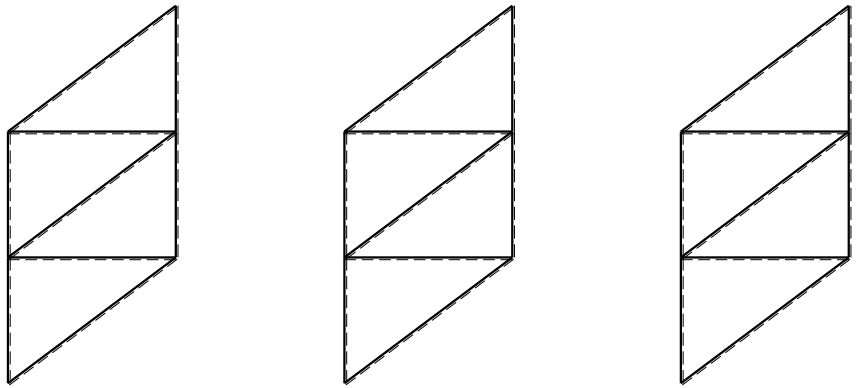
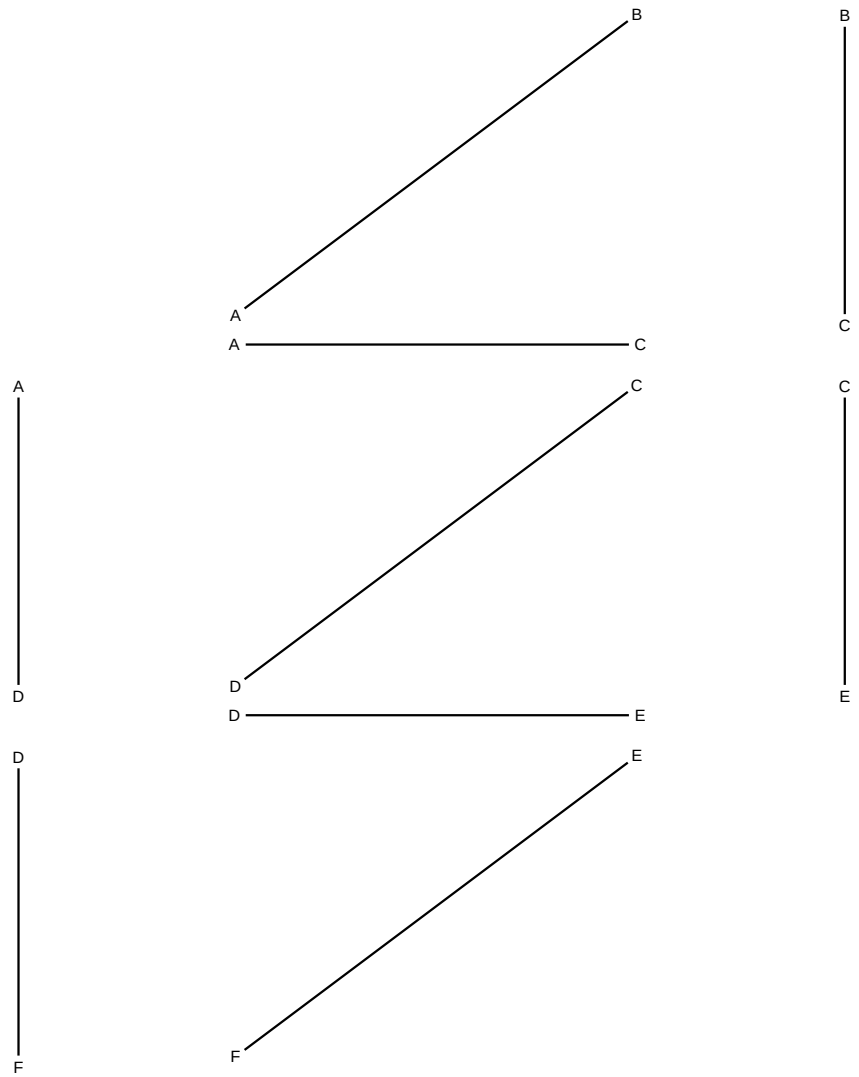
H_A = -8F
EA_{AB} = 5EA
EA_{CB} = 4EA
EA_{AC} = 4EA
EA_{DA} = 3EA
EA_{DC} = 3EA
EA_{EC} = 2EA
EA_{FE} = 2EA
EA_{DE} = EA
EA_{FD} = EA



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.
Calcolare spostamento e rotazione di tutti i nodi.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.





