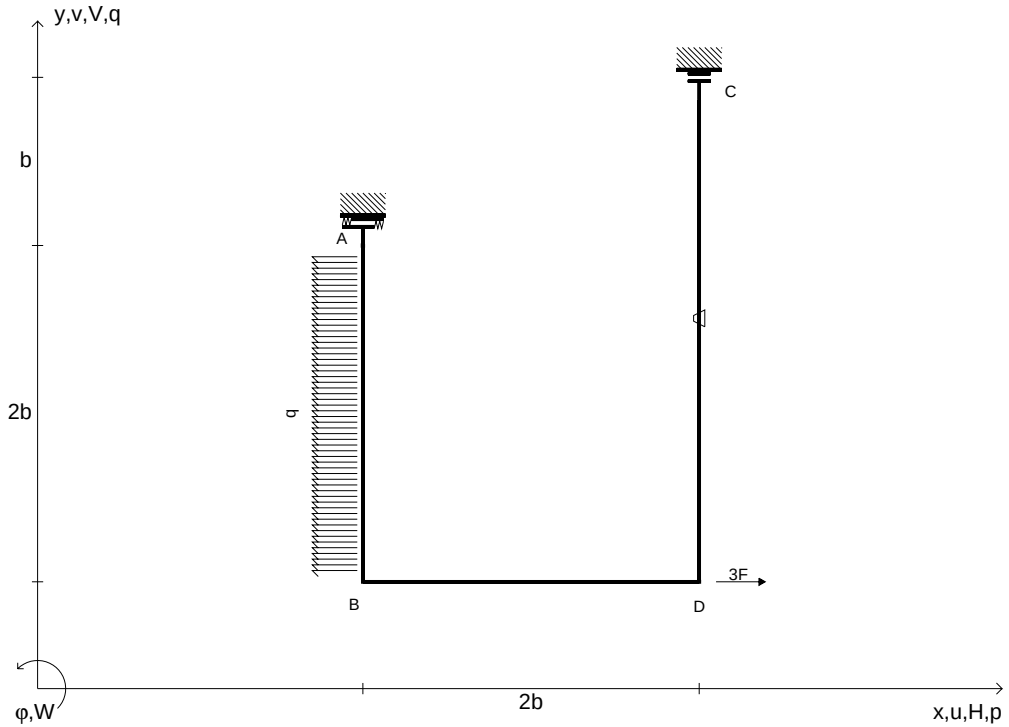
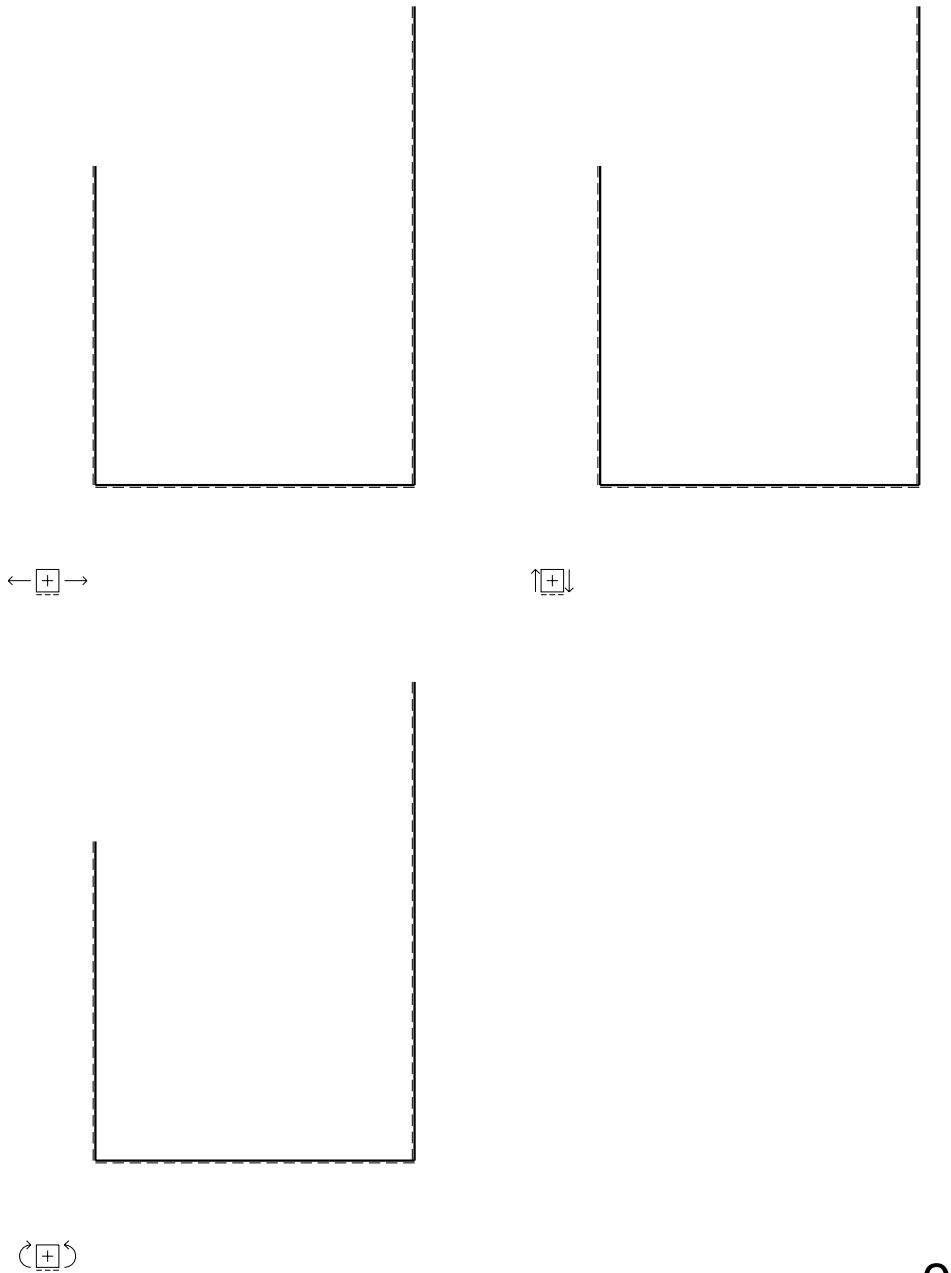


$H_D = 3F$
$p_{AB} = -q = -F/b$
$\theta_{CD} = -\theta = -\alpha T/b = -bF/E$

$k_A = EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{CD} = 2EJ$

$EJ_{BD} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta CD positiva se convessa a destra con inizio C.



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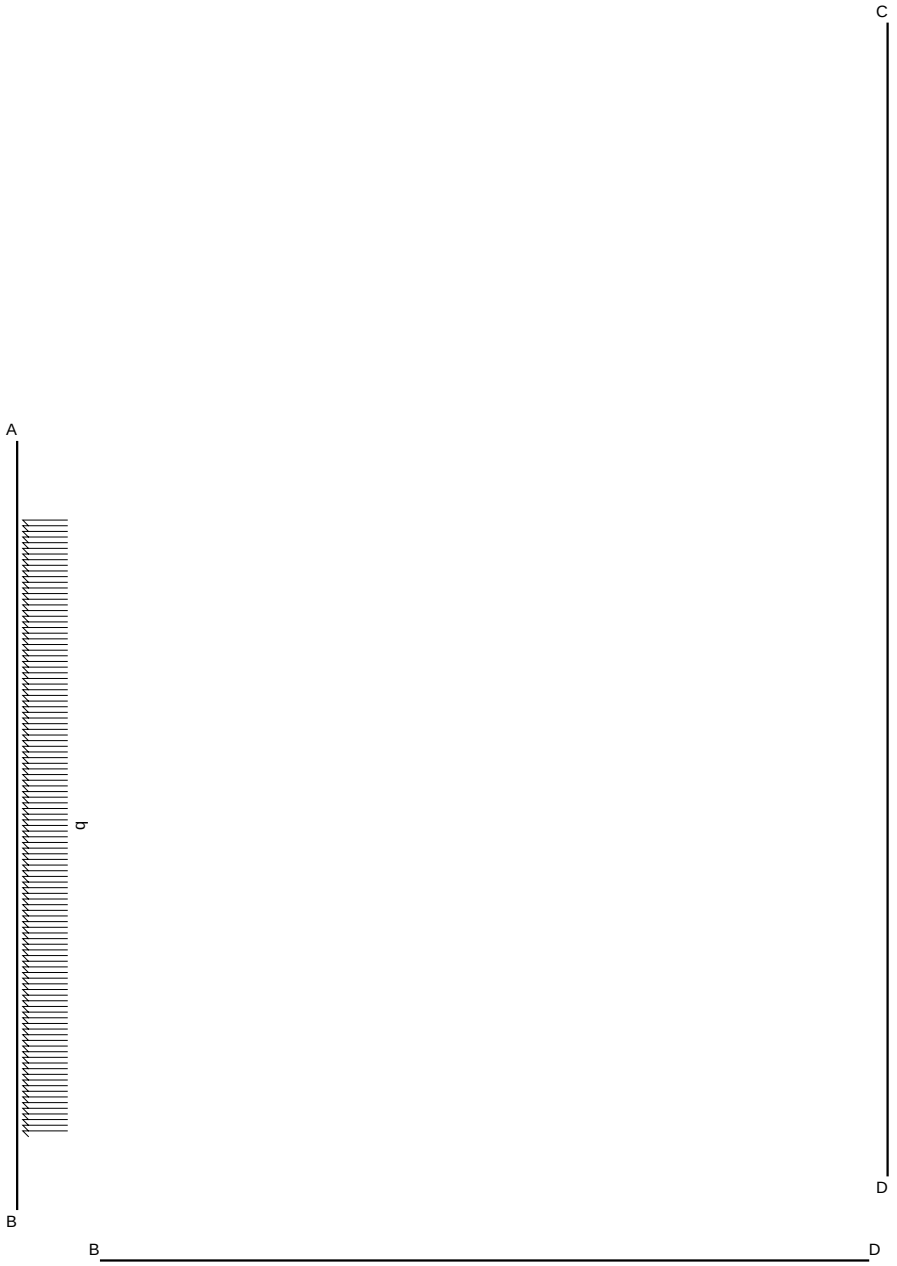
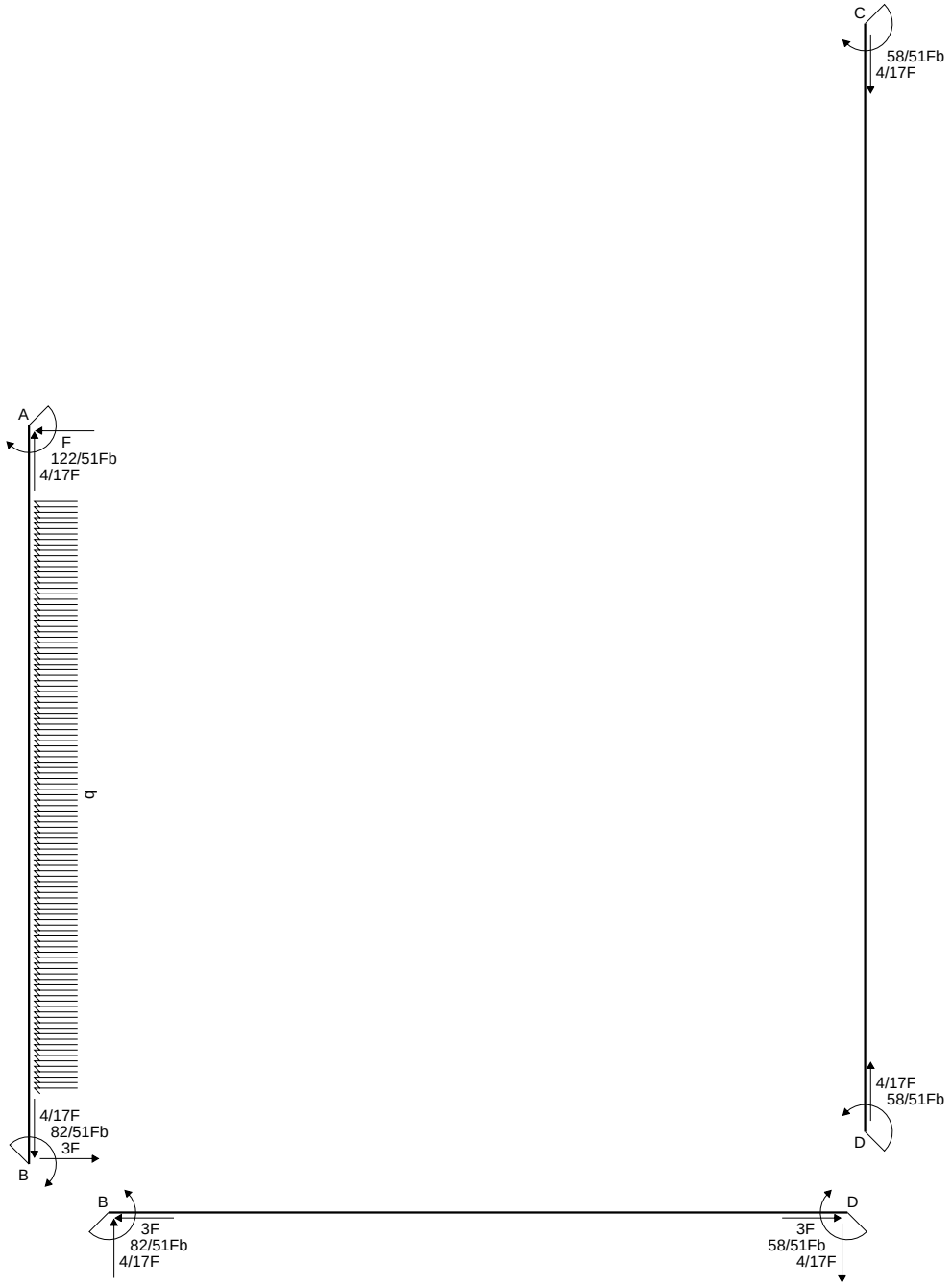
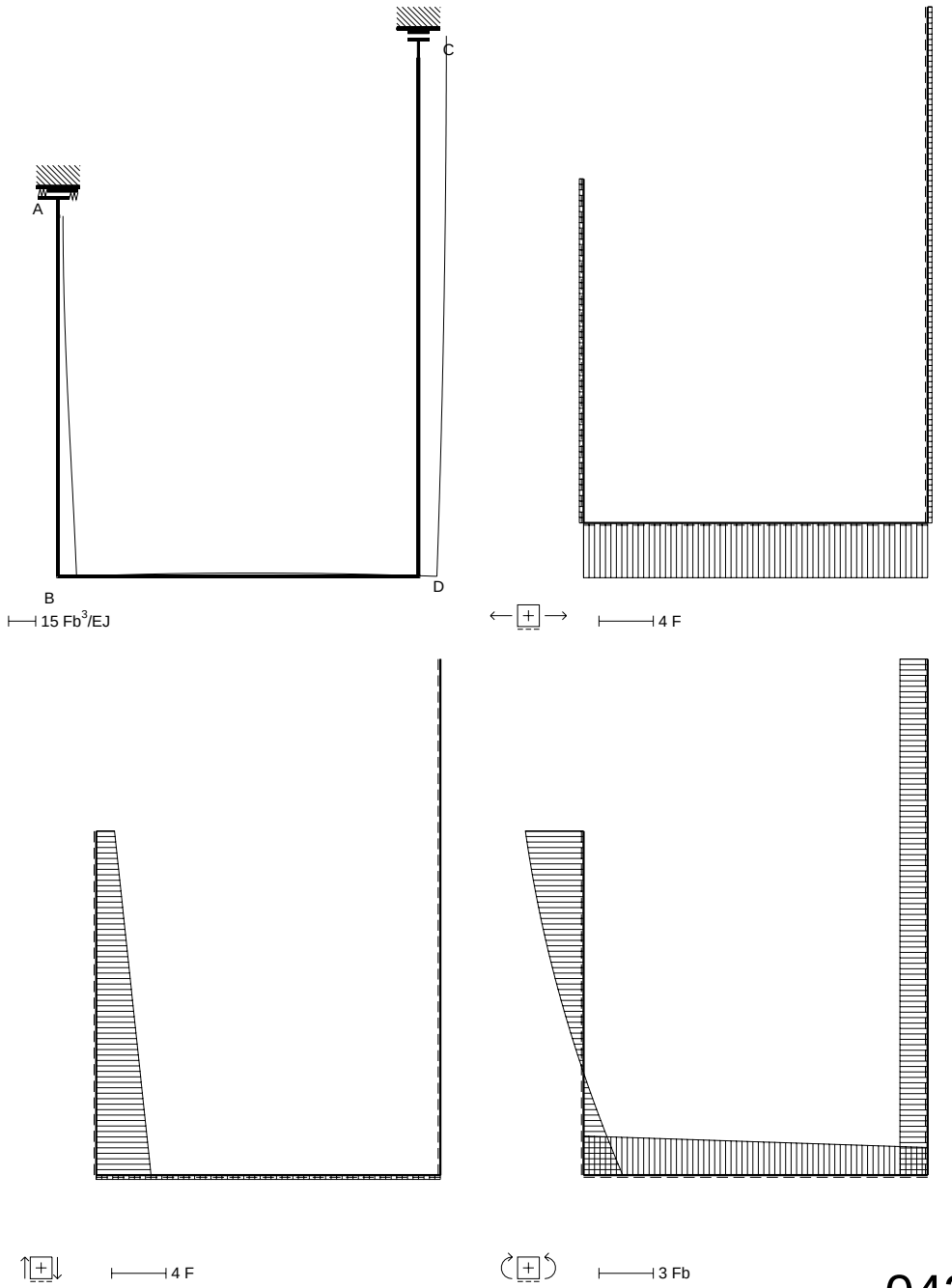


DEFORMATA (coordinate locali)
AB y(x)EJ =
CD y(x)EJ =
BD y(x)EJ =

SPOSTAMENTI NODALI

u_A =	u_B =	u_{CCD} =	u_D =
v_A =	v_B =	v_C =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{DC}$ $Y = W_{BD}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CD} K_{CD} φ_{BD} K_{BD}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(2b) - y'_{BD}(0) = 0$

$y'_{CD}(0) = 0$

$y'_{CD}(3b) - y'_{BD}(2b) = 0$

$y_{AB}(0) + H_A b^3/EJ = 0$

$y_{CD}(3b) - y_{AB}(2b) = 0$

$y_{BD}(0) = 0$

$y_{BD}(2b) = 0$

$M_{AB} = -Fx +4Fb -1/2qx^2 -Y$

$EJy = -Fx +4Fb -1/2qx^2 -Y$

$EJy = -1/2Fx^2 +4Fbx -1/6qx^3 -Y +EJ\varphi_{AB}$

$EJy = -1/6Fx^3 +2Fbx2 -1/24qx^4 -Yb +EJ\varphi_{AB}x +EJK_{AB}$

$M_{CD} = Xb$

$EJy = -EJ\theta +1/2Xb$

$EJy = -EJ\theta x +1/2Xb +EJ\varphi_{CD}$

$EJy = -1/2EJ\theta x2 +1/2Xb +EJ\varphi_{CD}x +EJK_{CD}$

$M_{BD} = -1/2X +1/2Y -Yb$

$EJy = -1/2X +1/2Y -Yb$

$EJy = -1/2X +1/2Y -Yb +EJ\varphi_{BD}$

$EJy = -1/2X +1/2Y -Yb +EJ\varphi_{BD}x +EJK_{BD}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CD}b$	K_{CD}	$\varphi_{BD}b$	K_{BD}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	0	0	-1	0	0	-2		-14/3	0
y'_{CD}	0	0	1	0	0	0	0	0		0	0
y'_{DC}	0	0	1	0	-1	0	5/2	1	=	0	3
y_{AB}	0	1	0	0	0	0	0	0		1	0
y_{DC}	-2	-1	3	1	0	0	9/4	2		6	9/2
y_{BD}	0	0	0	0	0	1	0	0		0	0
y_{DB}	0	0	0	0	2	1	-2/3	-4/3		0	0

Soluzione

		$[Fb^3/EJ]$
$\varphi_{AB}b$		0
$\varphi_{BD}b$		74/51
$\varphi_{CD}b$		0
Xb^2/EJ	=	58/51
K_{AB}		1
K_{CD}		292/51
K_{BD}		0
Yb^2/EJ		82/51

DEFORMATA (coordinate locali)

AB $y(x)EJ = Fb^3 +61/51x^2Fb -1/6x^3F -1/24x^4q$

BA $y(x)EJ = 193/51Fb^3 -74/51xFb^2 -41/51x^2Fb +1/2x^3F -1/24x^4q$

CD $y(x)EJ = 292/51Fb^3 -11/51x^2Fb$

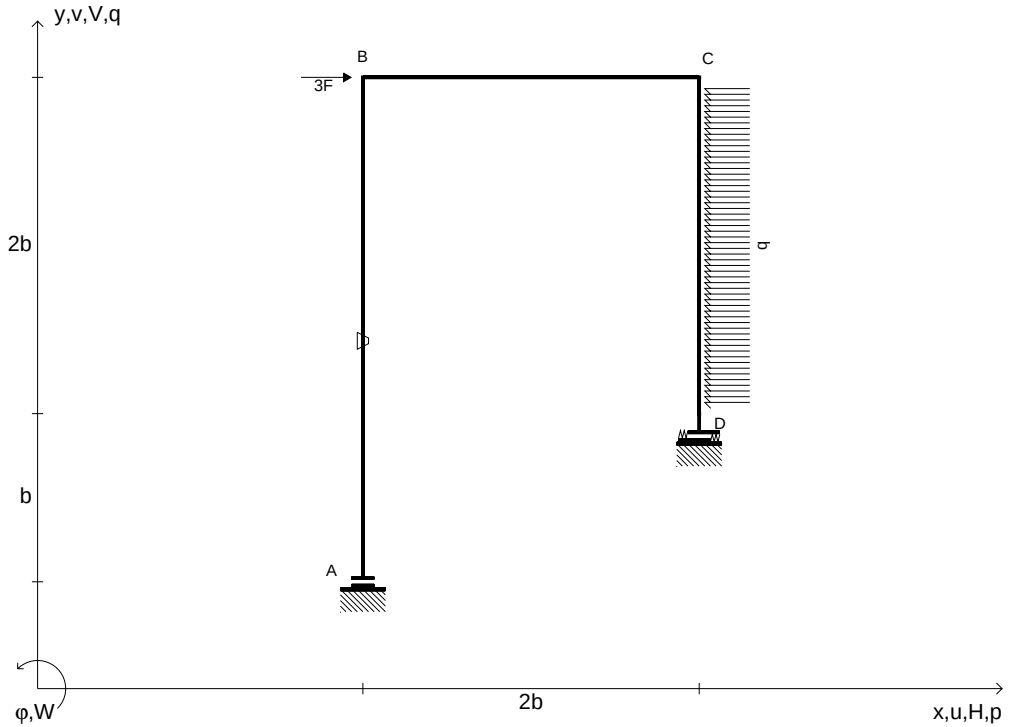
DC $y(x)EJ = 193/51Fb^3 +22/17xFb^2 -11/51x^2Fb$