REAZIONI

H_B = V_B = H_F = V_F =

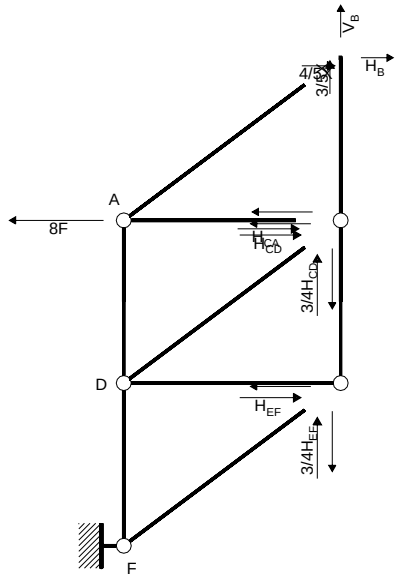
N_{AB} = N_{CB} = N_{AC} = N_{DA} = N_{DC} = N_{EC} =

N_{FE} = N_{DE} = N_{FD} =

SPOSTAMENTI NODALI

u_A = u_B = u_C = u_D =
v_A = v_B = v_C = v_D =

u_E = u_F =
v_E = v_F =



EQUAZIONI DI EQUILIBRIO

Rotazione intorno a F: aste FD DA DC DE AB AC EC CB

$-9H_Bb +4V_Bb = 24/5Xb -48Fb$

Rotazione intorno a D: aste DA AB AC

$-3H_{CA}b = 12/5Xb -24Fb$

Rotazione intorno a D: aste DE EC CB

$-6H_Bb +4V_Bb +3H_{CA}b -3H_{EF}b = 0$

Rotazione intorno a E: aste EC CB

$-6H_Bb +3H_{CA}b +3H_{CD}b = 0$

Rotazione intorno a C: aste CB

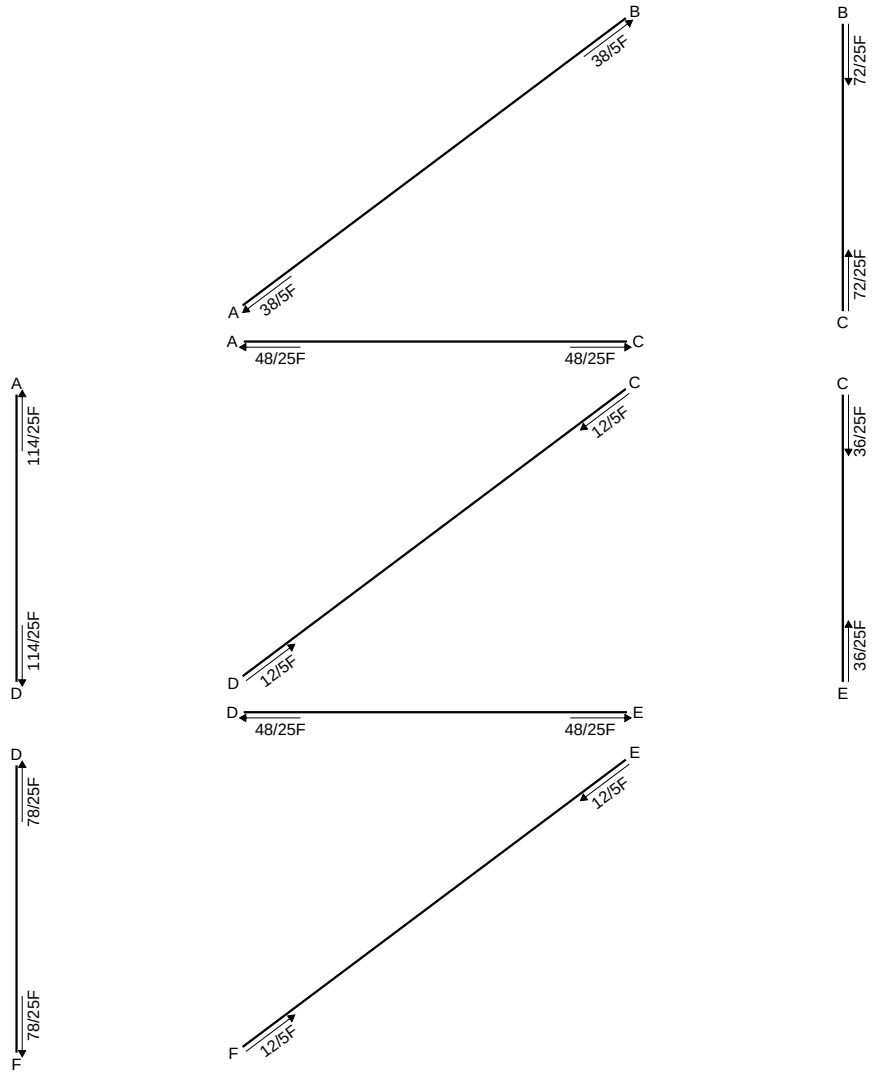
$-3H_Bb = 0$

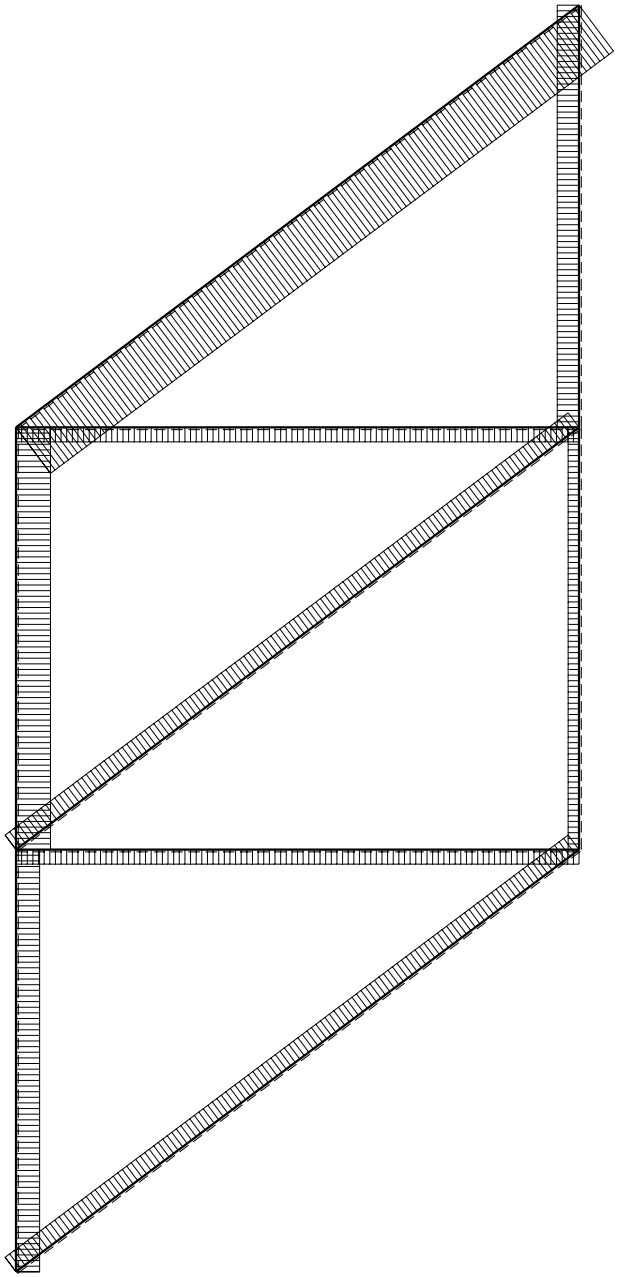
Matrice di equilibrio

	H_Bb	V_Bb	$H_{CA}b$	$H_{CD}b$	$H_{EF}b$		Xb	Fb
φ_{FD}	-9	4	0	0	0		24/5	-48
φ_{DA}	0	0	-3	0	0		12/5	-24
φ_{DE}	-6	4	3	0	-3	=	0	0
φ_{EC}	-6	0	3	3	0		0	0
φ_{CB}	-3	0	0	0	0		0	0

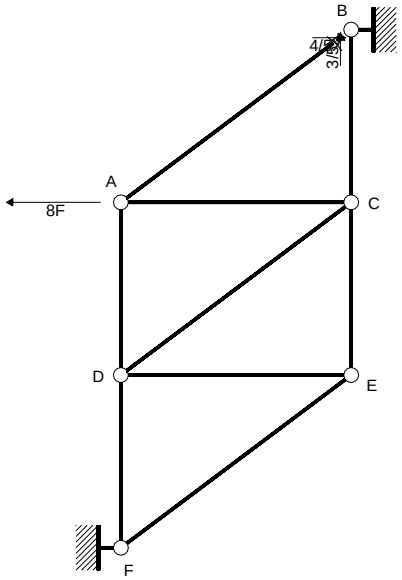
Soluzione del sistema

		Xb	Fb
H_Bb		0	0
$H_{CA}b$		-4/5	8
V_Bb	=	6/5	-12
$H_{CD}b$		4/5	-8
$H_{EF}b$		4/5	-8