BD $y(x)EJ = 74/51xFb^2 -41/51x^2Fb +2/51x^3F$

DB $y(x)EJ = 22/17xFb^2 -29/51x^2Fb -2/51x^3F$

SPOSTAMENTI NODALI

$u_A = (Fb^3/EJ)$	$u_B = 193/51(Fb^3/EJ)$	$u_{CCD} = 292/51(Fb^3/EJ)$	$u_D = 193/51(Fb^3/EJ)$
$v_A = 0$	$v_B = 0$	$v_C = 0$	$v_D = 0$
$\varphi_A = 0$	$\varphi_B = 74/51(Fb^2/EJ)$	$\varphi_C = 0$	$\varphi_D = -22/17(Fb^2/EJ)$

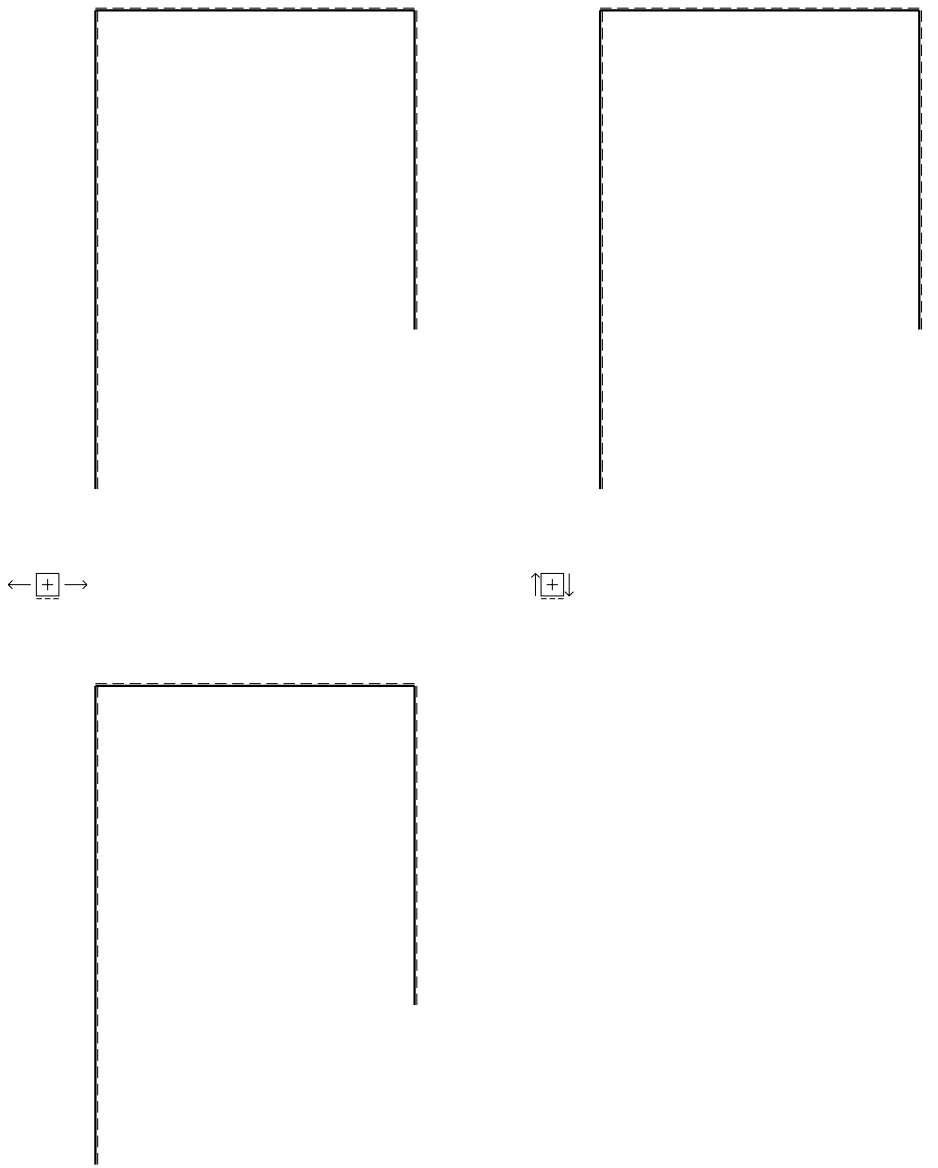


$H_B = 3F$
$p_{DC} = -q = -F/b$
$\theta_{AB} = -\theta = -\alpha T/b = -bF/E$

$k_D = EJ/b^3$
$EJ_{AB} = 3EJ$
$EJ_{CB} = EJ$

$EJ_{DC} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta AB positiva se convessa a destra con inizio A.



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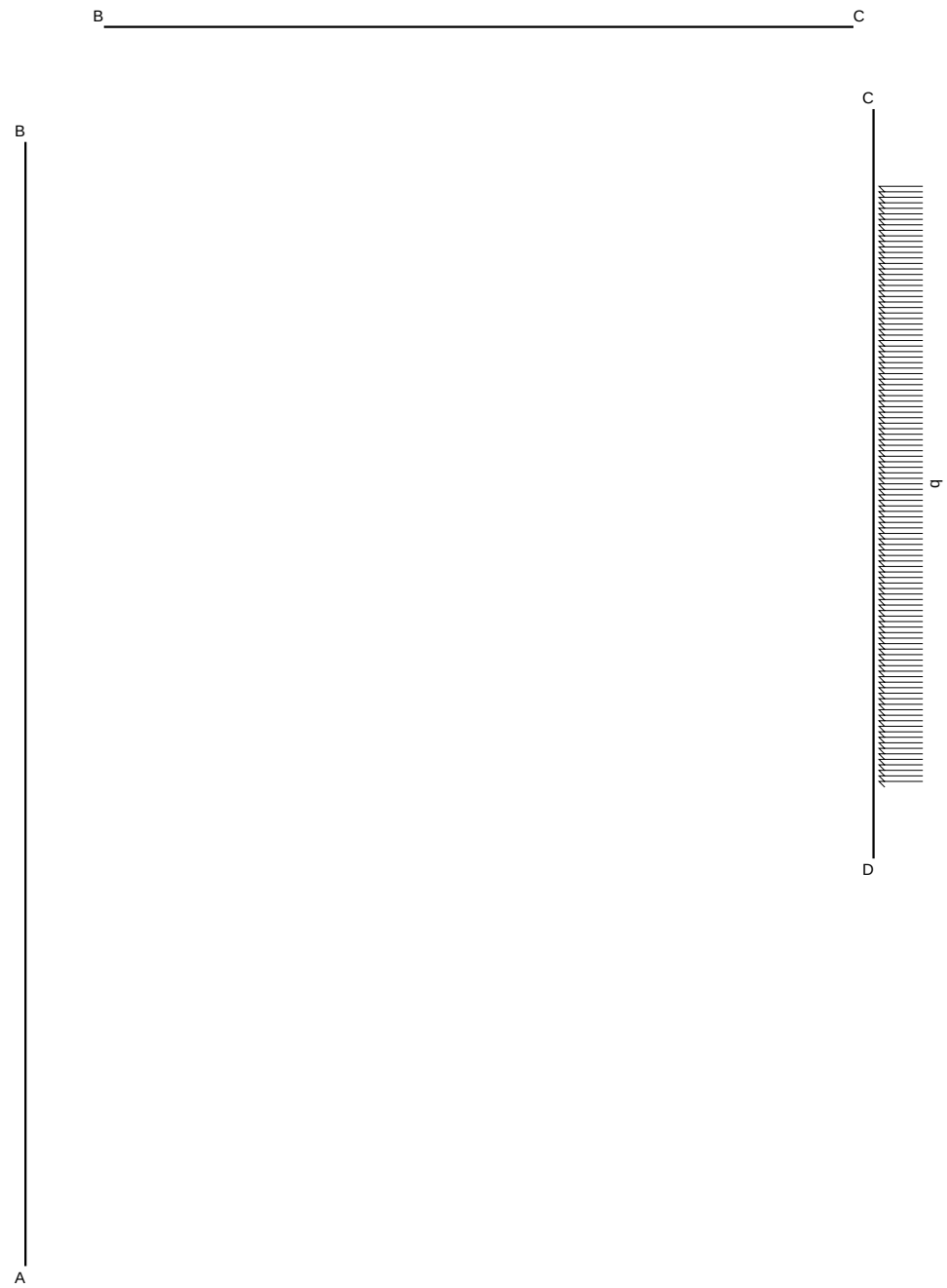
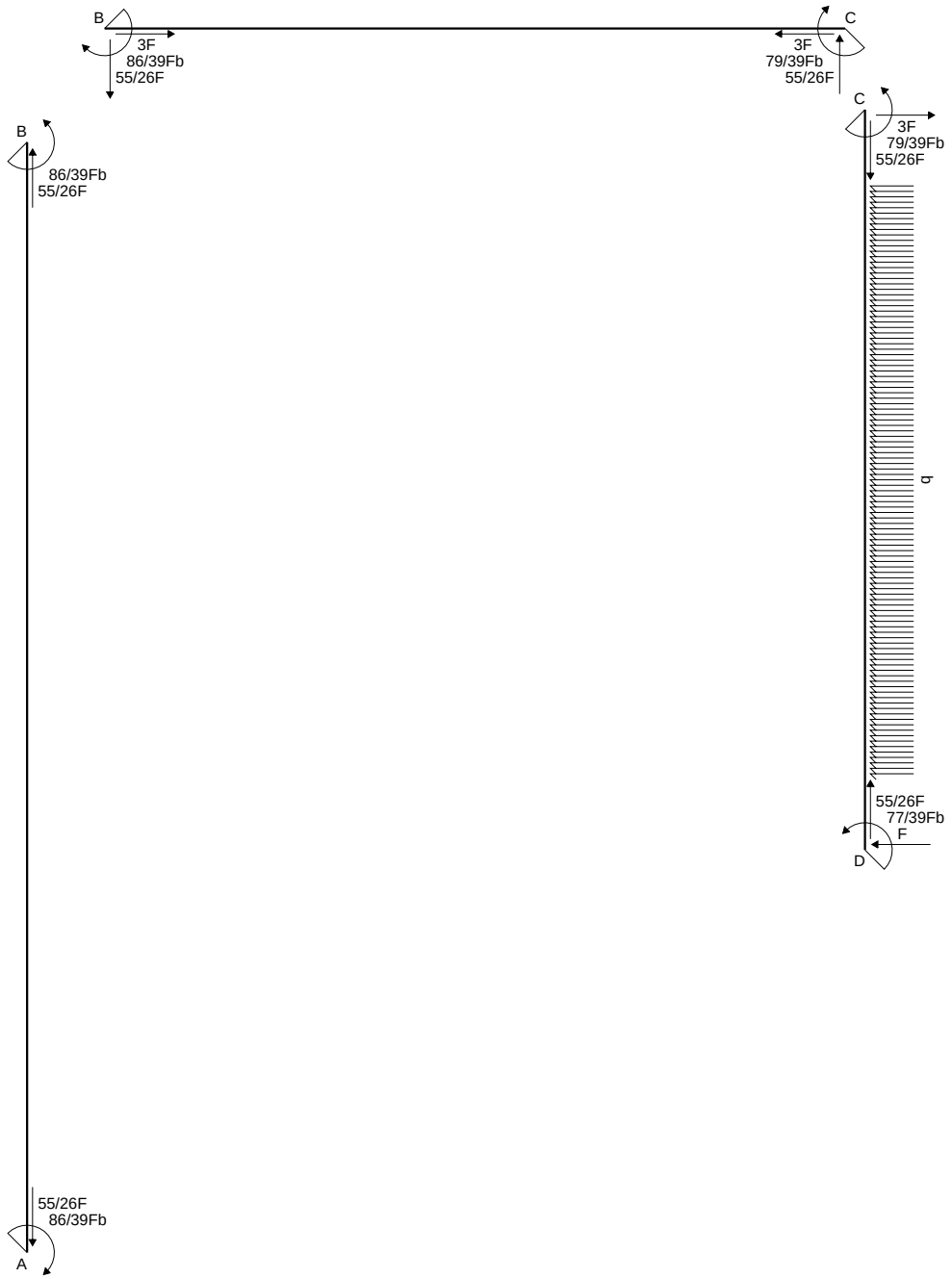
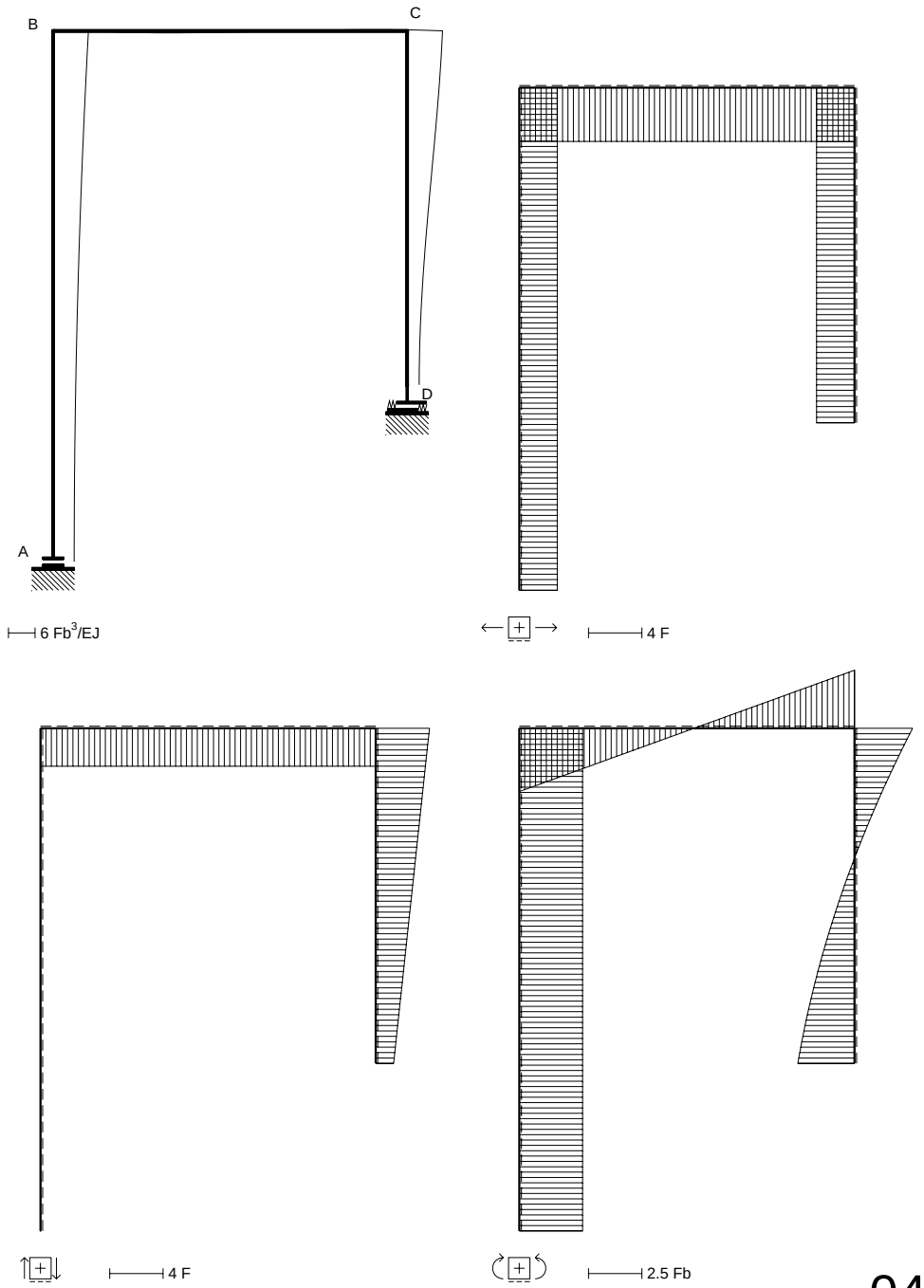


DEFORMATA (coordinate locali)
AB y(x)EJ =
CB y(x)EJ =
DC y(x)EJ =

SPOSTAMENTI NODALI

u_{AAB} =	u_B =	u_C =	u_D =
v_A =	v_B =	v_C =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{BA}$ $Y = W_{CB}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CB} K_{CB} φ_{DC} K_{DC}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(3b) - y'_{CB}(2b) = 0$

$y'_{CB}(0) - y'_{DC}(2b) = 0$

$y'_{DC}(0) = 0$

$y_{CB}(0) = 0$

$y_{CB}(2b) = 0$

$y_{DC}(0) - H_D b^3/EJ = 0$

$y_{DC}(2b) - y_{AB}(3b) = 0$

$M_{AB} = X$

$EJy = -EJ\theta + 1/3X$

$EJy = -EJ\theta x + 1/3X + EJ\varphi_{AB}$

$EJy = -1/2EJ\theta x2 + 1/3Xb + EJ\varphi_{AB}x + EJK_{AB}$

$M_{CB} = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{CB}$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{CB}x + EJK_{CB}$

$M_{DC} = Fx - 4Fb + 1/2qx^2 - Yb$

$EJy = Fx - 4Fb + 1/2qx^2 - Yb$

$EJy = 1/2Fx^2 - 4Fbx + 1/6qx^3 - Yb + EJ\varphi_{DC}$

$EJy = 1/6Fx^3 - 2Fbx2 + 1/24qx^4 - Yb + EJ\varphi_{DC}x + EJK_{DC}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CB}b$	K_{CB}	$\varphi_{DC}b$	K_{DC}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	-1	0	0	0	2	1		0	3
y'_{CB}	0	0	1	0	-1	0	0	2		-14/3	0
y'_{DC}	0	0	0	0	1	0	0	0	=	0	0
y_{CB}	0	0	0	1	0	0	0	0		0	0
y_{BC}	0	0	2	1	0	0	-2/3	-4/3		0	0
y_{DC}	0	0	0	0	0	1	0	0		-1	0
y_{CD}	-3	-1	0	0	2	1	-3/2	-2		6	-9/2

Soluzione

		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{CB}b$		-8/13
$\varphi_{DC}b$		0
Xb^2/EJ	=	86/39
K_{CB}		0
Yb^2/EJ		-79/39
K_{DC}		-1
K_{AB}		-137/78

DEFORMATA (coordinate locali)

AB $y(x)EJ = -137/78Fb^3 - 31/234x^2Fb$

BA $y(x)EJ = -115/39Fb^3 + 31/39xFb^2 - 31/234x^2Fb$

CB $y(x)EJ = -8/13xFb^2 + 79/78x^2Fb - 55/156x^3F$

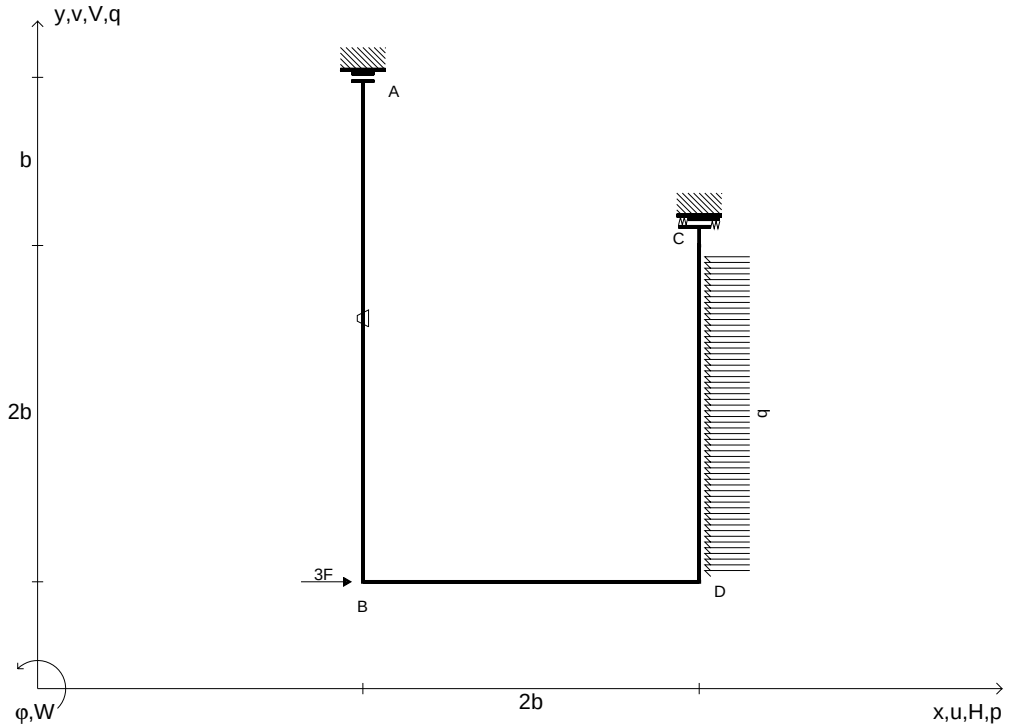
BC $y(x)EJ = 31/39xFb^2 - 43/39x^2Fb + 55/156x^3F$

DC $y(x)EJ = -Fb^3 - 77/78x^2Fb + 1/6x^3F + 1/24x^4q$

CD $y(x)EJ = -115/39Fb^3 + 8/13xFb^2 + 79/78x^2Fb - 1/2x^3F + 1/24x^4q$

SPOSTAMENTI NODALI

$u_{AAB} = 137/78(Fb^3/EJ)$	$u_B = 115/39(Fb^3/EJ)$	$u_C = 115/39(Fb^3/EJ)$	$u_D = (Fb^3/EJ)$
$v_A = 0$	$v_B = 0$	$v_C = 0$	$v_D = 0$
$\varphi_A = 0$	$\varphi_B = -31/39(Fb^2/EJ)$	$\varphi_C = -8/13(Fb^2/EJ)$	$\varphi_D = 0$