10 F



REAZIONI IPERSTATICHE

$X = H_{BA}$

CALCOLO DELLE REAZIONI IPERSTATICHE

$L^{XX}_{AB} = N^{X}_{AB}\ N^{X}_{AB}\ l_{AB}/EA_{AB} = 1\ 1\ 5\ 1/5\ Fb/EA = Fb/EA$

$L^{XX}_{CB} = N^{X}_{CB}\ N^{X}_{CB}\ l_{CB}/EA_{CB} = 6/5\ 6/5\ 3\ 1/4\ Fb/EA = 27/25\ Fb/EA$

$L^{XX}_{AC} = N^{X}_{AC}\ N^{X}_{AC}\ l_{AC}/EA_{AC} = -4/5\ (-4/5)\ 4\ 1/4\ Fb/EA = 16/25\ Fb/EA$

$L^{XX}_{DA} = N^{X}_{DA}\ N^{X}_{DA}\ l_{DA}/EA_{DA} = 3/5\ 3/5\ 3\ 1/3\ Fb/EA = 9/25\ Fb/EA$

$L^{XX}_{DC} = N^{X}_{DC}\ N^{X}_{DC}\ l_{DC}/EA_{DC} = 1\ 1\ 5\ 1/3\ Fb/EA = 5/3\ Fb/EA$

$L^{XX}_{EC} = N^{X}_{EC}\ N^{X}_{EC}\ l_{EC}/EA_{EC} = 3/5\ 3/5\ 3\ 1/2\ Fb/EA = 27/50\ Fb/EA$

$L^{XX}_{FE} = N^{X}_{FE}\ N^{X}_{FE}\ l_{FE}/EA_{FE} = 1\ 1\ 5\ 1/2\ Fb/EA = 5/2\ Fb/EA$

$L^{XX}_{DE} = N^{X}_{DE}\ N^{X}_{DE}\ l_{DE}/EA_{DE} = -4/5\ (-4/5)\ 4\ 1\ Fb/EA = 64/25\ Fb/EA$

$L^{XX}_{FD} = N^{X}_{FD}\ N^{X}_{FD}\ l_{FD}/EA_{FD} = 6/5\ 6/5\ 3\ 1\ Fb/EA = 108/25\ Fb/EA$

$L^{Xo}_{CB} = N^{X}_{CB}\, N^{o}_{CB}\, l_{CB}/EA_{CB} = 6/5\ (-12)\ 3\ 1/4\ Fb/EA = -54/5\ Fb/EA$

$L^{Xo}_{AC} = N^{X}_{AC}\, N^{o}_{AC}\, l_{AC}/EA_{AC} = -4/5\ 8\ 4\ 1/4\ Fb/EA = -32/5\ Fb/EA$

$L^{Xo}_{DC} = N^{X}_{DC}\, N^{o}_{DC}\, l_{DC}/EA_{DC} = 1\ (-10)\ 5\ 1/3\ Fb/EA = -50/3\ Fb/EA$

$L^{Xo}_{EC} = N^{X}_{EC}\, N^{o}_{EC}\, l_{EC}/EA_{EC} = 3/5\ (-6)\ 3\ 1/2\ Fb/EA = -27/5\ Fb/EA$

$L^{Xo}_{FE} = N^{X}_{FE}\, N^{o}_{FE}\, l_{FE}/EA_{FE} = 1\ (-10)\ 5\ 1/2\ Fb/EA = -25\ Fb/EA$

$L^{Xo}_{DE} = N^{X}_{DE}\, N^{o}_{DE}\, l_{DE}/EA_{DE} = -4/5\ 8\ 4\ 1\ Fb/EA = -128/5\ Fb/EA$

$L^{Xo}_{FD} = N^{X}_{FD}\, N^{o}_{FD}\, l_{FD}/EA_{FD} = 6/5\ (-6)\ 3\ 1\ Fb/EA = -108/5\ Fb/EA$

Contributi nulli elementi
L^{Xo}_{AB} L^{Xo}_{DA}

Contributi nulli nodi vincolati
L^{XX}_{B} L^{XX}_{F} L^{Xo}_{B} L^{Xo}_{F}

Espressione risolvente
$$\left(L^{XX}_{AB} + L^{XX}_{CB} + L^{XX}_{AC} + L^{XX}_{DA} + L^{XX}_{DC} + L^{XX}_{EC} + L^{XX}_{FE} + L^{XX}_{DE} + L^{XX}_{FD} \right) X = -\left(L^{Xo}_{CB} + L^{Xo}_{AC} + L^{Xo}_{DC} + L^{Xo}_{EC} + L^{Xo}_{FE} + L^{Xo}_{DE} + L^{Xo}_{FD} \right)$$

$$\left(1 + 27/25 + 16/25 + 9/25 + 5/3 + 27/50 + 5/2 + 64/25 + 108/25 \right) X = \left(54/5 + 32/5 + 50/3 + 27/5 + 25 + 128/5 + 108/5 \right) F$$

$44/3\ X = 1672/15\ F$

Soluzione
$X = 152/25\ F$

REAZIONI
$H_B = 152/25F$ $V_B = 42/25F$ $H_F = 48/25F$ $V_F = -42/25F$

$N_{AB} = 38/5F$ $N_{CB} = -72/25F$ $N_{AC} = 48/25F$ $N_{DA} = 114/25F$ $N_{DC} = -12/5F$ $N_{EC} = -36/25F$

$N_{FE} = -12/5F$ $N_{DE} = 48/25F$ $N_{FD} = 78/25F$

PROCEDIMENTO E RISULTATI Nome: Es.N.039

SPOSTAMENTI NODALI

$u_A = -997/50(Fb/EA)$ $u_B = 0$ $u_C = -901/50(Fb/EA)$ $u_D = -921/50(Fb/EA)$
$v_A = 348/25(Fb/EA)$ $v_B = 0$ $v_C = 54/25(Fb/EA)$ $v_D = 234/25(Fb/EA)$