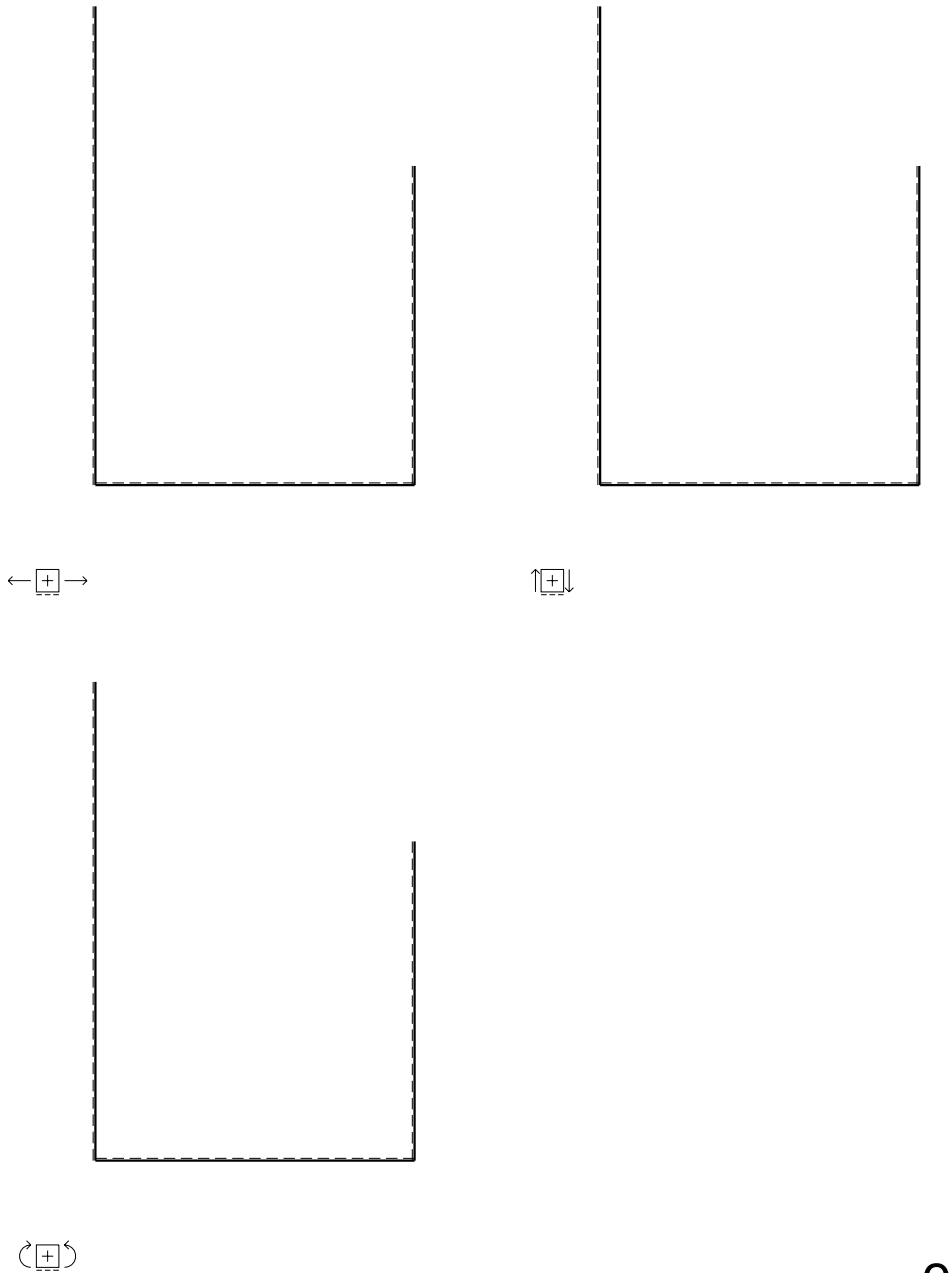


$H_B = 3F$
$p_{CD} = -q = -F/b$
$\theta_{AB} = -\theta = -\alpha T/b = -bF/E$

$k_C = EJ/b^3$
$EJ_{AB} = 4EJ$
$EJ_{CD} = EJ$

$EJ_{DB} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta AB positiva se convessa a destra con inizio A.



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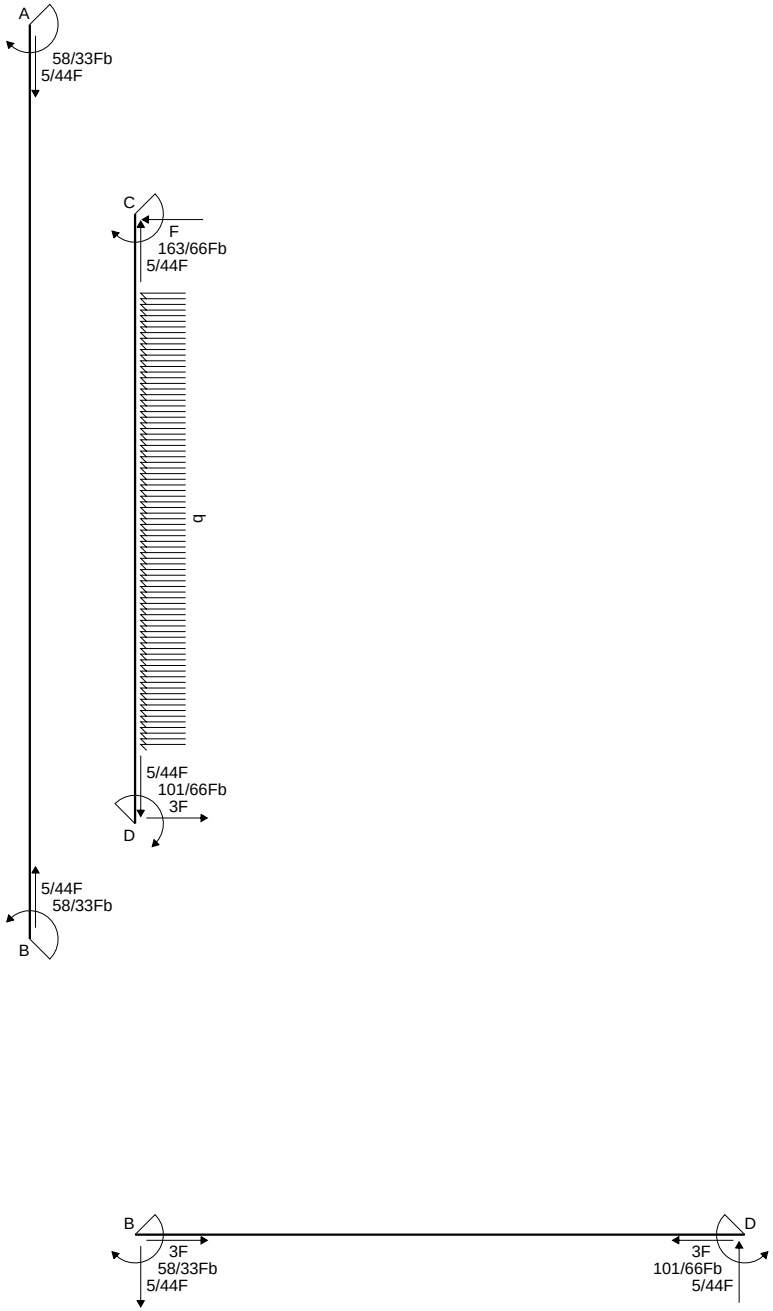
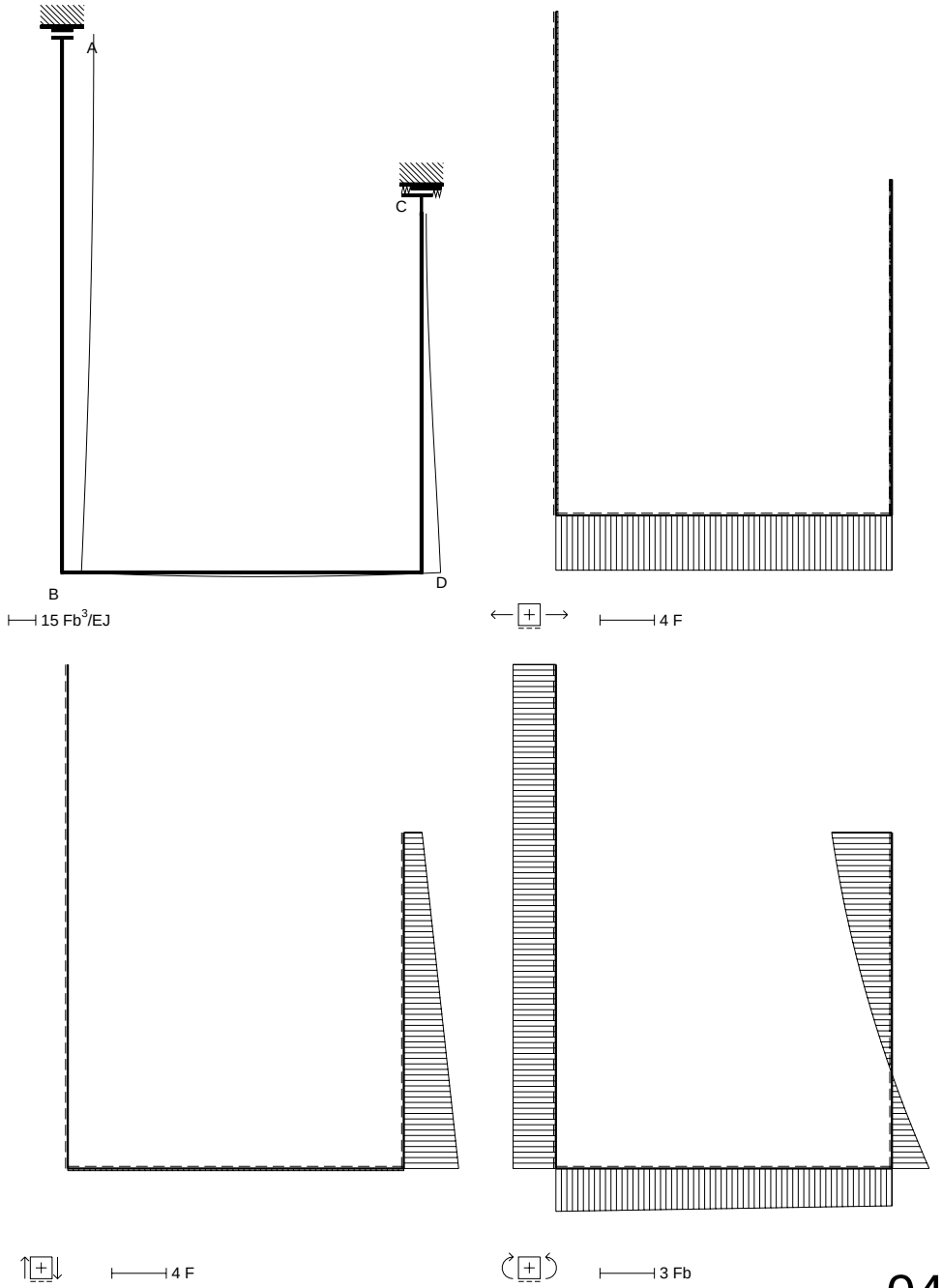
DEFORMATA (coordinate locali)
AB y(x)EJ =
CD y(x)EJ =
DB y(x)EJ =

SPOSTAMENTI NODALI

u_{AAB} =	u_B =	u_C =	u_D =
v_A =	v_B =	v_C =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{BA}$ $Y = W_{DB}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CD} K_{CD} φ_{DB} K_{DB}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(3b) - y'_{DB}(2b) = 0$

$y'_{CD}(0) = 0$

$y'_{CD}(2b) - y'_{DB}(0) = 0$

$y_{CD}(0) + H_C b^3/EJ = 0$

$y_{CD}(2b) - y_{AB}(3b) = 0$

$y_{DB}(0) = 0$

$y_{DB}(2b) = 0$

$M_{AB} = X$

$EJy = -EJ\theta + 1/4X$

$EJy = -EJ\theta x + 1/4X + EJ\varphi_{AB}$

$EJy = -1/2EJ\theta x2 + 1/4Xb + EJ\varphi_{AB}x + EJK_{AB}$

$M_{CD} = -Fx + 4Fb - 1/2qx^2 - Yb$

$EJy = -Fx + 4Fb - 1/2qx^2 - Yb$

$EJy = -1/2Fx^2 + 4Fbx - 1/6qx^3 - Yb + EJ\varphi_{CD}$

$EJy = -1/6Fx^3 + 2Fbx2 - 1/24qx^4 - Yb + EJ\varphi_{CD}x + EJK_{CD}$

$M_{DB} = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{DB}$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{DB}x + EJK_{DB}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CD}b$	K_{CD}	$\varphi_{DB}b$	K_{DB}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	0	0	-1	0	7/4	1		0	3
y'_{CD}	0	0	1	0	0	0	0	0		0	0
y'_{DC}	0	0	1	0	-1	0	0	-2	=	-14/3	0
y_{CD}	0	0	0	1	0	0	0	0		1	0
y_{DC}	-3	-1	2	1	0	0	-9/8	-2		-6	-9/2
y_{DB}	0	0	0	0	0	1	0	0		0	0
y_{BD}	0	0	0	0	2	1	-2/3	-4/3		0	0

Soluzione

		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{DB}b$		53/33
$\varphi_{CD}b$		0
Xb^2/EJ	=	58/33
K_{CD}		1
K_{AB}		853/132
K_{DB}		0
Yb^2/EJ		101/66

DEFORMATA (coordinate locali)

AB $y(x)EJ = 853/132Fb^3 - 37/132x^2Fb$

BA $y(x)EJ = 130/33Fb^3 + 37/22xFb^2 - 37/132x^2Fb$

CD $y(x)EJ = Fb^3 + 163/132x^2Fb - 1/6x^3F - 1/24x^4q$

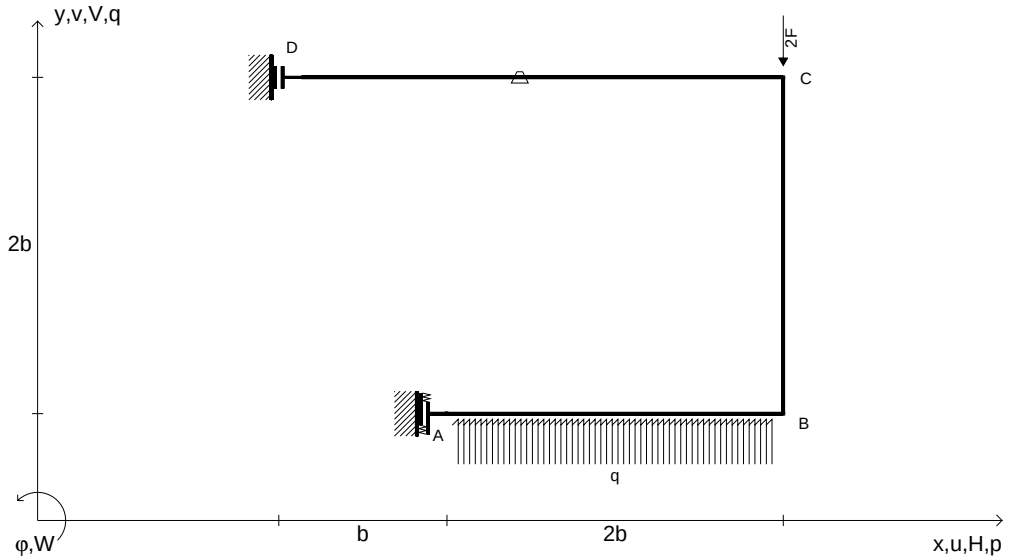
DC $y(x)EJ = 130/33Fb^3 - 53/33xFb^2 - 101/132x^2Fb + 1/2x^3F - 1/24x^4q$

DB $y(x)EJ = 53/33xFb^2 - 101/132x^2Fb - 5/264x^3F$

BD $y(x)EJ = 37/22xFb^2 - 29/33x^2Fb + 5/264x^3F$

SPOSTAMENTI NODALI

$u_{AAB} = 853/132(Fb^3/EJ)$	$u_B = 130/33(Fb^3/EJ)$	$u_C = (Fb^3/EJ)$	$u_D = 130/33(Fb^3/EJ)$
$v_A = 0$	$v_B = 0$	$v_C = 0$	$v_D = 0$
$\varphi_A = 0$	$\varphi_B = -37/22(Fb^2/EJ)$	$\varphi_C = 0$	$\varphi_D = 53/33(Fb^2/EJ)$

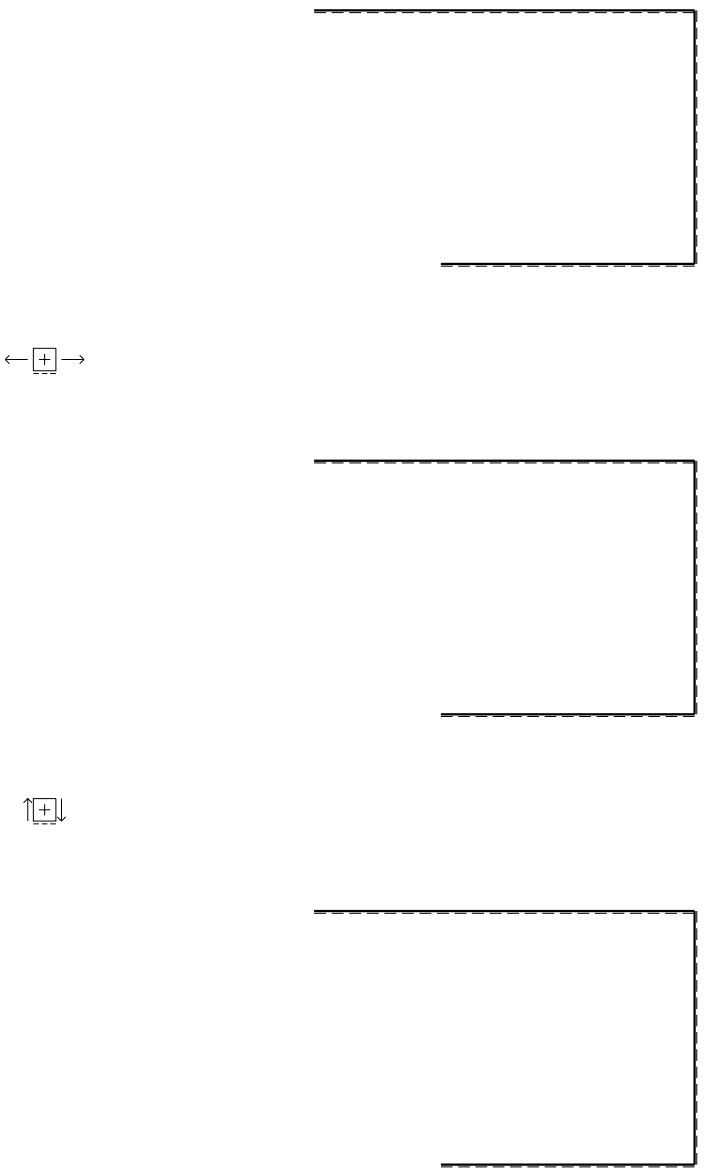


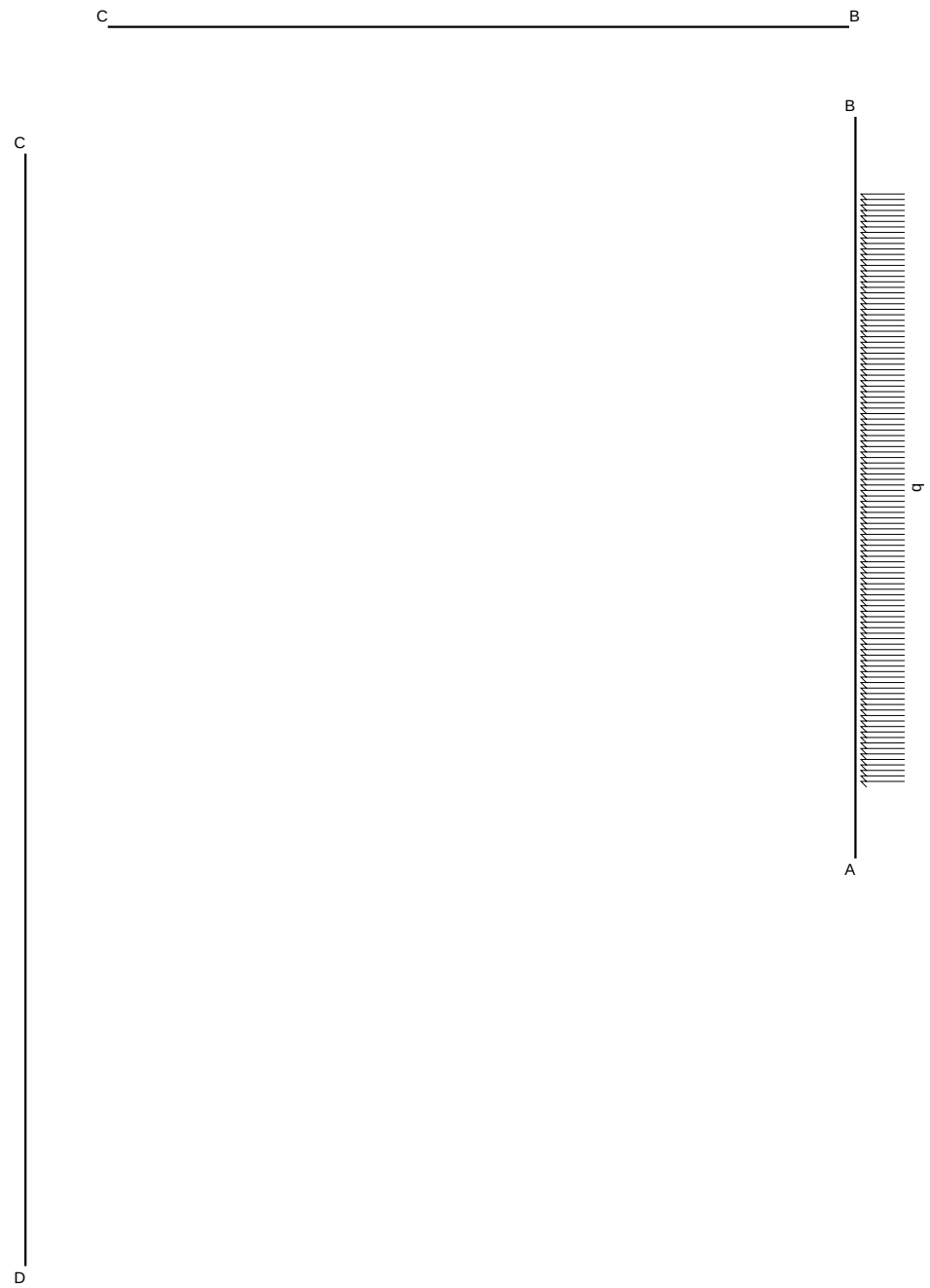
$V_C = -2F$
$q_{AB} = q = F/b$
$\theta_{DC} = 3\theta = 3\alpha T/b = 3bF/E$

$k_A = 3EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{BC} = EJ$

$EJ_{DC} = 1/4EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta DC positiva se convessa a destra con inizio D.





DEFORMATA (coordinate locali)
AB y(x)EJ =
BC y(x)EJ =
DC y(x)EJ =

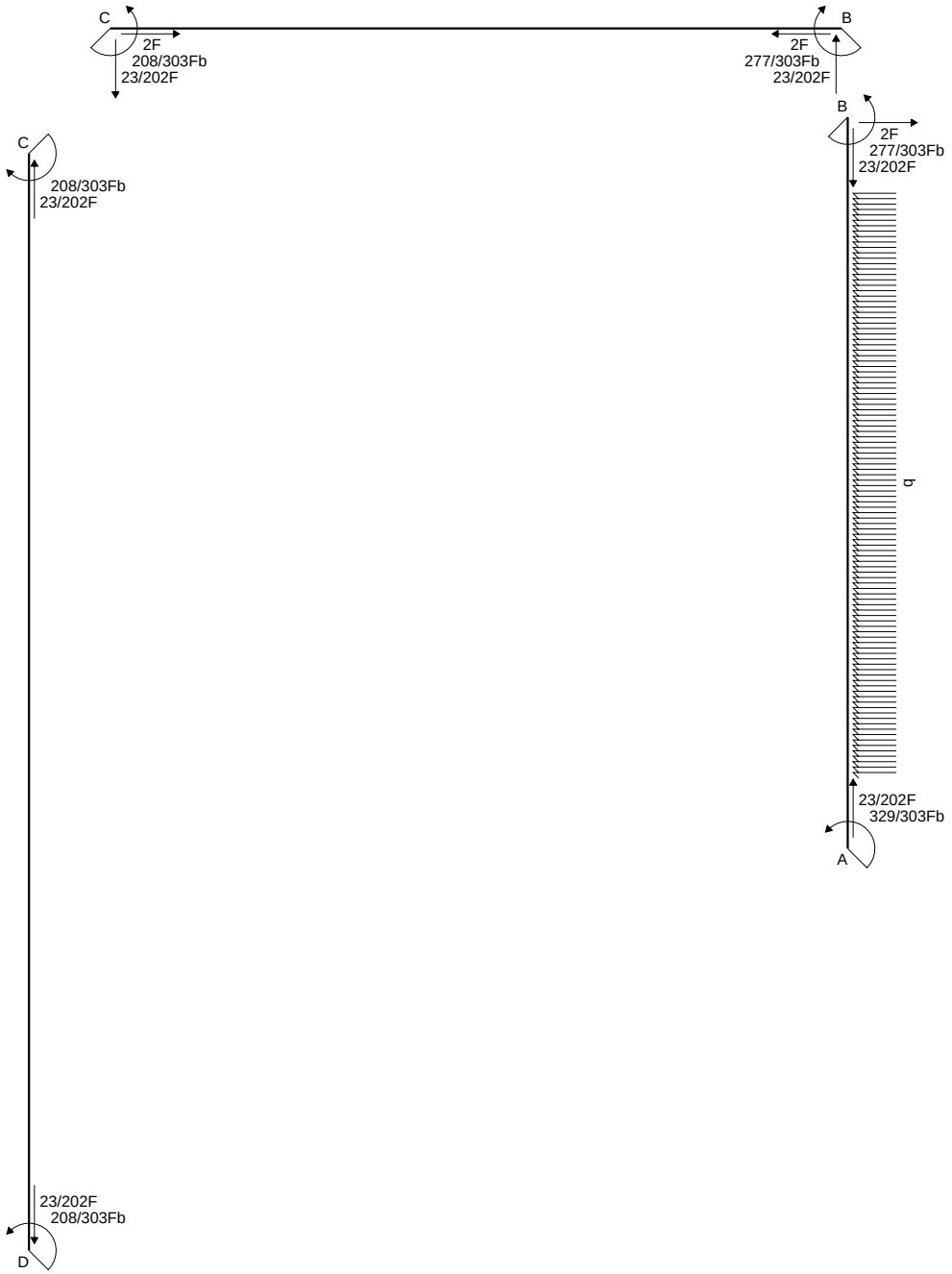
SPOSTAMENTI NODALI

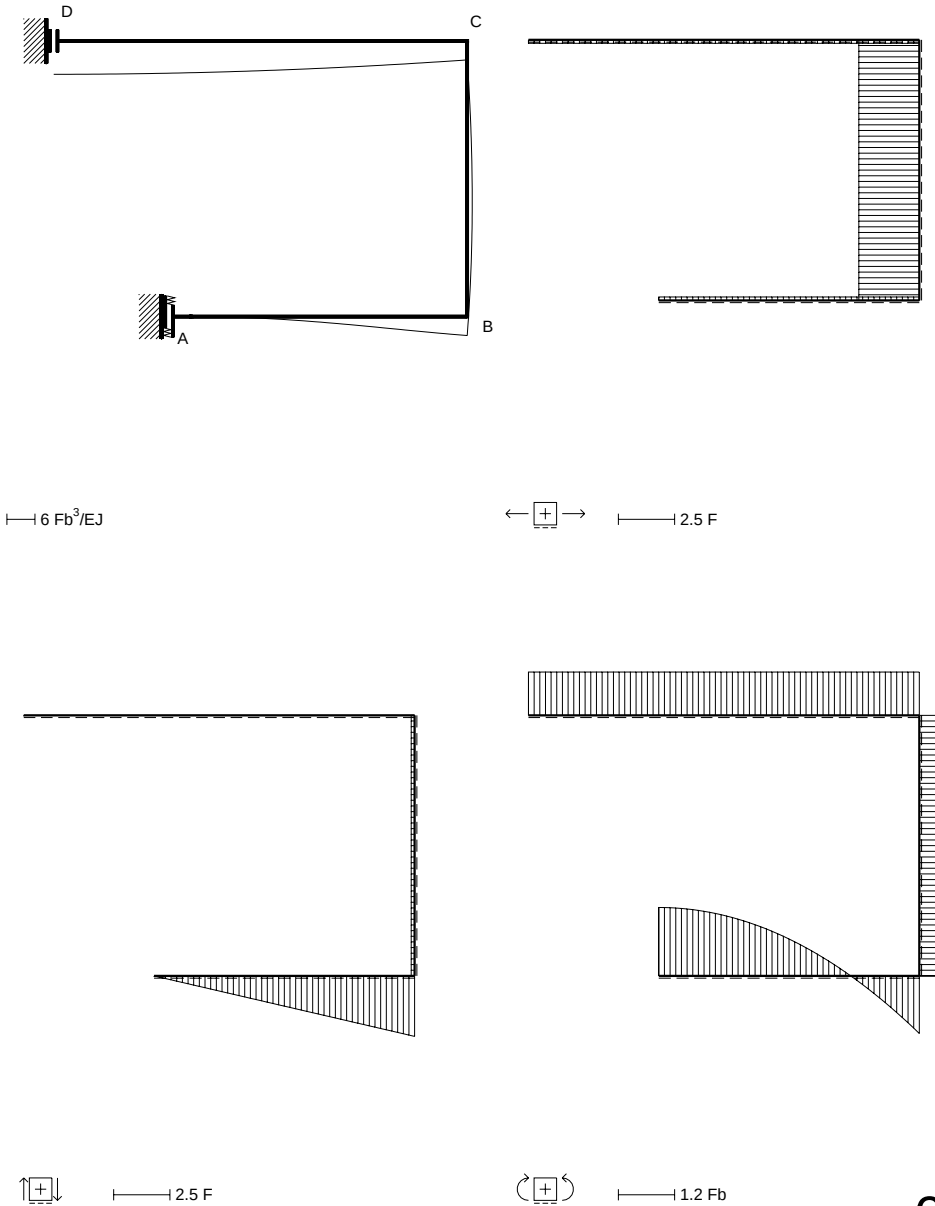
u_A =
v_A =
φ_A =

u_B =
v_B =
φ_B =

u_C =
v_C =
φ_C =

u_D =
v_{DDC} =
φ_D =





REAZIONI IPERSTATICHE
$X = W_{BC}$ $Y = W_{CD}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA
Costanti di integrazione: φ_{AB} K_{AB} φ_{BC} K_{BC} φ_{DC} K_{DC}

Relazioni di congruenza
$y'_{AB}(0) = 0$
$y'_{AB}(2b) - y'_{BC}(0) = 0$
$y'_{BC}(2b) - y'_{DC}(3b) = 0$
$y'_{DC}(0) = 0$
$y_{AB}(0) + 1/3V_A b^3/EJ = 0$
$y_{BC}(0) = 0$
$y_{BC}(2b) = 0$
$y_{DC}(3b) - y_{AB}(2b) = 0$

$M_{AB} = -2Fb +1/2qx^2 -Xb$
$EJy = -2Fb +1/2qx^2 -Xb$
$EJy = -2Fbx +1/6qx^3 -Xb +EJ\varphi_{AB}$
$EJy = -Fbx2 +1/24qx^4 -Xb +EJ\varphi_{AB}x +EJK_{AB}$

$M_{BC} = 1/2X -Xb -1/2Y$
$EJy = 1/2X -Xb -1/2Y$
$EJy = 1/2X -Xb -1/2Y +EJ\varphi_{BC}$
$EJy = 1/2X -Xb -1/2Y +EJ\varphi_{BC}x +EJK_{BC}$

$M_{DC} = Yb$
$EJy = 3EJ\theta +4Yb$
$EJy = 3EJ\theta x +4Yb +EJ\varphi_{DC}$
$EJy = 3/2EJ\theta x2 +4Yb +EJ\varphi_{DC}x +EJK_{DC}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{BC}b$	K_{BC}	$\varphi_{DC}b$	K_{DC}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	-1	0	0	0	-2	0		8/3	0
y'_{CB}	0	0	1	0	-1	0	-1	-13		0	9
y'_{DC}	0	0	0	0	1	0	0	0	=	0	0
y_{AB}	0	1	0	0	0	0	0	0		0	0
y_{BC}	0	0	0	1	0	0	0	0		0	0
y_{CB}	0	0	2	1	0	0	-4/3	-2/3		0	0
y_{CD}	-2	-1	0	0	3	1	2	18		-10/3	-27/2

Soluzione

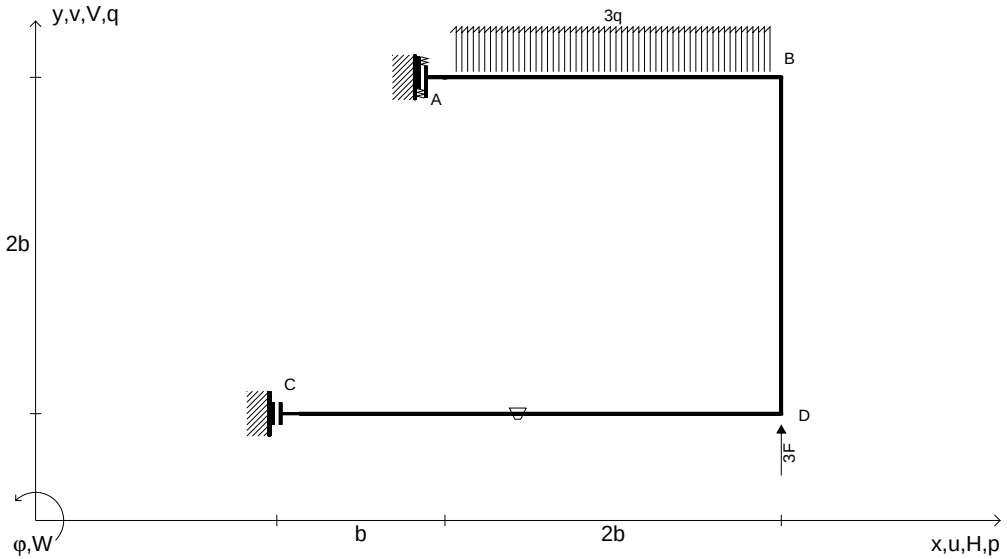
		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{BC}b$		-254/303
$\varphi_{DC}b$		0
Xb^2/EJ	=	-277/303
K_{AB}		0
K_{BC}		0
Yb^2/EJ		-208/303
K_{DC}		-535/202

DEFORMATA (coordinate locali)
AB $y(x)EJ = -329/606x^2Fb +1/24x^4q$
BA $y(x)EJ = -152/101Fb^3 +254/303xFb^2 +277/606x^2Fb -1/3x^3F +1/24x^4q$
BC $y(x)EJ = -254/303xFb^2 +277/606x^2Fb -23/1212x^3F$
CB $y(x)EJ = -77/101xFb^2 +104/303x^2Fb +23/1212x^3F$
DC $y(x)EJ = -535/202Fb^3 +77/606x^2Fb$
CD $y(x)EJ = -152/101Fb^3 -77/101xFb^2 +77/606x^2Fb$

SPOSTAMENTI NODALI

$u_A = 0$ $u_B = 0$ $u_C = 0$
$v_A = 0$ $v_B = -152/101(Fb^3/EJ)$ $v_C = -152/101(Fb^3/EJ)$
$\varphi_A = 0$ $\varphi_B = -254/303(Fb^2/EJ)$ $\varphi_C = 77/101(Fb^2/EJ)$

$u_D = 0$
$v_{DDC} = -535/202(Fb^3/EJ)$
$\varphi_D = 0$

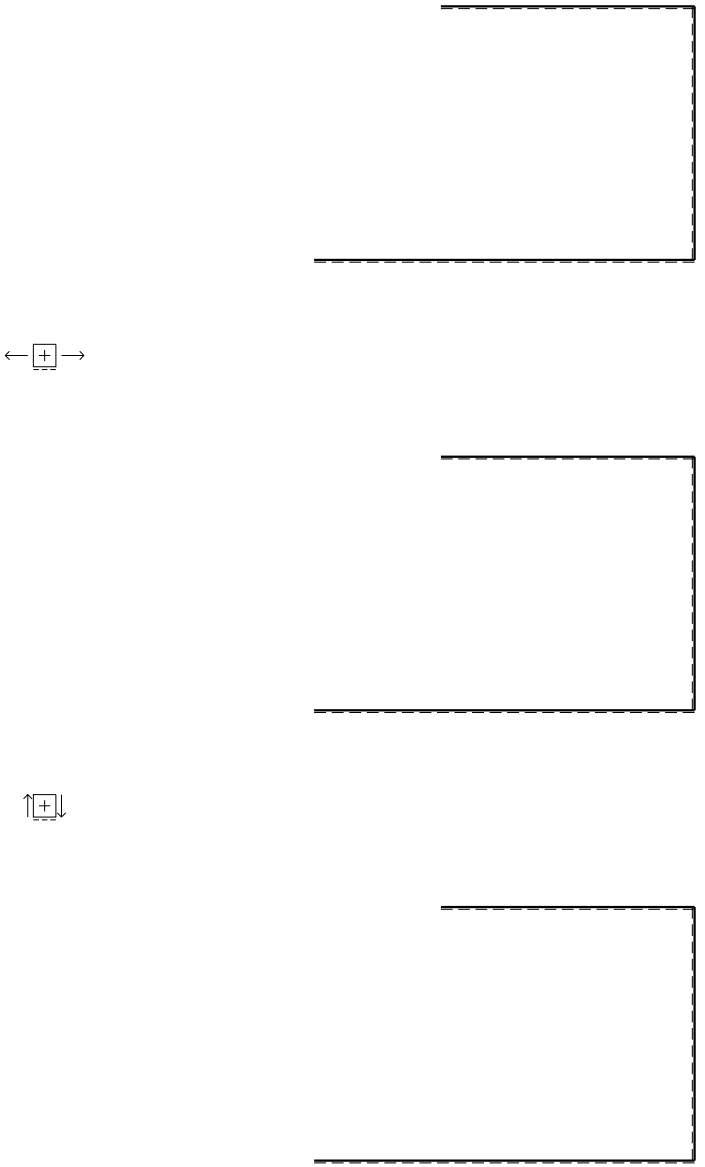


$V_D = 3F$
$q_{AB} = 3q = 3F/b$
$\theta_{CD} = -\theta = -\alpha T/b = -bF/E$

$k_A = EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{CD} = 1/3EJ$

$EJ_{BD} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta CD positiva se convessa a destra con inizio C.



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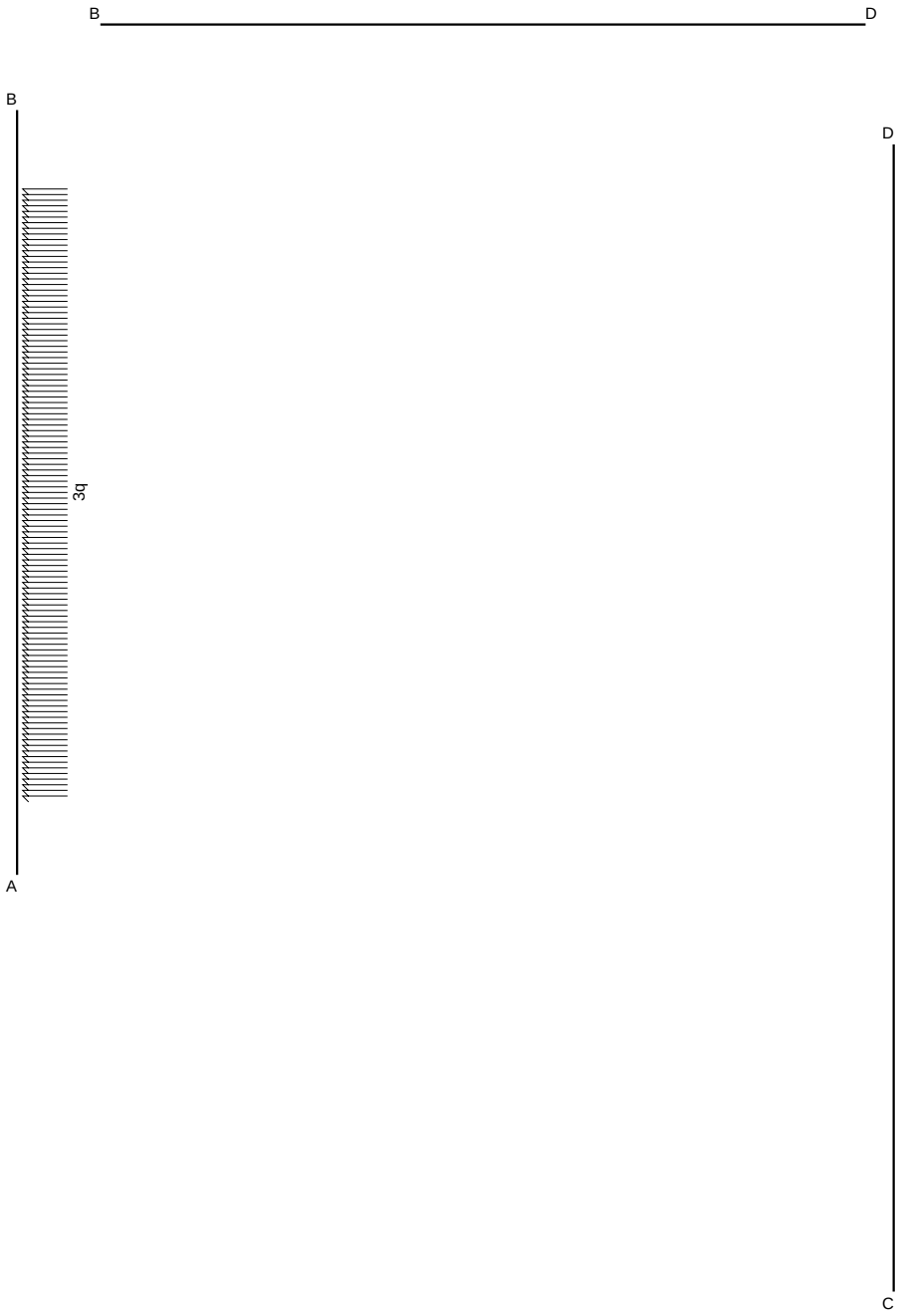
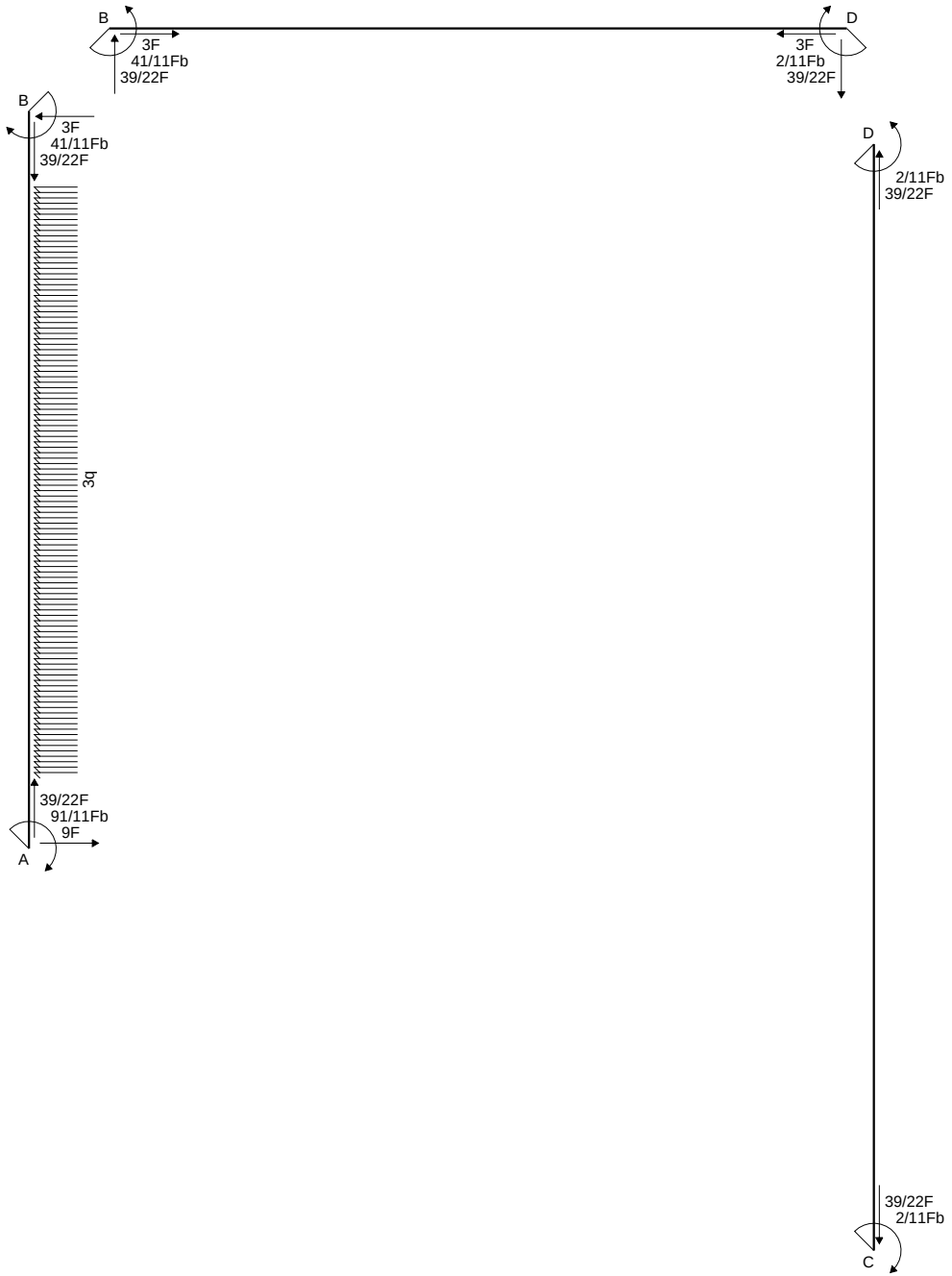
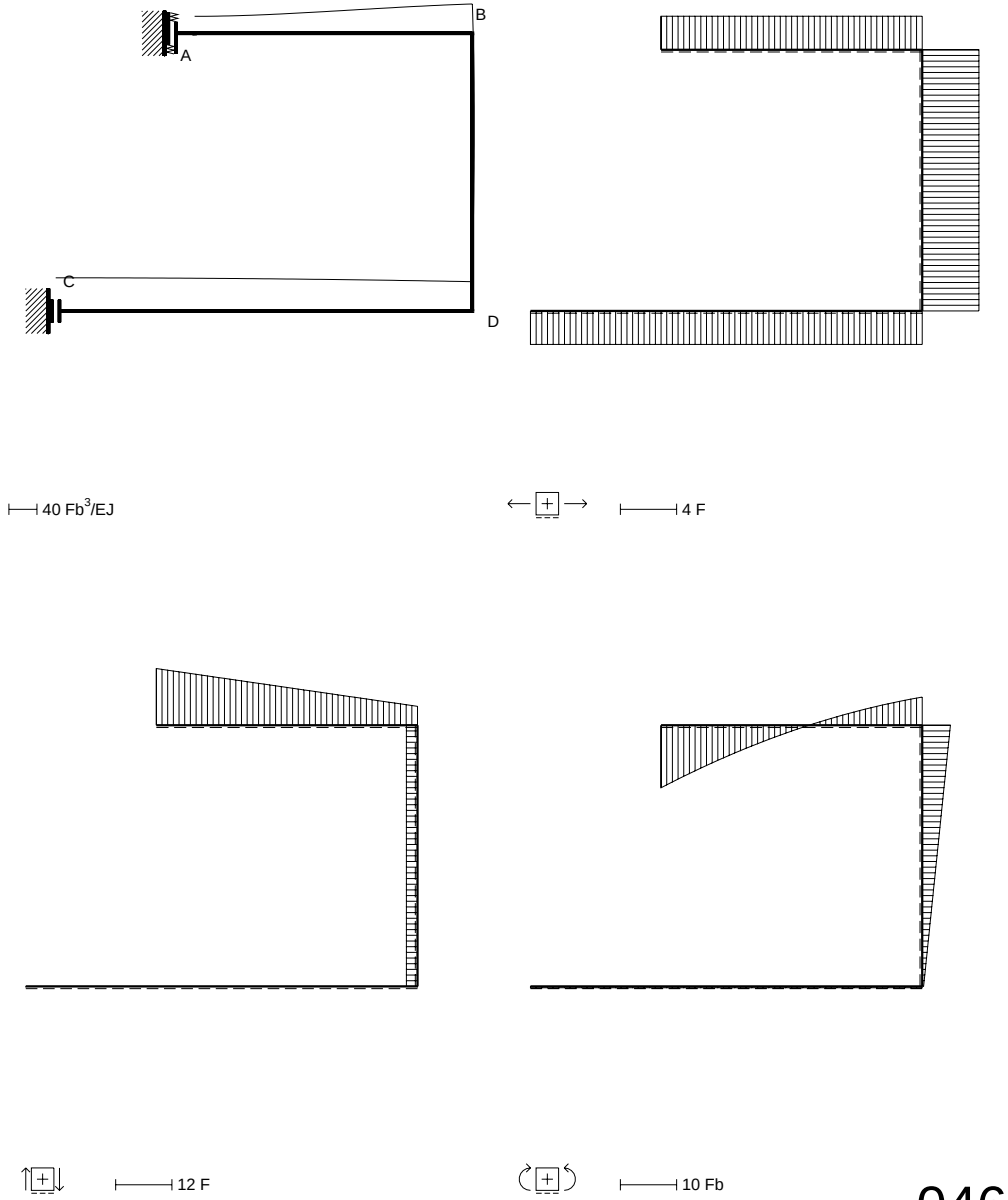