$u_E = -537/50(Fb/EA)$ $u_F = 0$
$v_E = 108/25(Fb/EA)$ $v_F = 0$

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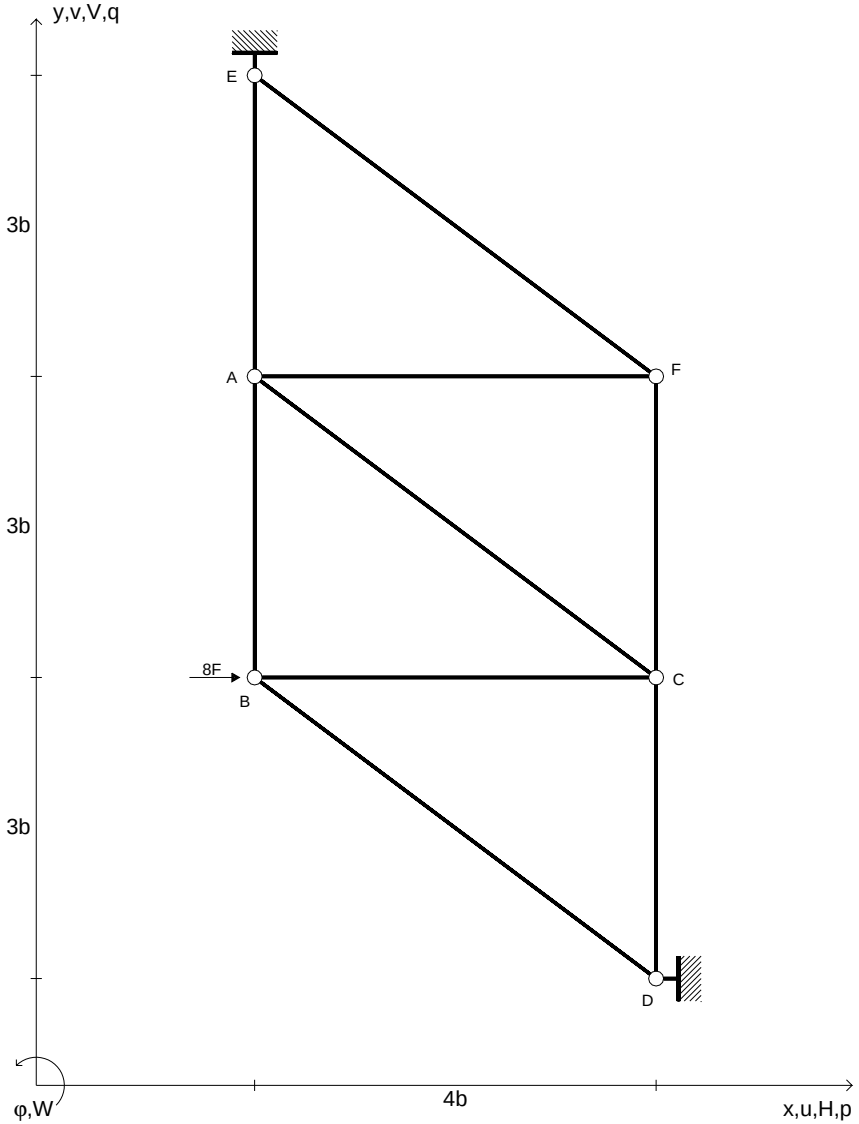
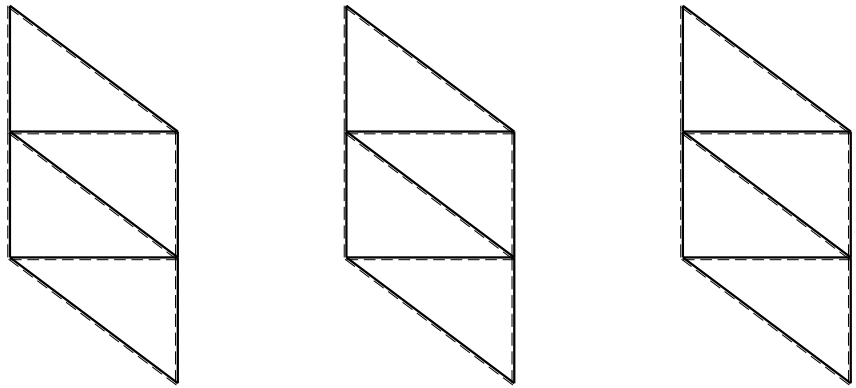
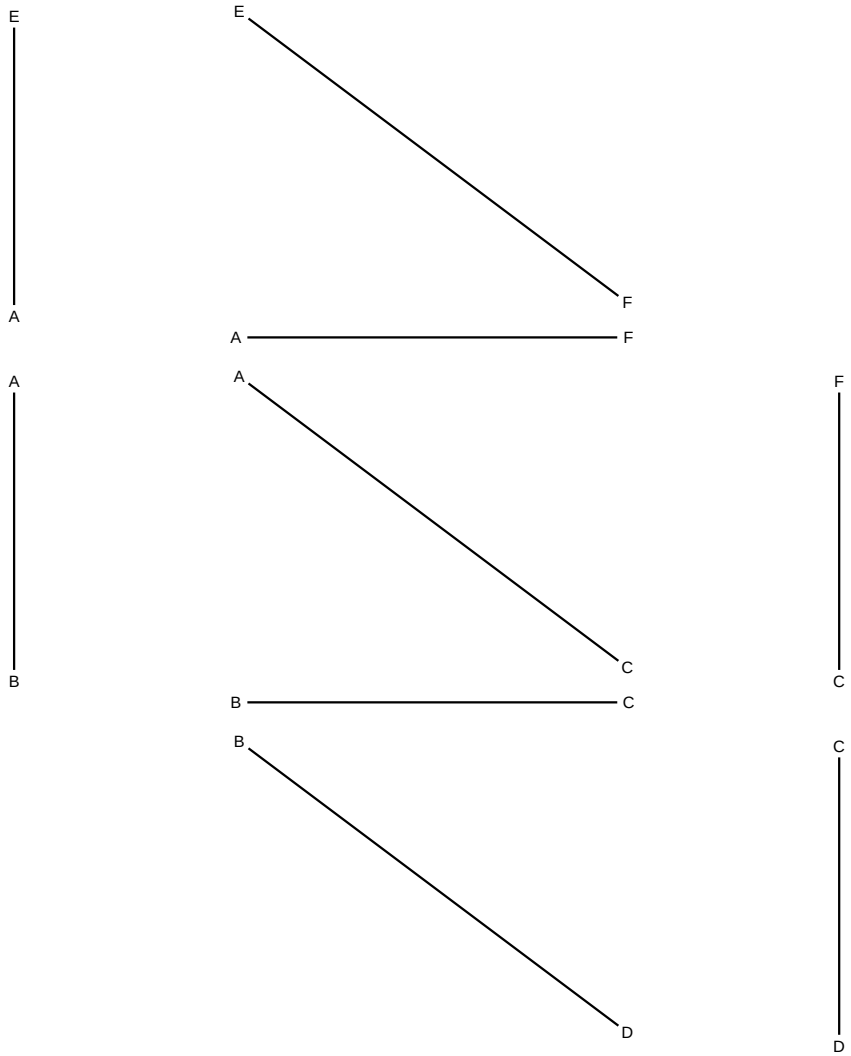
H_B = 8F
EA_{AB} = 3EA
EA_{BC} = 4EA
EA_{CD} = 4EA
EA_{BD} = 5EA
EA_{EA} = EA
EA_{AF} = EA
EA_{EF} = 2EA
EA_{FC} = 2EA
EA_{AC} = 3EA



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.
Calcolare spostamento e rotazione di tutti i nodi.
A_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.





REAZIONI

H_D = V_D = H_E = V_E =

N_{AB} = N_{BC} = N_{CD} = N_{BD} = N_{EA} =

N_{AF} = N_{EF} = N_{FC} = N_{AC} =

SPOSTAMENTI NODALI

u_A = u_B = u_C = u_D =
v_A = v_B = v_C = v_D =

u_E = u_F =
v_E = v_F =

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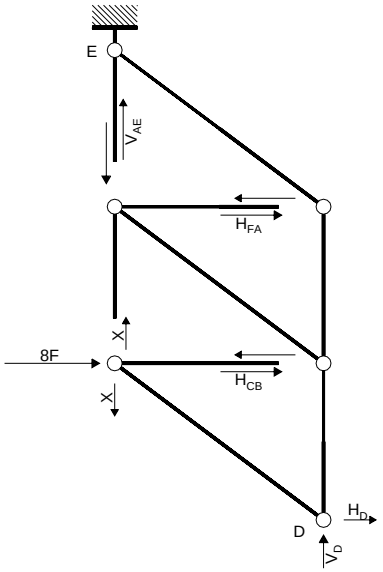


EQUAZIONI DI EQUILIBRIO

Rotazione intorno a E: aste EF FC CD CA AB DB AF BC

$9H_Db + 4V_Db = -48Fb$

Rotazione intorno a F: aste FC CD CA AB DB AF BC