DEFORMATA (coordinate locali)
AB y(x)EJ =
CD y(x)EJ =
BD y(x)EJ =

SPOSTAMENTI NODALI

u_A =	u_B =	u_C =	u_D =
v_A =	v_B =	v_{CCD} =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{DC}$ $Y = W_{BD}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CD} K_{CD} φ_{BD} K_{BD}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(2b) - y'_{BD}(0) = 0$

$y'_{CD}(0) = 0$

$y'_{CD}(3b) - y'_{BD}(2b) = 0$

$y_{AB}(0) + V_A b^3/EJ = 0$

$y_{CD}(3b) - y_{AB}(2b) = 0$

$y_{BD}(0) = 0$

$y_{BD}(2b) = 0$

$M_{AB} = -9Fx +12Fb +3/2qx^2 -Yb$

$EJy = -9Fx +12Fb +3/2qx^2 -Yb$

$EJy = -9/2Fx^2 +12Fbx +1/2qx^3 -Yb +EJ\varphi_{AB}$

$EJy = -3/2Fx^3 +6Fbx2 +1/8qx^4 -Yb +EJ\varphi_{AB}x +EJK_{AB}$

$M_{CD} = Xb$

$EJy = -EJ\theta +3Xb$

$EJy = -EJ\theta x +3Xb +EJ\varphi_{CD}$

$EJy = -1/2EJ\theta x2 +3Xb +EJ\varphi_{CD}x +EJK_{CD}$

$M_{BD} = -1/2X +1/2Y -Yb$

$EJy = -1/2X +1/2Y -Yb$

$EJy = -1/2X +1/2Y -Yb +EJ\varphi_{BD}$

$EJy = -1/2X +1/2Y -Yb +EJ\varphi_{BD}x +EJK_{BD}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CD}b$	K_{CD}	$\varphi_{BD}b$	K_{BD}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	0	0	-1	0	0	-2		-10	0
y'_{CD}	0	0	1	0	0	0	0	0		0	0
y'_{DC}	0	0	1	0	-1	0	10	1	=	0	3
y_{AB}	0	1	0	0	0	0	0	0		9	0
y_{DC}	-2	-1	3	1	0	0	27/2	2		14	9/2
y_{BD}	0	0	0	0	0	1	0	0		0	0
y_{DB}	0	0	0	0	2	1	-2/3	-4/3		0	0

Soluzione

		$[Fb^3/EJ]$
$\varphi_{AB}b$		0
$\varphi_{BD}b$		28/11
$\varphi_{CD}b$		0
Xb^2/EJ	=	2/11
K_{AB}		9
K_{CD}		387/22
K_{BD}		0
Yb^2/EJ		41/11

DEFORMATA (coordinate locali)

AB $y(x)EJ = 9Fb^3 +91/22x^2Fb -3/2x^3F +1/8x^4q$

BA $y(x)EJ = 171/11Fb^3 -28/11xFb^2 -41/22x^2Fb +1/2x^3F +1/8x^4q$

CD $y(x)EJ = 387/22Fb^3 -5/22x^2Fb$

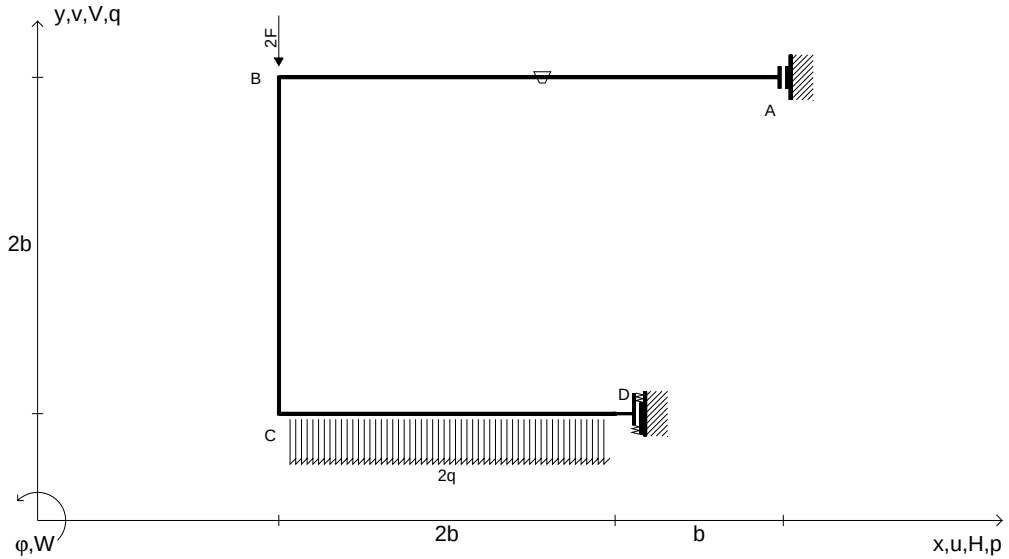
DC $y(x)EJ = 171/11Fb^3 +15/11xFb^2 -5/22x^2Fb$

BD $y(x)EJ = 28/11xFb^2 -41/22x^2Fb +13/44x^3F$

DB $y(x)EJ = 15/11xFb^2 -1/11x^2Fb -13/44x^3F$

SPOSTAMENTI NODALI

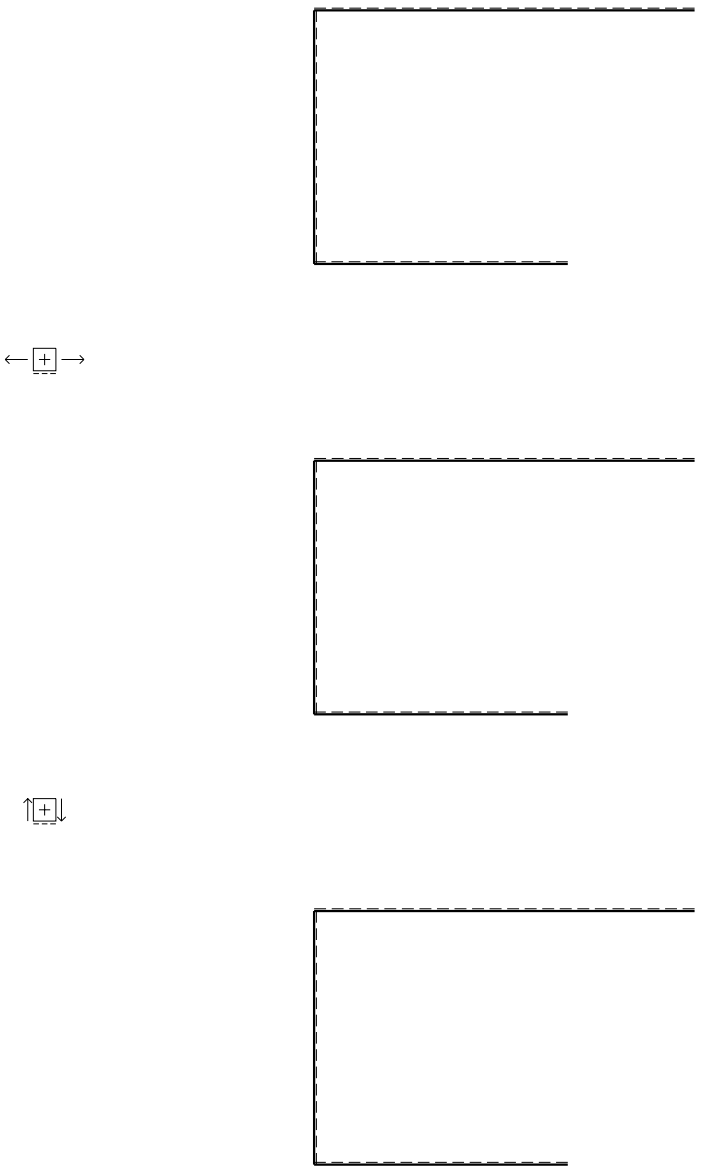
$u_A = 0$	$u_B = 0$	$u_C = 0$	$u_D = 0$
$v_A = 9(Fb^3/EJ)$	$v_B = 171/11(Fb^3/EJ)$	$v_{CCD} = 387/22(Fb^3/EJ)$	$v_D = 171/11(Fb^3/EJ)$
$\varphi_A = 0$	$\varphi_B = 28/11(Fb^2/EJ)$	$\varphi_C = 0$	$\varphi_D = -15/11(Fb^2/EJ)$

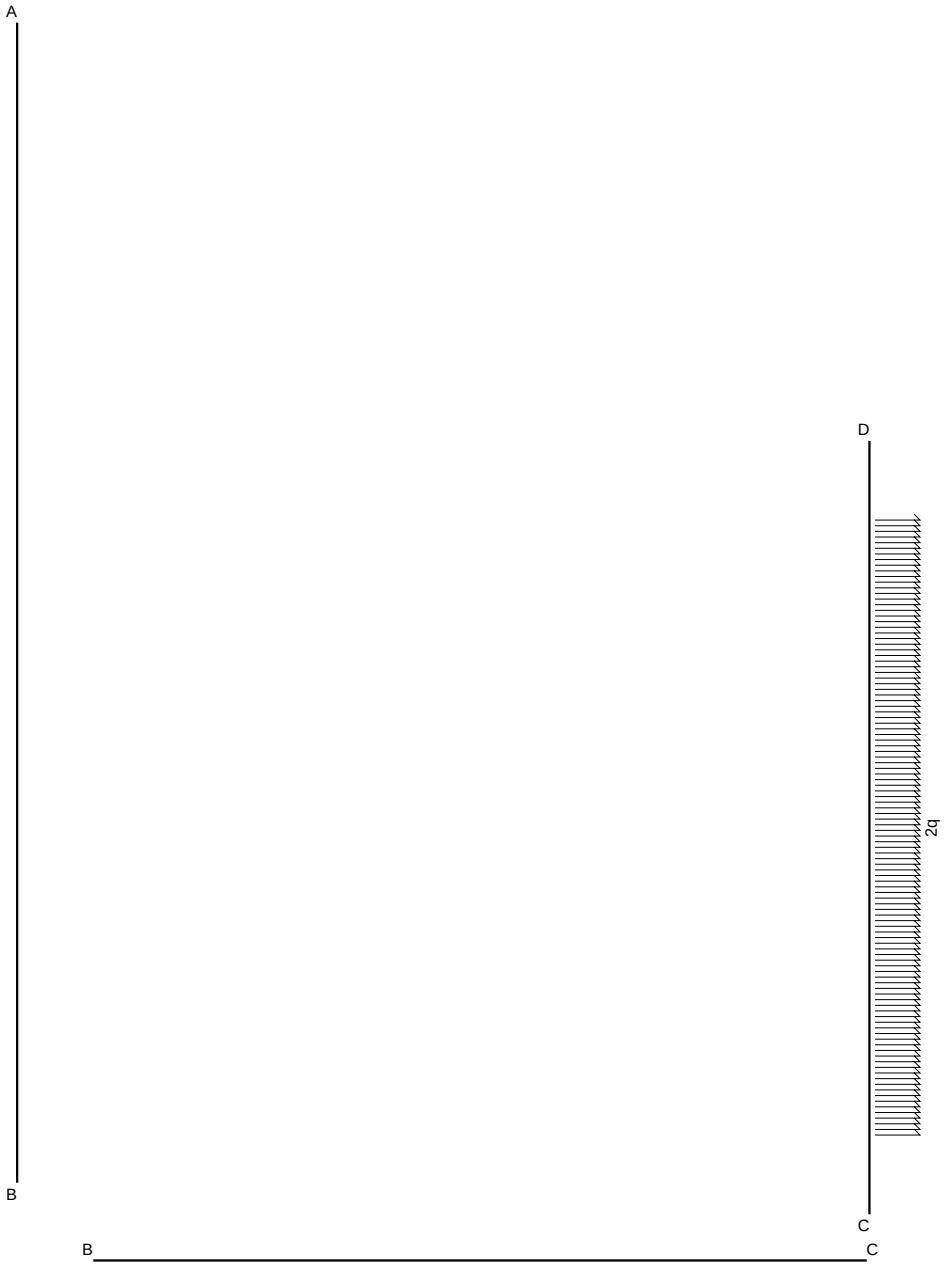


$V_B = -2F$ $\theta_{AB} = \theta = \alpha T/b = bF/E$ $EJ_{AB} = 1/2EJ$ $EJ_{DC} = EJ$

$q_{DC} = -2q = -2F/b$ $k_D = 3EJ/b^3$ $EJ_{CB} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta AB positiva se convessa a destra con inizio A.





DEFORMATA (coordinate locali)
AB y(x)EJ =
CB y(x)EJ =
DC y(x)EJ =

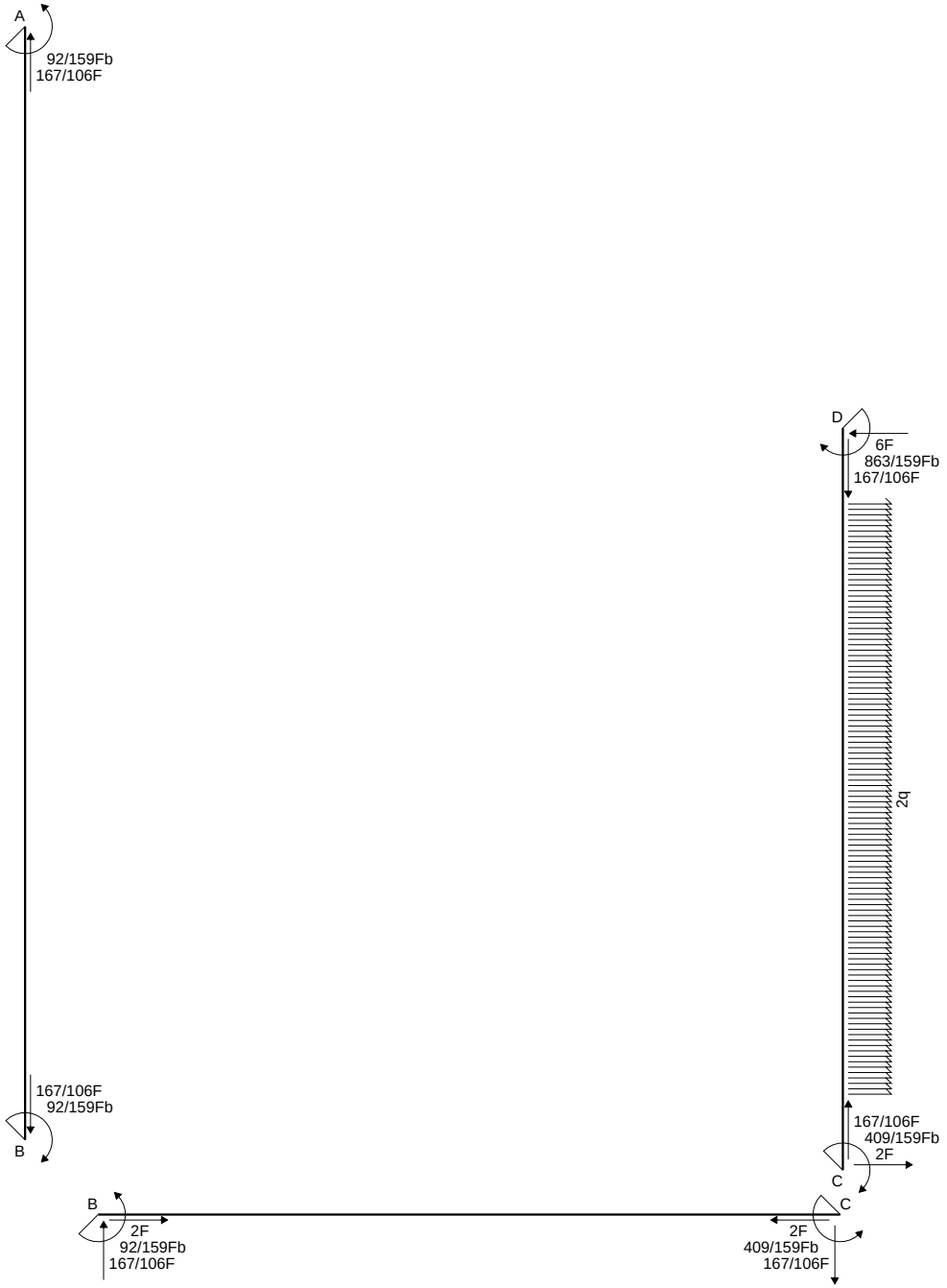
SPOSTAMENTI NODALI

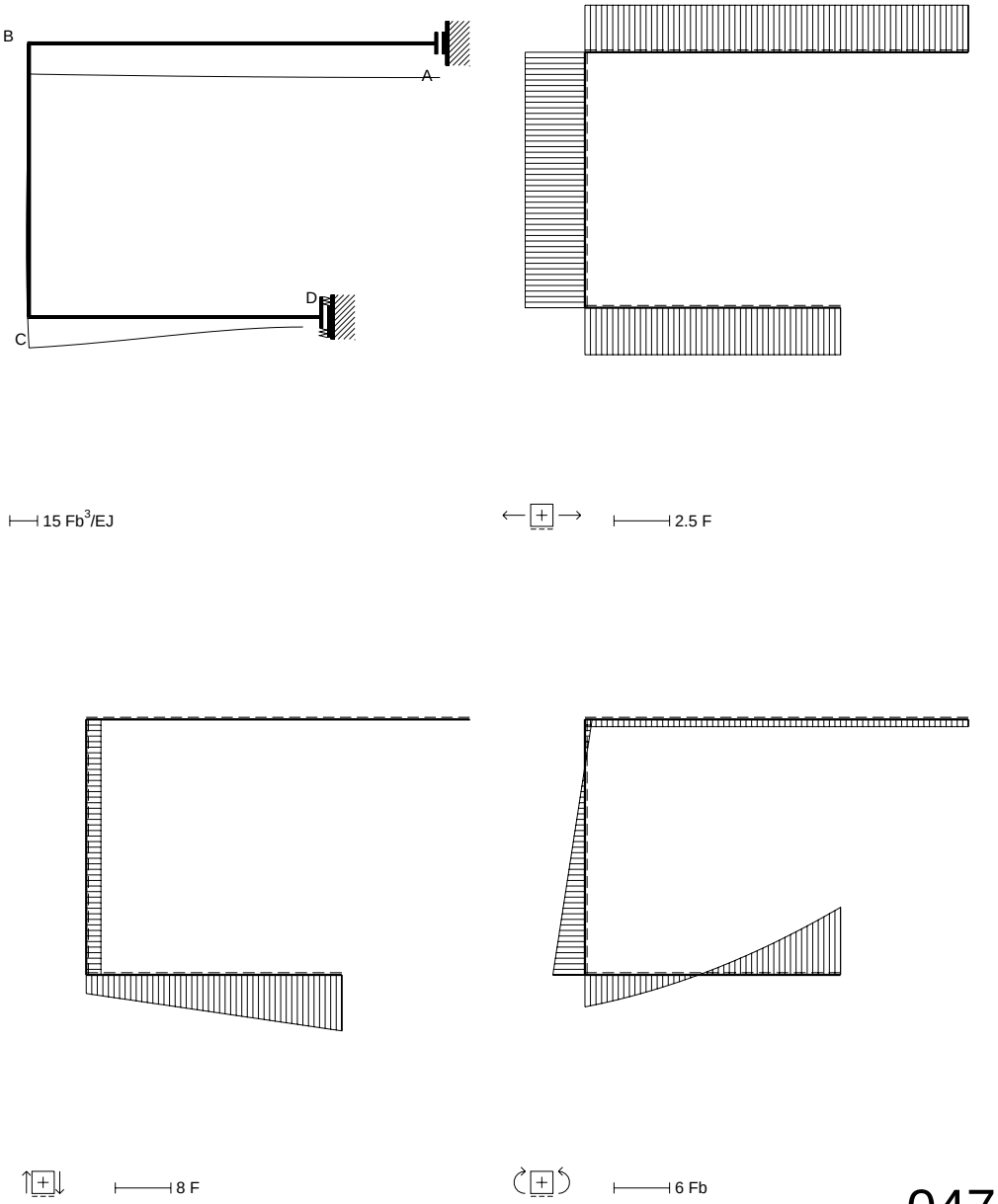
u_A =
v_{AAB} =
φ_A =

u_B =
v_B =
φ_B =

u_C =
v_C =
φ_C =

u_D =
v_D =
φ_D =





REAZIONI IPERSTATICHE

$X = W_{BA}$ $Y = W_{CB}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CB} K_{CB} φ_{DC} K_{DC}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(3b) - y'_{CB}(2b) = 0$