$6H_Db + 4V_{AE}b = -24Fb$

Rotazione intorno a C: aste CD DB BC

$3H_Db = -4Xb$

Rotazione intorno a C: aste CA AB AF

$4V_{AE}b - 3H_{FA}b = 4Xb$

Rotazione intorno a D: aste DB BC

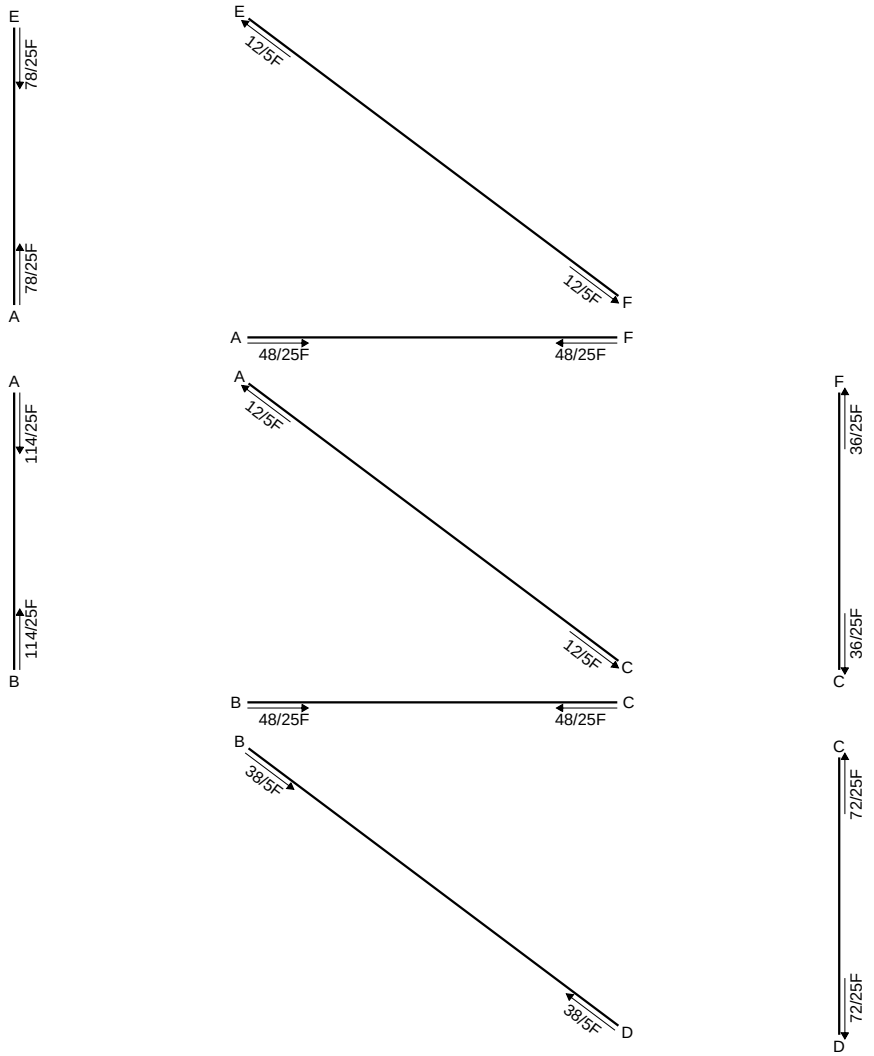
$-3H_{CB}b = -4Xb + 24Fb$

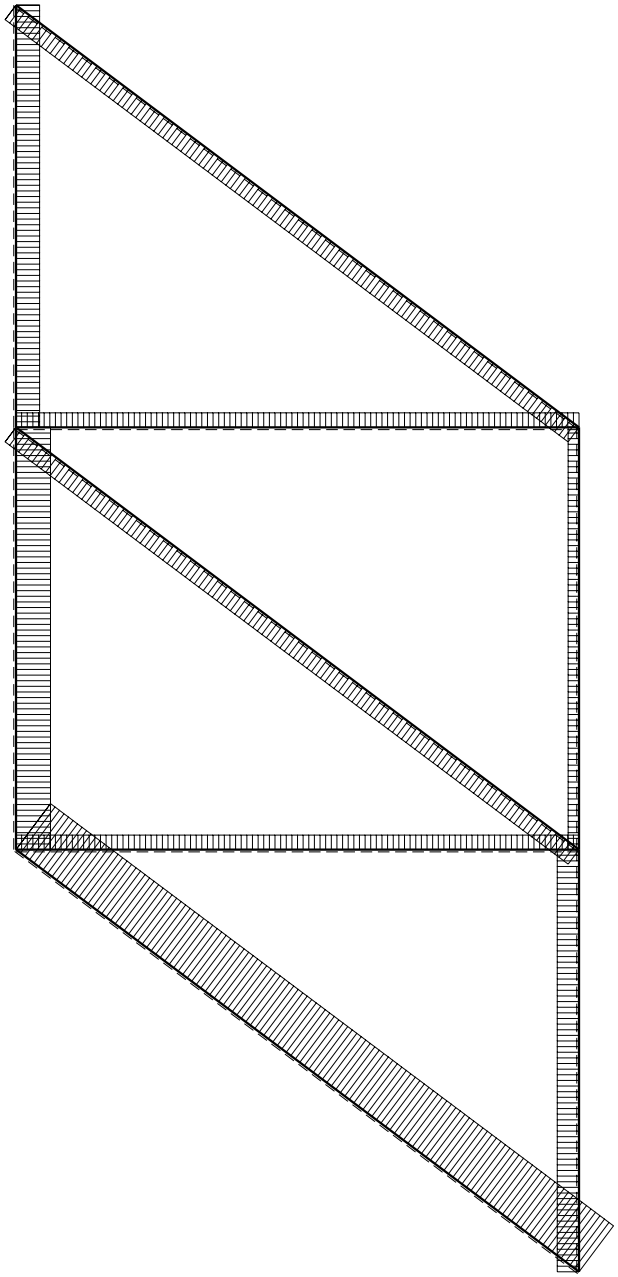
Matrice di equilibrio

	H_Db	V_Db	$H_{CB}b$	$V_{AE}b$	$H_{FA}b$		Xb	Fb
φ_{EF}	9	4	0	0	0		0	-48
φ_{FC}	6	0	0	4	0		0	-24
φ_{CD}	3	0	0	0	0	=	-4	0
φ_{CA}	0	0	0	4	-3		4	0
φ_{DB}	0	0	-3	0	0		-4	24

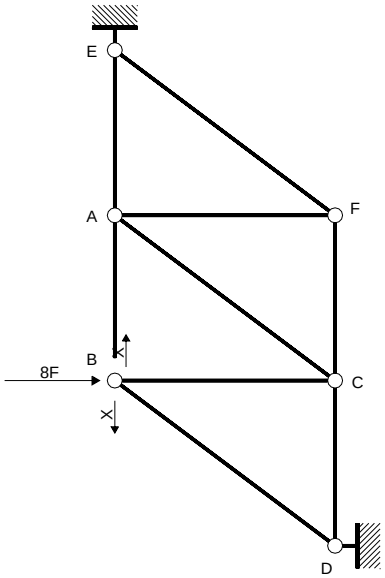
Soluzione del sistema

		Xb	Fb
H_Db		-4/3	0
V_Db		3	-12
$V_{AE}b$	=	2	-6
$H_{FA}b$		4/3	-8
$H_{CB}b$		4/3	-8