$y'_{CB}(0) - y'_{DC}(2b) = 0$

$y'_{DC}(0) = 0$

$y_{CB}(0) = 0$

$y_{CB}(2b) = 0$

$y_{DC}(0) - 1/3V_D b^3/EJ = 0$

$y_{DC}(2b) - y_{AB}(3b) = 0$

$M_{AB} = X$

$EJy = EJ\theta + 2X$

$EJy = EJ\theta x + 2X + EJ\varphi_{AB}$

$EJy = 1/2EJ\theta x2 + 2Xb + EJ\varphi_{AB}x + EJK_{AB}$

$M_{CB} = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{CB}$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{CB}x + EJK_{CB}$

$M_{DC} = -6Fx + 8Fb + qx^2 - Yb$

$EJy = -6Fx + 8Fb + qx^2 - Yb$

$EJy = -3Fx^2 + 8Fbx + 1/3qx^3 - Yb + EJ\varphi_{DC}$

$EJy = -Fx^3 + 4Fbx2 + 1/12qx^4 - Yb + EJ\varphi_{DC}x + EJK_{DC}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CB}b$	K_{CB}	$\varphi_{DC}b$	K_{DC}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	-1	0	0	0	7	1		0	-3
y'_{CB}	0	0	1	0	-1	0	0	2		20/3	0
y'_{DC}	0	0	0	0	1	0	0	0	=	0	0
y_{CB}	0	0	0	1	0	0	0	0		0	0
y_{BC}	0	0	2	1	0	0	-2/3	-4/3		0	0
y_{DC}	0	0	0	0	0	1	0	0		2	0
y_{CD}	-3	-1	0	0	2	1	-9	-2		-28/3	9/2

Soluzione

		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{CB}b$		242/159
$\varphi_{DC}b$		0
Xb^2/EJ	=	-92/159
K_{CB}		0
Yb^2/EJ		409/159
K_{DC}		2
K_{AB}		731/106

DEFORMATA (coordinate locali)

AB $y(x)EJ = 731/106Fb^3 - 25/318x^2Fb$

BA $y(x)EJ = 328/53Fb^3 + 25/53xFb^2 - 25/318x^2Fb$

CB $y(x)EJ = 242/159xFb^2 - 409/318x^2Fb + 167/636x^3F$

BC $y(x)EJ = 25/53xFb^2 + 46/159x^2Fb - 167/636x^3F$

DC $y(x)EJ = 2Fb^3 + 863/318x^2Fb - x^3F + 1/12x^4q$

CD $y(x)EJ = 328/53Fb^3 - 242/159xFb^2 - 409/318x^2Fb + 1/3x^3F + 1/12x^4q$

SPOSTAMENTI NODALI

$u_A = 0$ $u_B = 0$ $u_C = 0$

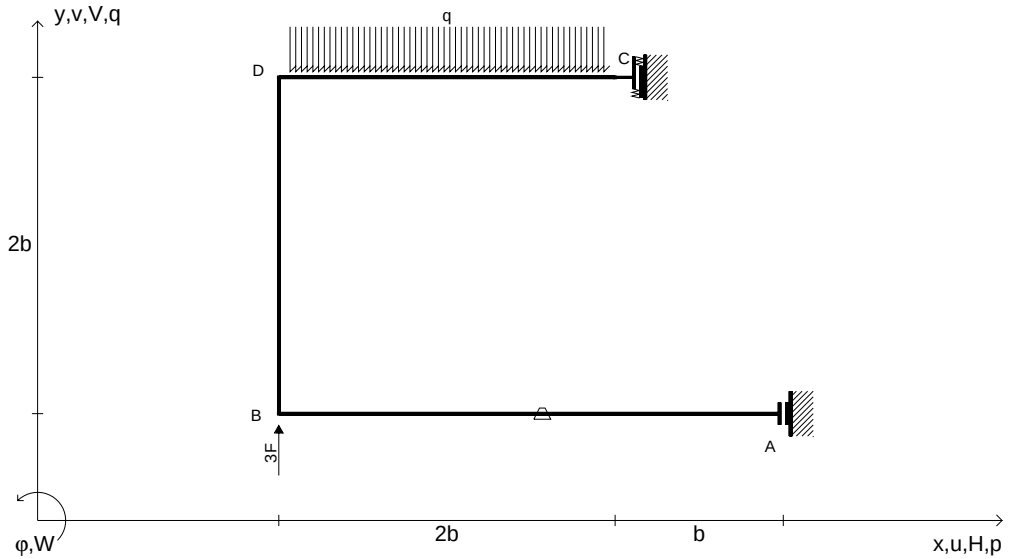
$v_{AAB} = -731/106(Fb^3/EJ)$ $v_B = -328/53(Fb^3/EJ)$ $v_C = -328/53(Fb^3/EJ)$

$\varphi_A = 0$ $\varphi_B = -25/53(Fb^2/EJ)$ $\varphi_C = 242/159(Fb^2/EJ)$

$u_D = 0$

$v_D = -2(Fb^3/EJ)$

$\varphi_D = 0$

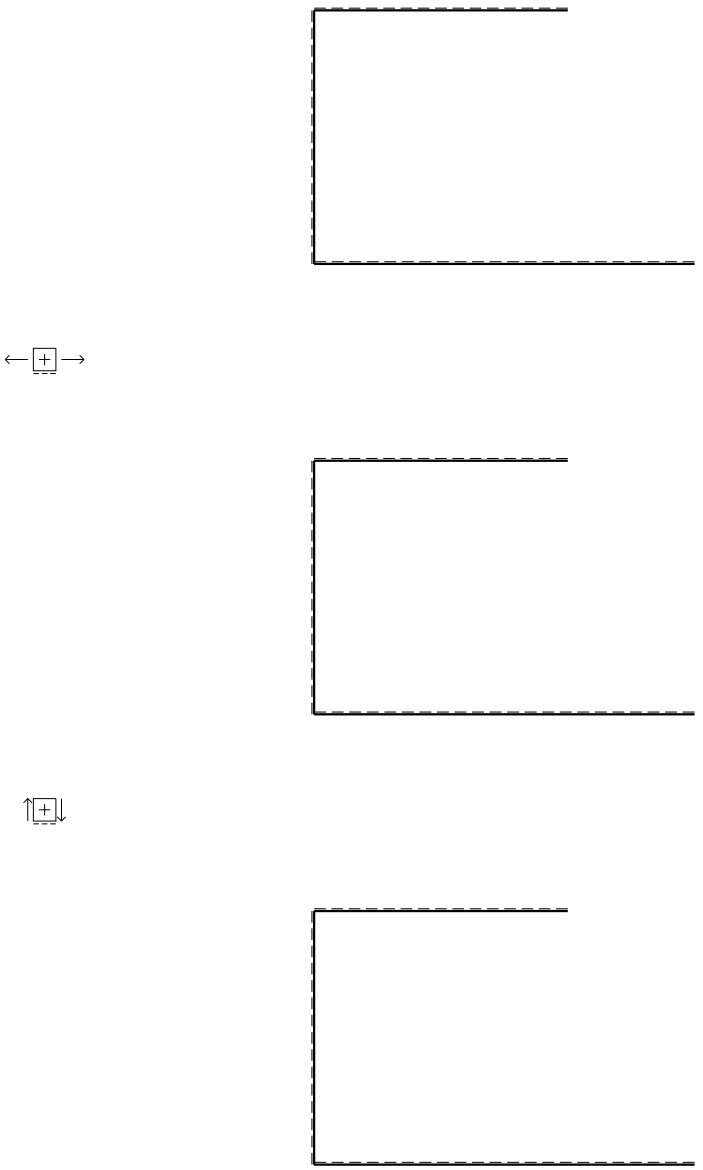


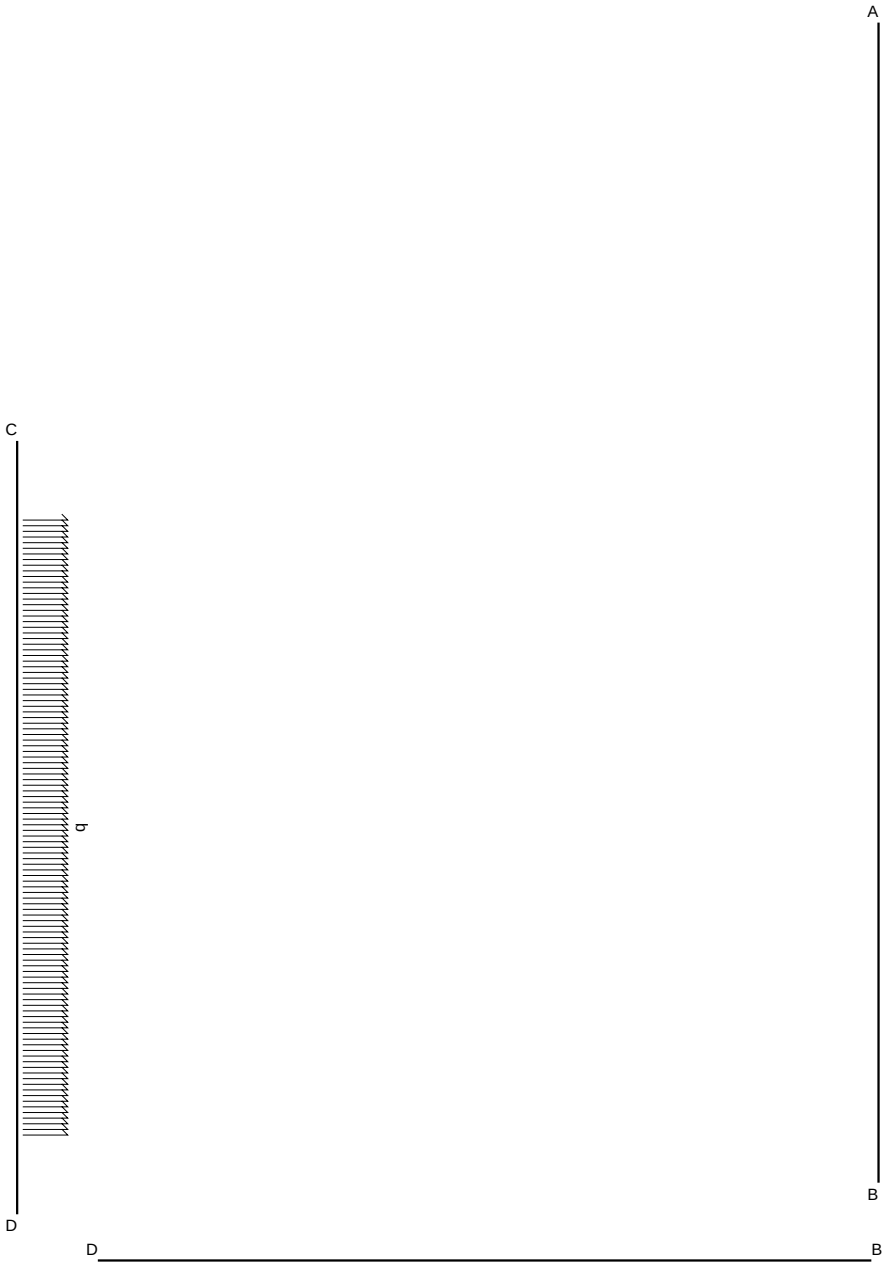
$V_B = 3F$
$q_{CD} = -q = -F/b$
$\theta_{AB} = -\theta = -\alpha T/b = -bF/E$

$k_C = EJ/b^3$
$EJ_{AB} = 2/3EJ$
$EJ_{CD} = EJ$

$EJ_{DB} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta AB positiva se convessa a destra con inizio A.

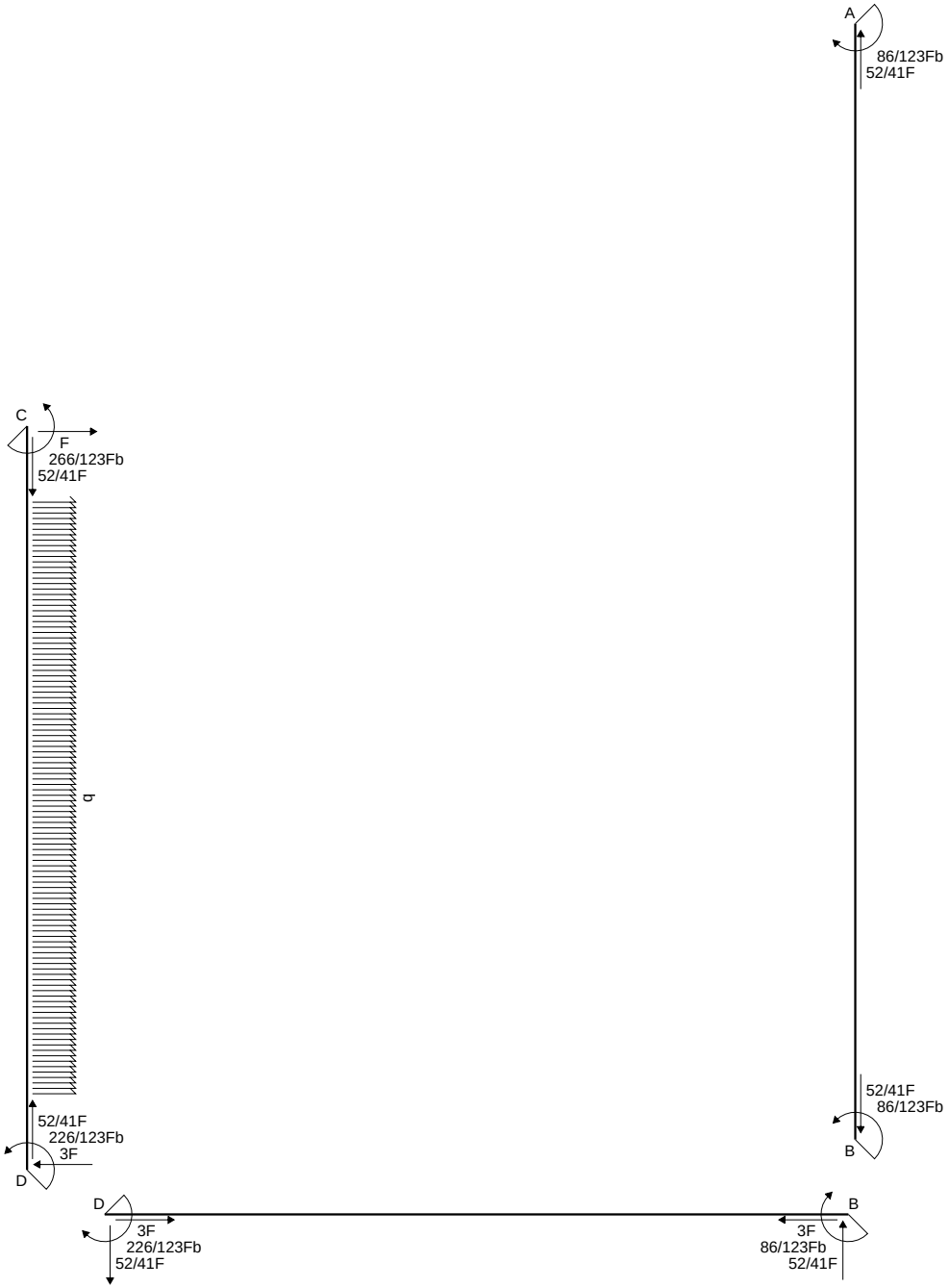


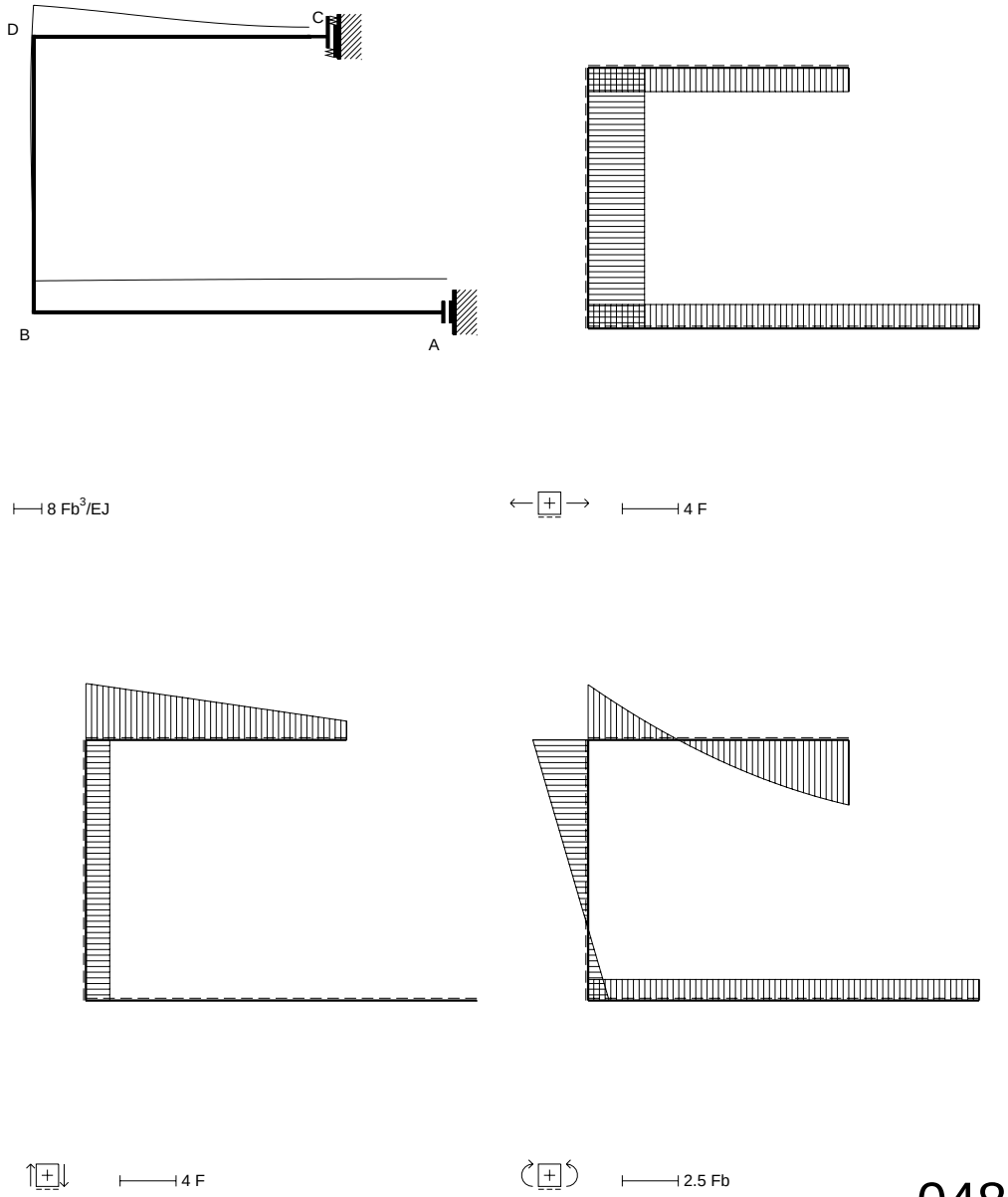


DEFORMATA (coordinate locali)
AB y(x)EJ =
CD y(x)EJ =
DB y(x)EJ =

SPOSTAMENTI NODALI

u_A =	u_B =	u_C =	u_D =
v_{AAB} =	v_B =	v_C =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{BA}$ $Y = W_{DB}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CD} K_{CD} φ_{DB} K_{DB}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(3b) - y'_{DB}(2b) = 0$