10 F



REAZIONI IPERSTATICHE

$X = V_{BA}$

CALCOLO DELLE REAZIONI IPERSTATICHE

$L^{XX}_{AB} = N^{X}_{AB}\ N^{X}_{AB}\ l_{AB}/EA_{AB} = -1\ (-1)\ 3\ 1/3\ Fb/EA = Fb/EA$

$L^{XX}_{BC} = N^{X}_{BC}\ N^{X}_{BC}\ l_{BC}/EA_{BC} = 4/3\ 4/3\ 4\ 1/4\ Fb/EA = 16/9\ Fb/EA$

$L^{XX}_{CD} = N^{X}_{CD}\ N^{X}_{CD}\ l_{CD}/EA_{CD} = -2\ (-2)\ 3\ 1/4\ Fb/EA = 3\ Fb/EA$

$L^{XX}_{BD} = N^{X}_{BD}\ N^{X}_{BD}\ l_{BD}/EA_{BD} = -5/3\ (-5/3)\ 5\ 1/5\ Fb/EA = 25/9\ Fb/EA$

$L^{XX}_{EA} = N^{X}_{EA}\ N^{X}_{EA}\ l_{EA}/EA_{EA} = -2\ (-2)\ 3\ 1\ Fb/EA = 12\ Fb/EA$

$L^{XX}_{AF} = N^{X}_{AF}\ N^{X}_{AF}\ l_{AF}/EA_{AF} = 4/3\ 4/3\ 4\ 1\ Fb/EA = 64/9\ Fb/EA$

$L^{XX}_{EF} = N^{X}_{EF}\ N^{X}_{EF}\ l_{EF}/EA_{EF} = -5/3\ (-5/3)\ 5\ 1/2\ Fb/EA = 125/18\ Fb/EA$

$L^{XX}_{FC} = N^{X}_{FC}\ N^{X}_{FC}\ l_{FC}/EA_{FC} = -1\ (-1)\ 3\ 1/2\ Fb/EA = 3/2\ Fb/EA$

$L^{XX}_{AC} = N^{X}_{AC}\ N^{X}_{AC}\ l_{AC}/EA_{AC} = -5/3\ (-5/3)\ 5\ 1/3\ Fb/EA = 125/27\ Fb/EA$

$L^{Xo}_{BC} = N^{X}_{BC}\, N^{o}_{BC}\, l_{BC}/EA_{BC} = 4/3\ (-8)\ 4\ 1/4\ Fb/EA = -32/3\ Fb/EA$

$L^{Xo}_{CD} = N^{X}_{CD}\, N^{o}_{CD}\, l_{CD}/EA_{CD} = -\ 2\ 12\ 3\ 1/4\ Fb/EA = -18\ Fb/EA$

$L^{Xo}_{EA} = N^{X}_{EA}\, N^{o}_{EA}\, l_{EA}/EA_{EA} = -\ 2\ 6\ 3\ 1\ Fb/EA = -36\ Fb/EA$

$L^{Xo}_{AF} = N^{X}_{AF}\, N^{o}_{AF}\, l_{AF}/EA_{AF} = 4/3\ (-8)\ 4\ 1\ Fb/EA = -128/3\ Fb/EA$

$L^{Xo}_{EF} = N^{X}_{EF}\, N^{o}_{EF}\, l_{EF}/EA_{EF} = -\ 5/3\ 10\ 5\ 1/2\ Fb/EA = -125/3\ Fb/EA$

$L^{Xo}_{FC} = N^{X}_{FC}\, N^{o}_{FC}\, l_{FC}/EA_{FC} = -\ 1\ 6\ 3\ 1/2\ Fb/EA = -9\ Fb/EA$

$L^{Xo}_{AC} = N^{X}_{AC}\, N^{o}_{AC}\, l_{AC}/EA_{AC} = -\ 5/3\ 10\ 5\ 1/3\ Fb/EA = -250/9\ Fb/EA$

Contributi nulli elementi
L^{Xo}_{AB} L^{Xo}_{BD}

Contributi nulli nodi vincolati
L^{XX}_{D} L^{XX}_{E} L^{Xo}_{D} L^{Xo}_{E}

Espressione risolvente
$$\left(L^{XX}_{AB} + L^{XX}_{BC} + L^{XX}_{CD} + L^{XX}_{BD} + L^{XX}_{EA} + L^{XX}_{AF} + L^{XX}_{EF} + L^{XX}_{FC} + L^{XX}_{AC} \right) X = -\left(L^{Xo}_{BC} + L^{Xo}_{CD} + L^{Xo}_{EA} + L^{Xo}_{AF} + L^{Xo}_{EF} + L^{Xo}_{FC} + L^{Xo}_{AC} \right)$$

$$\left(1 + 16/9 + 3 + 25/9 + 12 + 64/9 + 125/18 + 3/2 + 125/27 \right) X = \left(32/3 + 18 + 36 + 128/3 + 125/3 + 9 + 250/9 \right) F$$

$1100/27\ X = 1672/9\ F$

Soluzione
$X = 114/25\ F$

REAZIONI
$H_D = -152/25F$ $V_D = 42/25F$ $H_E = -48/25F$ $V_E = -42/25F$

$N_{AB} = -114/25F$ $N_{BC} = -48/25F$ $N_{CD} = 72/25F$ $N_{BD} = -38/5F$ $N_{EA} = -78/25F$

$N_{AF} = -48/25F$ $N_{EF} = 12/5F$ $N_{FC} = 36/25F$ $N_{AC} = 12/5F$

PROCEDIMENTO E RISULTATI Nome: Es.N.040

SPOSTAMENTI NODALI

$u_A = 921/50(Fb/EA)$ $u_B = 997/50(Fb/EA)$ $u_C = 901/50(Fb/EA)$ $u_D = 0$
$v_A = 234/25(Fb/EA)$ $v_B = 348/25(Fb/EA)$ $v_C = 54/25(Fb/EA)$ $v_D = 0$

$u_E = 0$ $u_F = 537/50(Fb/EA)$
$v_E = 0$ $v_F = 108/25(Fb/EA)$

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