$y'_{CD}(0) = 0$

$y'_{CD}(2b) - y'_{DB}(0) = 0$

$y_{CD}(0) - V_C b^3/EJ = 0$

$y_{CD}(2b) - y_{AB}(3b) = 0$

$y_{DB}(0) = 0$

$y_{DB}(2b) = 0$

$M_{AB} = X$

$EJy = -EJ\theta + 3/2X$

$EJy = -EJ\theta x + 3/2X + EJ\varphi_{AB}$

$EJy = -1/2EJ\theta x2 + 3/2Xb + EJ\varphi_{AB}x + EJK_{AB}$

$M_{CD} = Fx - 4Fb + 1/2qx^2 - Yb$

$EJy = Fx - 4Fb + 1/2qx^2 - Yb$

$EJy = 1/2Fx^2 - 4Fbx + 1/6qx^3 - Yb + EJ\varphi_{CD}$

$EJy = 1/6Fx^3 - 2Fbx2 + 1/24qx^4 - Yb + EJ\varphi_{CD}x + EJK_{CD}$

$M_{DB} = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{DB}$

$EJy = -1/2X + 1/2Y - Yb + EJ\varphi_{DB}x + EJK_{DB}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CD}b$	K_{CD}	$\varphi_{DB}b$	K_{DB}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	0	0	-1	0	11/2	1		0	3
y'_{CD}	0	0	1	0	0	0	0	0		0	0
y'_{DC}	0	0	1	0	-1	0	0	-2	=	14/3	0
y_{CD}	0	0	0	1	0	0	0	0		-1	0
y_{DC}	-3	-1	2	1	0	0	-27/4	-2		6	-9/2
y_{DB}	0	0	0	0	0	1	0	0		0	0
y_{BD}	0	0	0	0	2	1	-2/3	-4/3		0	0

Soluzione

		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{DB}b$		-122/123
$\varphi_{CD}b$		0
Xb^2/EJ	=	86/123
K_{CD}		-1
K_{AB}		-436/123
K_{DB}		0
Yb^2/EJ		-226/123

DEFORMATA (coordinate locali)

AB $y(x)EJ = -436/123Fb^3 + 1/41x^2Fb$

BA $y(x)EJ = -409/123Fb^3 - 6/41xFb^2 + 1/41x^2Fb$

CD $y(x)EJ = -Fb^3 - 133/123x^2Fb + 1/6x^3F + 1/24x^4q$

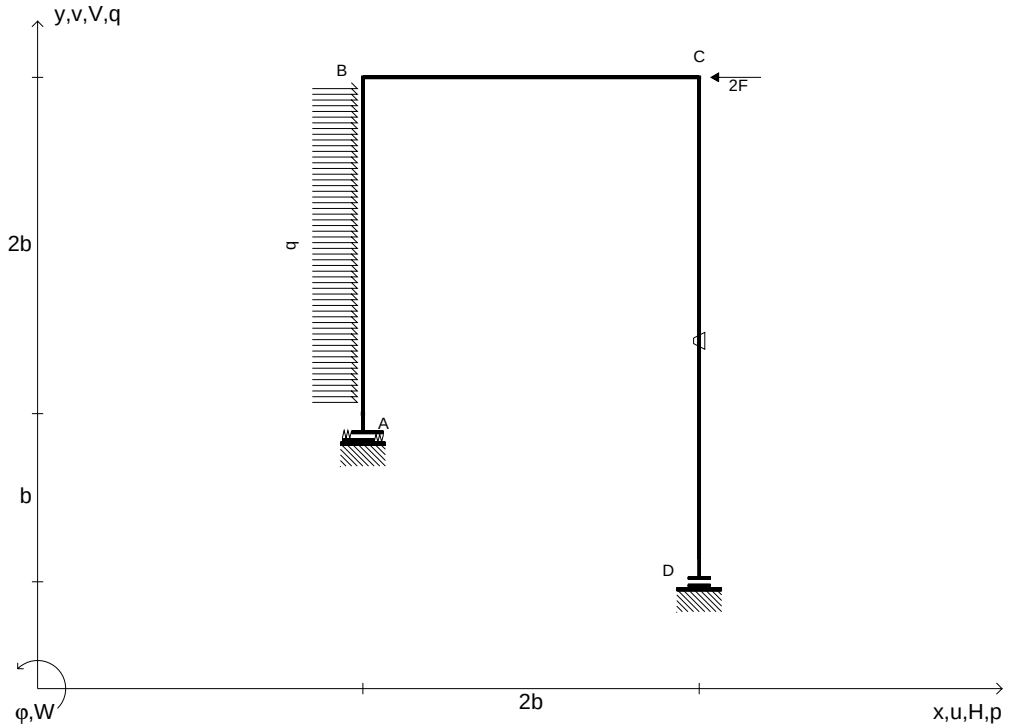
DC $y(x)EJ = -409/123Fb^3 + 122/123xFb^2 + 113/123x^2Fb - 1/2x^3F + 1/24x^4q$

DB $y(x)EJ = -122/123xFb^2 + 113/123x^2Fb - 26/123x^3F$

BD $y(x)EJ = -6/41xFb^2 - 43/123x^2Fb + 26/123x^3F$

SPOSTAMENTI NODALI

$u_A = 0$	$u_B = 0$	$u_C = 0$	$u_D = 0$
$v_{AAB} = 436/123(Fb^3/EJ)$	$v_B = 409/123(Fb^3/EJ)$	$v_C = (Fb^3/EJ)$	$v_D = 409/123(Fb^3/EJ)$
$\varphi_A = 0$	$\varphi_B = 6/41(Fb^2/EJ)$	$\varphi_C = 0$	$\varphi_D = -122/123(Fb^2/EJ)$

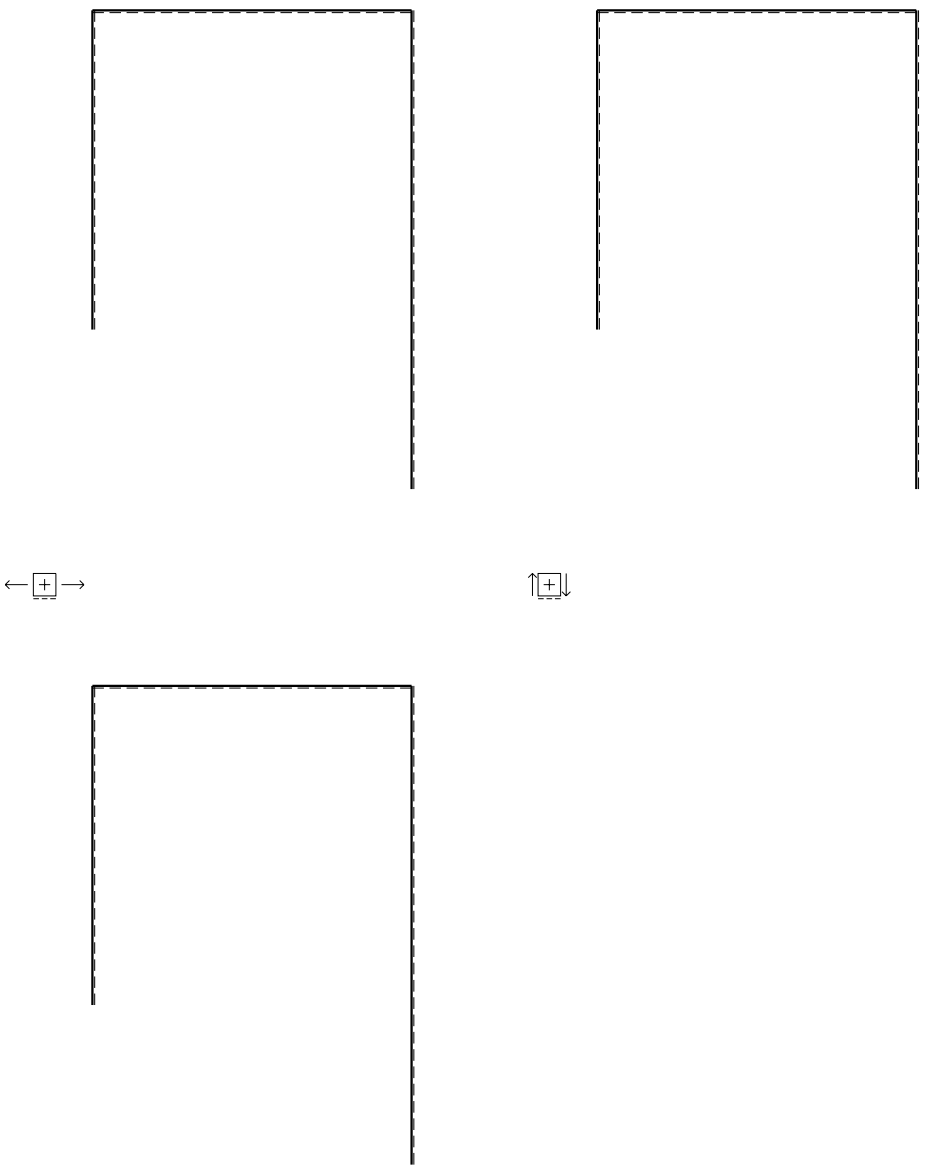


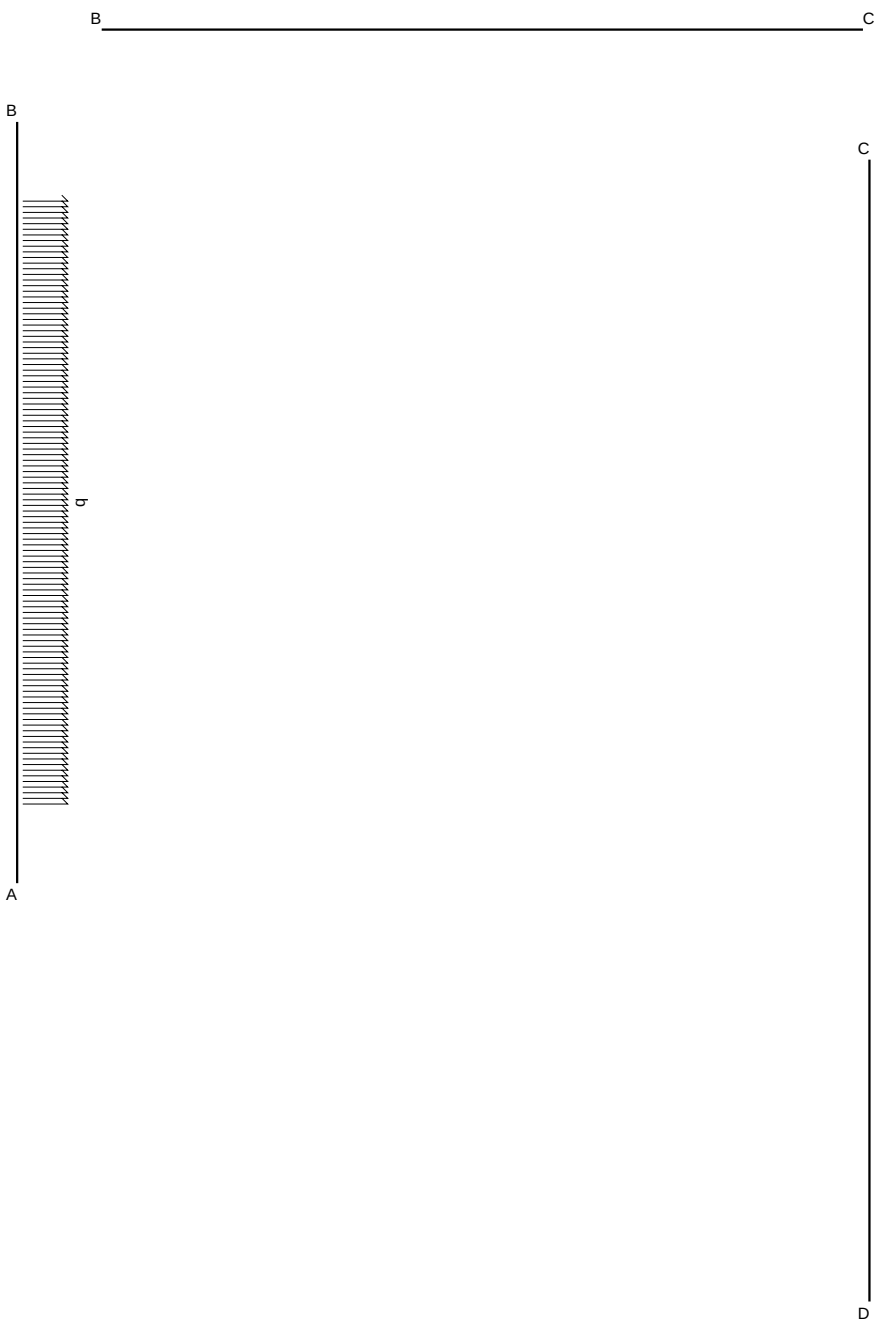
$H_C = -2F$
$p_{AB} = q = F/b$
$\theta_{DC} = 3\theta = 3\alpha T/b = 3bF/E$

$k_A = 3EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{BC} = 3/4EJ$

$EJ_{DC} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta DC positiva se convessa a destra con inizio D.

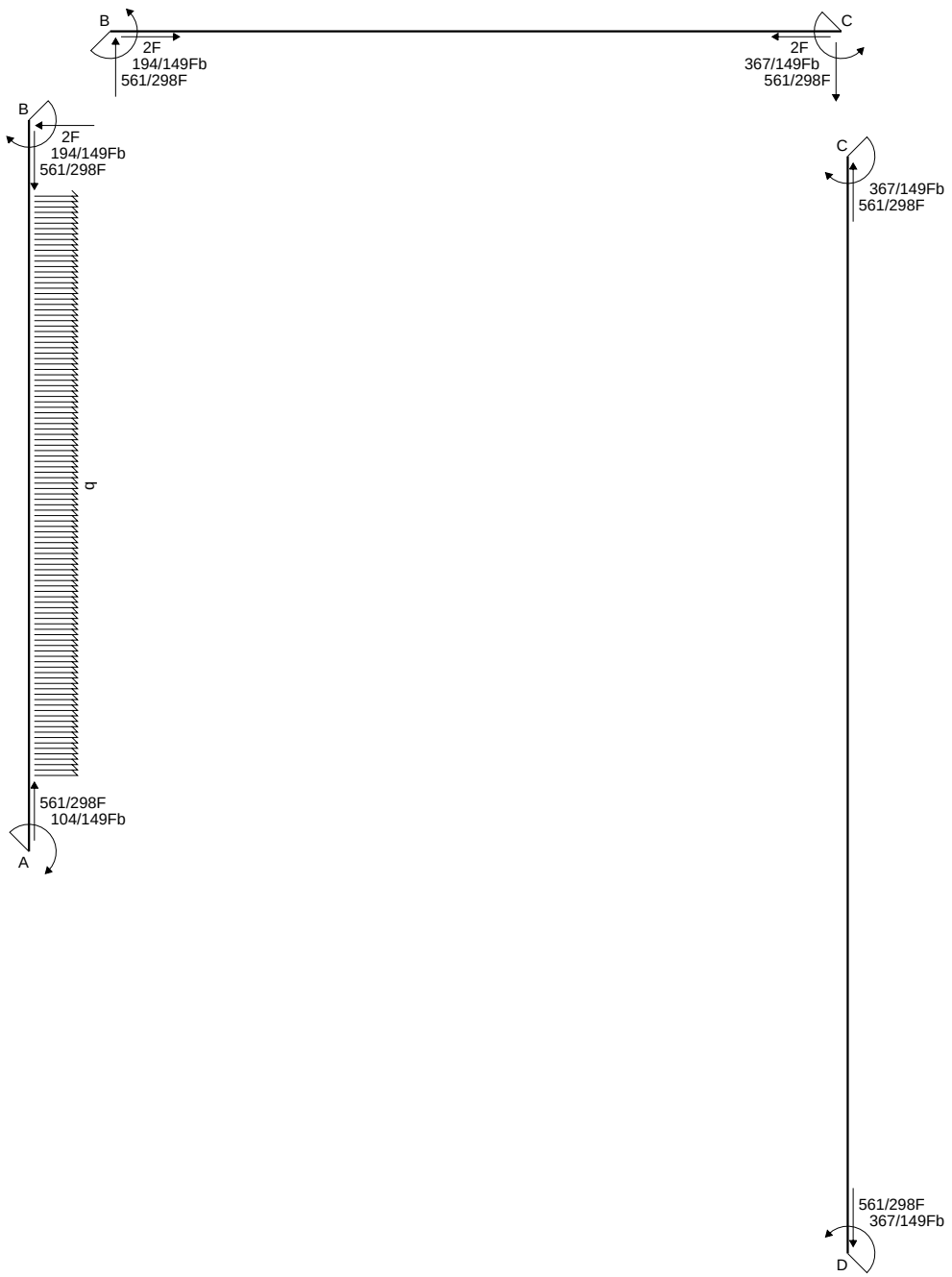


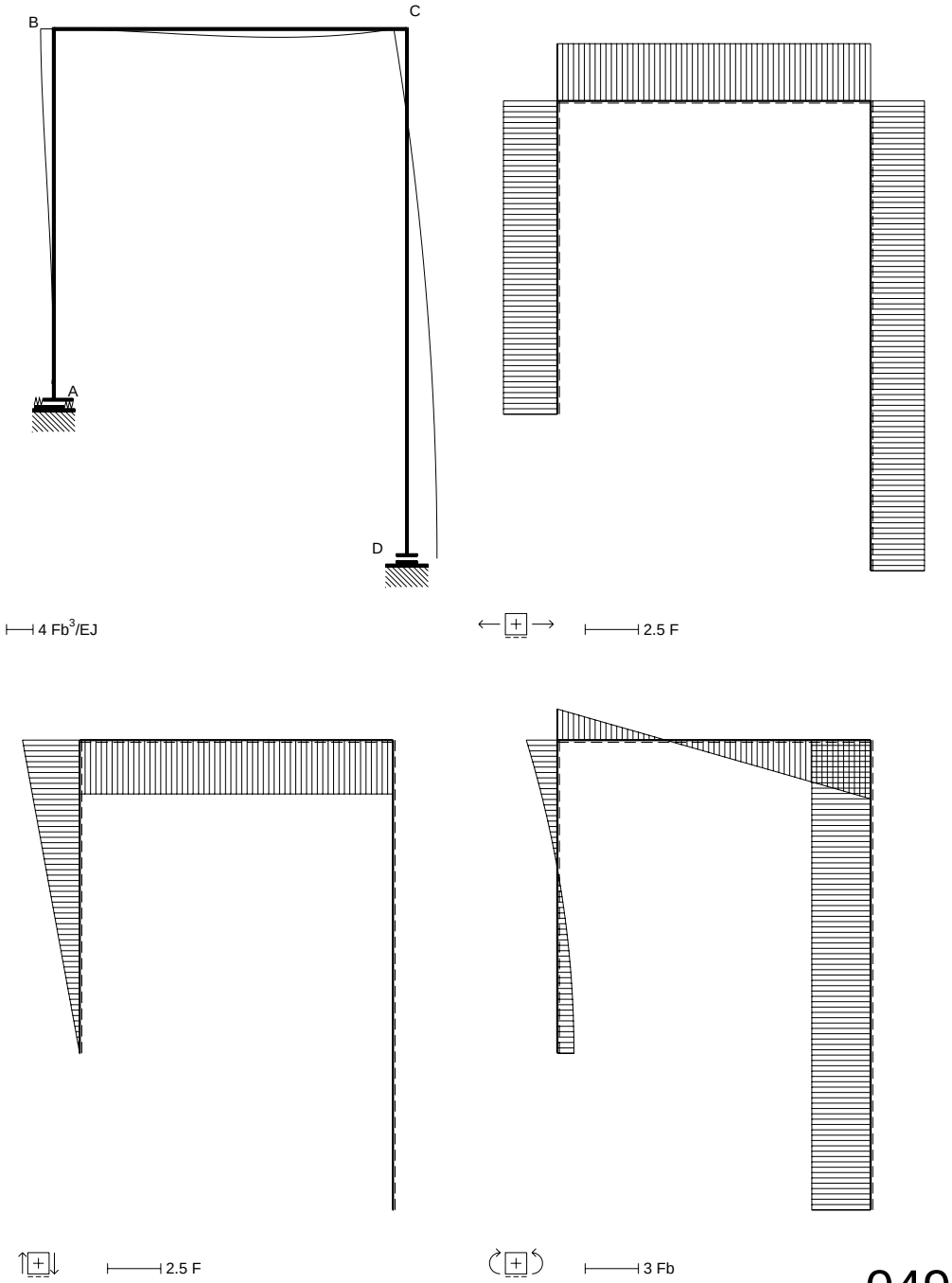


DEFORMATA (coordinate locali)
AB y(x)EJ =
BC y(x)EJ =
DC y(x)EJ =

SPOSTAMENTI NODALI

u_A =	u_B =	u_C =	u_{DDC} =
v_A =	v_B =	v_C =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{BC}$ $Y = W_{CD}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{BC} K_{BC} φ_{DC} K_{DC}

Relazioni di congruenza

$y'_{AB}(0) = 0$
$y'_{AB}(2b) - y'_{BC}(0) = 0$
$y'_{BC}(2b) - y'_{DC}(3b) = 0$
$y'_{DC}(0) = 0$
$y_{AB}(0) - 1/3H_A b^3/EJ = 0$
$y_{BC}(0) = 0$
$y_{BC}(2b) = 0$
$y_{DC}(3b) - y_{AB}(2b) = 0$

$M_{AB} = 2Fb -1/2qx^2 -Xb$
$EJy = 2Fb -1/2qx^2 -Xb$
$EJy = 2Fbx -1/6qx^3 -Xb +EJ\varphi_{AB}$
$EJy = Fbx2 -1/24qx^4 -Xb +EJ\varphi_{AB}x +EJK_{AB}$

$M_{BC} = 1/2X -Xb -1/2Y$
$EJy = 2/3X -4/3Xb -2/3Y$
$EJy = 2/3X -4/3Xb -2/3Y +EJ\varphi_{BC}$
$EJy = 2/3X -4/3Xb -2/3Y +EJ\varphi_{BC}x +EJK_{BC}$

$M_{DC} = Yb$
$EJy = 3EJ\theta +Yb$
$EJy = 3EJ\theta x +Yb +EJ\varphi_{DC}$
$EJy = 3/2EJ\theta x2 +Yb +EJ\varphi_{DC}x +EJK_{DC}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{BC}b$	K_{BC}	$\varphi_{DC}b$	K_{DC}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	-1	0	0	0	-2	0		-8/3	0
y'_{CB}	0	0	1	0	-1	0	-4/3	-13/3		0	9
y'_{DC}	0	0	0	0	1	0	0	0	=	0	0
y_{AB}	0	1	0	0	0	0	0	0		0	0
y_{BC}	0	0	0	1	0	0	0	0		0	0
y_{CB}	0	0	2	1	0	0	-16/9	-8/9		0	0
y_{CD}	-2	-1	0	0	3	1	2	9/2		10/3	-27/2

Soluzione

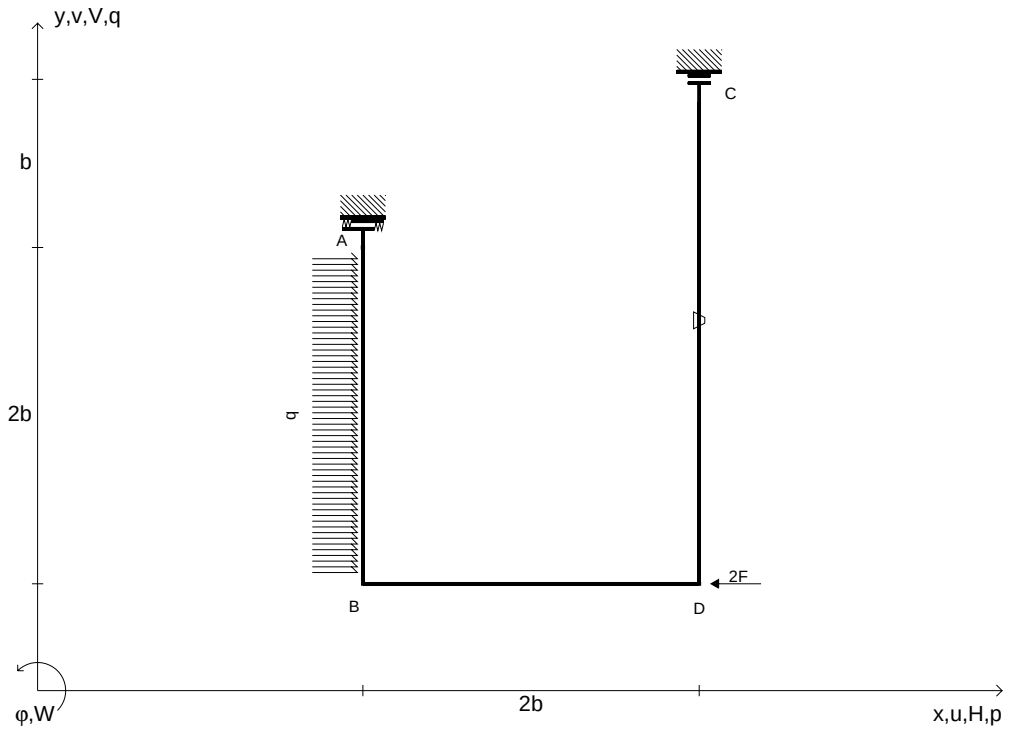
		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{BC}b$		28/447
$\varphi_{DC}b$		0
Xb^2/EJ	=	194/149
K_{AB}		0
K_{BC}		0
Yb^2/EJ		-367/149
K_{DC}		-754/447

DEFORMATA (coordinate locali)

AB $y(x)EJ = 52/149x^2Fb -1/24x^4q$
BA $y(x)EJ = 326/447Fb^3 -28/447xFb^2 -97/149x^2Fb +1/3x^3F -1/24x^4q$
BC $y(x)EJ = 28/447xFb^2 -388/447x^2Fb +187/447x^3F$
CB $y(x)EJ = -240/149xFb^2 +734/447x^2Fb -187/447x^3F$
DC $y(x)EJ = -754/447Fb^3 +40/149x^2Fb$
CD $y(x)EJ = 326/447Fb^3 -240/149xFb^2 +40/149x^2Fb$

SPOSTAMENTI NODALI

$u_A = 0$	$u_B = -326/447(Fb^3/EJ)$	$u_C = -326/447(Fb^3/EJ)$	$u_{DDC} = 754/447(Fb^3/EJ)$
$v_A = 0$	$v_B = 0$	$v_C = 0$	$v_D = 0$
$\varphi_A = 0$	$\varphi_B = 28/447(Fb^2/EJ)$	$\varphi_C = 240/149(Fb^2/EJ)$	$\varphi_D = 0$

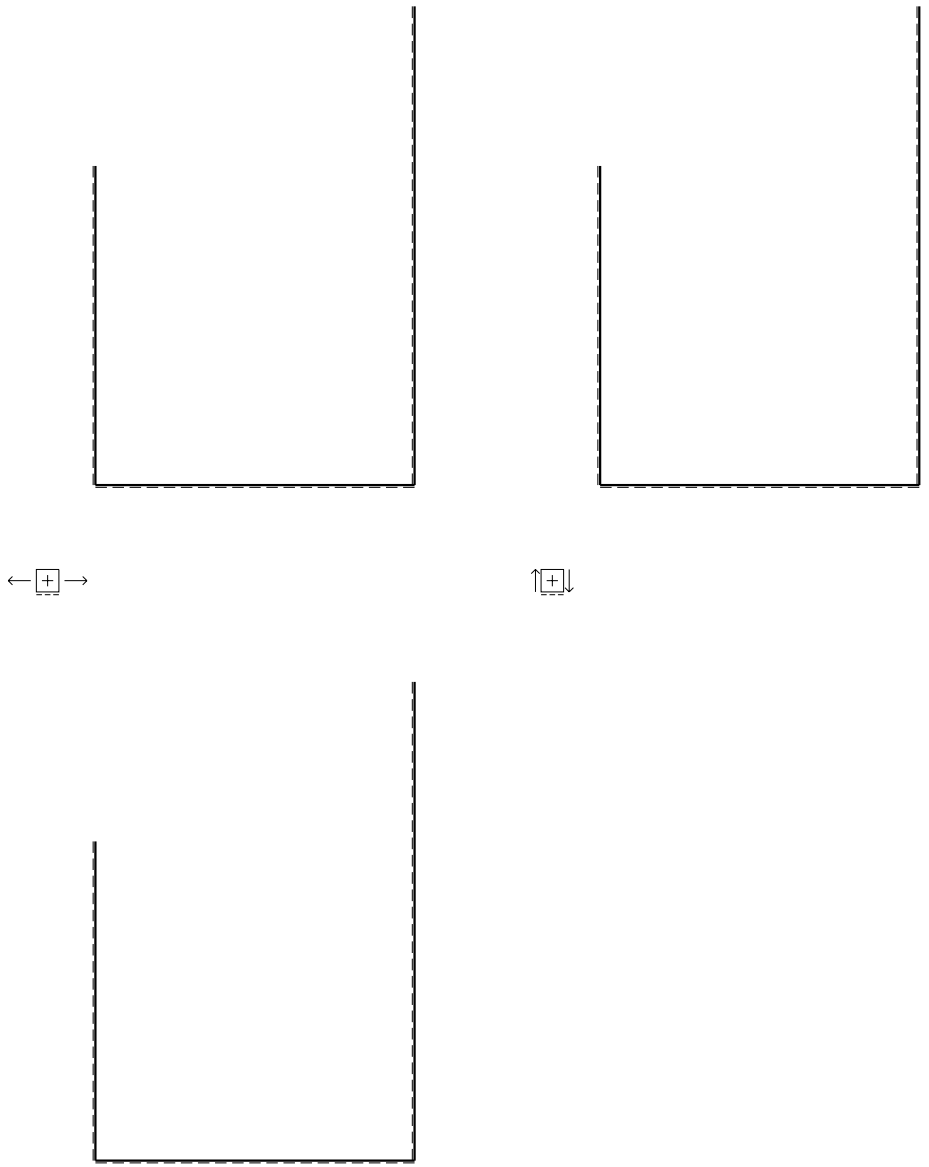


$H_D = -2F$
$p_{AB} = q = F/b$
$\theta_{CD} = 3\theta = 3\alpha T/b = 3bF/E$

$k_A = 3EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{CD} = EJ$

$EJ_{BD} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta CD positiva se convessa a destra con inizio C.



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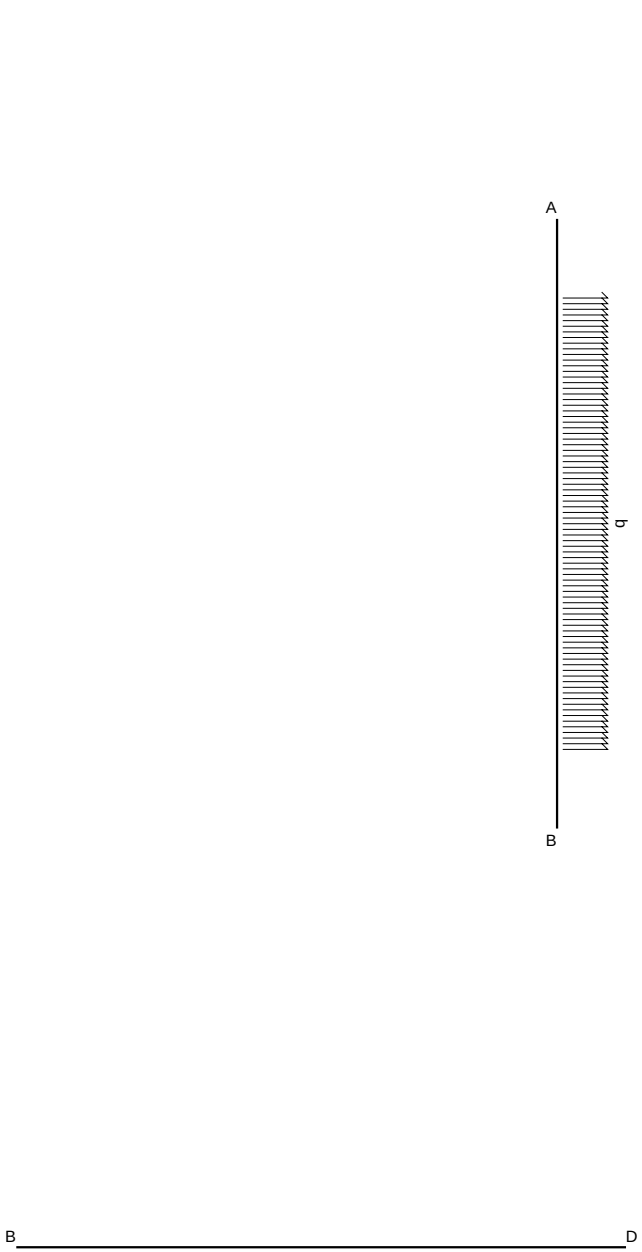
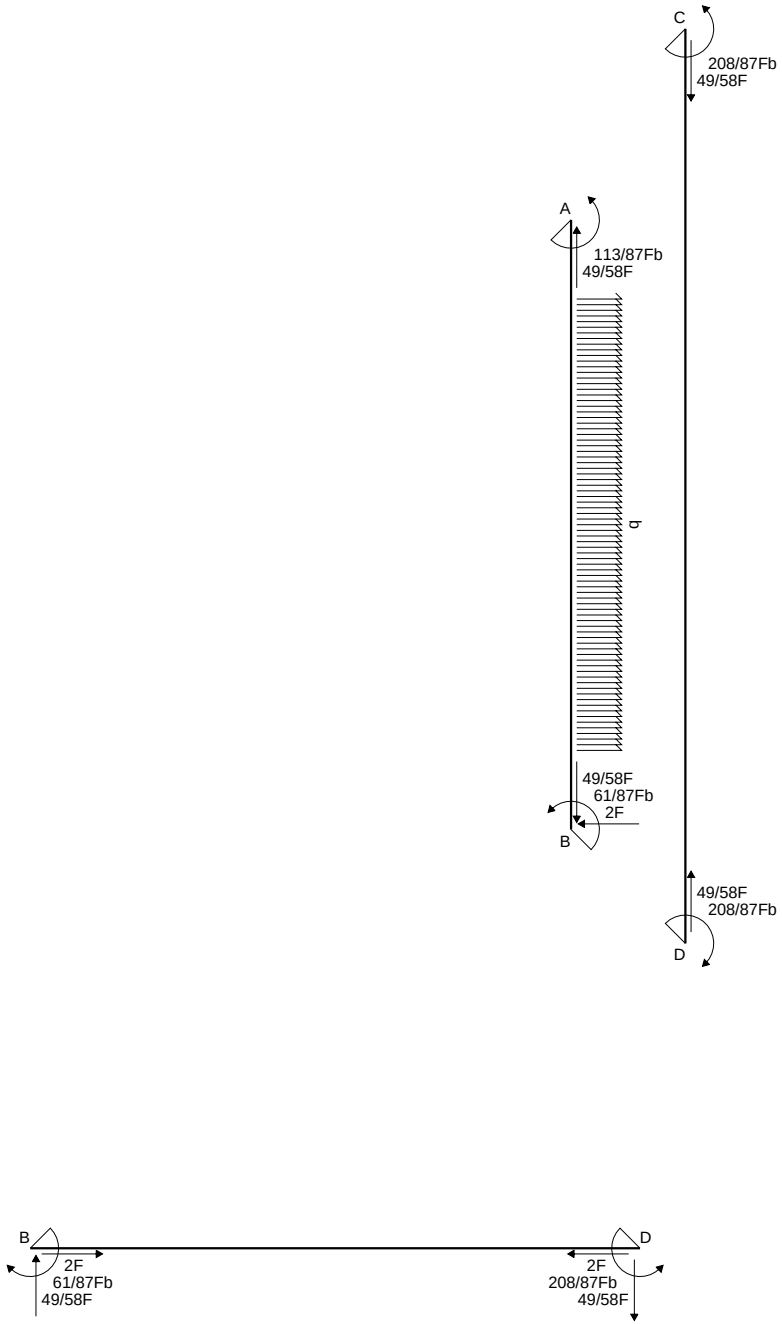
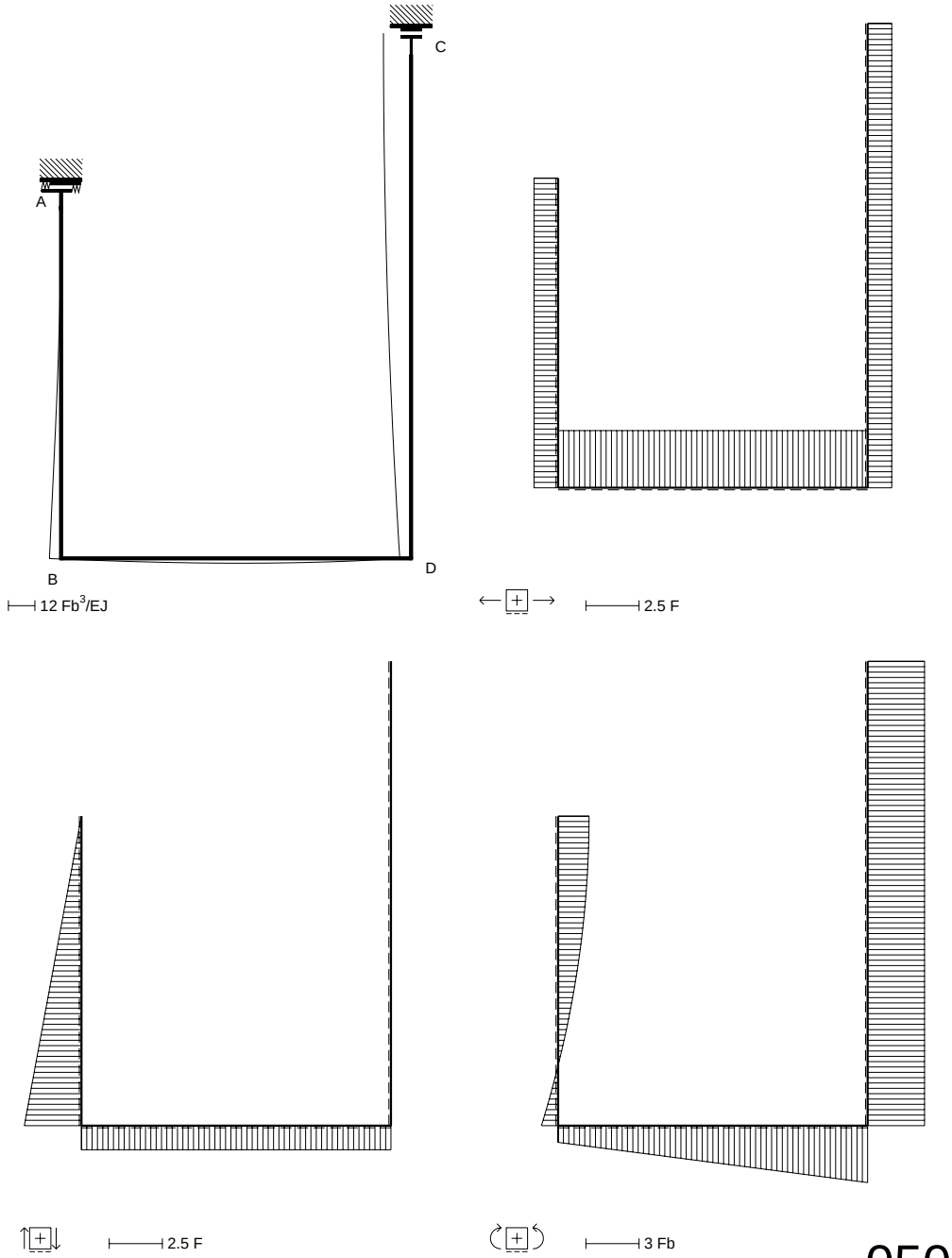


DEFORMATA (coordinate locali)
AB y(x)EJ =
CD y(x)EJ =
BD y(x)EJ =

SPOSTAMENTI NODALI

u_A =	u_B =	u_{CCD} =	u_D =
v_A =	v_B =	v_C =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{DC}$ $Y = W_{BD}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CD} K_{CD} φ_{BD} K_{BD}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(2b) - y'_{BD}(0) = 0$

$y'_{CD}(0) = 0$

$y'_{CD}(3b) - y'_{BD}(2b) = 0$

$y_{AB}(0) + 1/3H_A b^3/EJ = 0$

$y_{CD}(3b) - y_{AB}(2b) = 0$

$y_{BD}(0) = 0$

$y_{BD}(2b) = 0$

$M_{AB} = -2Fb +1/2qx^2 -Y$

$EJy = -2Fb +1/2qx^2 -Y$

$EJy = -2Fbx +1/6qx^3 -Y +EJ\varphi_{AB}$

$EJy = -Fbx2 +1/24qx^4 -Yb +EJ\varphi_{AB}x +EJK_{AB}$

$M_{CD} = Xb$

$EJy = 3EJ\theta +Xb$

$EJy = 3EJ\theta x +Xb +EJ\varphi_{CD}$

$EJy = 3/2EJ\theta x2 +Xb +EJ\varphi_{CD}x +EJK_{CD}$

$M_{BD} = -1/2X +1/2Y -Yb$

$EJy = -1/2X +1/2Y -Yb$

$EJy = -1/2X +1/2Y -Yb +EJ\varphi_{BD}$

$EJy = -1/2X +1/2Y -Yb +EJ\varphi_{BD}x +EJK_{BD}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CD}b$	K_{CD}	$\varphi_{BD}b$	K_{BD}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	0	0	-1	0	0	-2		8/3	0
y'_{CD}	0	0	1	0	0	0	0	0		0	0
y'_{DC}	0	0	1	0	-1	0	4	1	=	0	-9
y_{AB}	0	1	0	0	0	0	0	0		0	0
y_{DC}	-2	-1	3	1	0	0	9/2	2		-10/3	-27/2
y_{BD}	0	0	0	0	0	1	0	0		0	0
y_{DB}	0	0	0	0	2	1	-2/3	-4/3		0	0

Soluzione

		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{BD}b$		-110/87
$\varphi_{CD}b$		0
Xb^2/EJ	=	-208/87
K_{AB}		0
K_{CD}		-271/58
K_{BD}		0
Yb^2/EJ		-61/87

DEFORMATA (coordinate locali)

AB $y(x)EJ = -113/174x^2Fb +1/24x^4q$

BA $y(x)EJ = -56/29Fb^3 +110/87xFb^2 +61/174x^2Fb -1/3x^3F +1/24x^4q$

CD $y(x)EJ = -271/58Fb^3 +53/174x^2Fb$

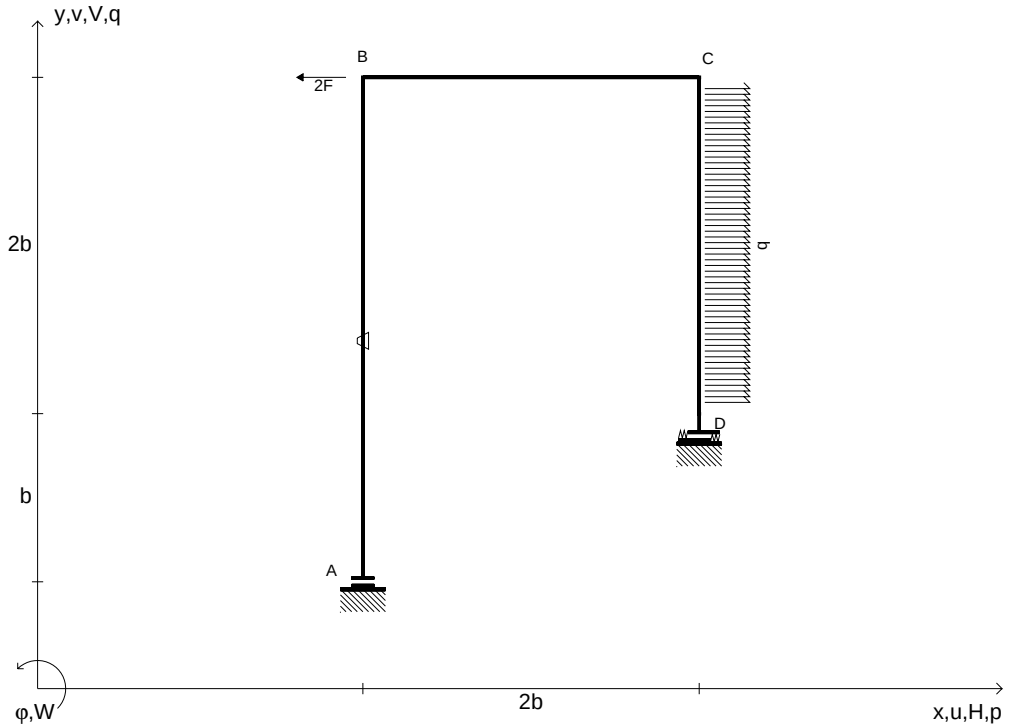
DC $y(x)EJ = -56/29Fb^3 -53/29xFb^2 +53/174x^2Fb$

BD $y(x)EJ = -110/87xFb^2 +61/174x^2Fb +49/348x^3F$

DB $y(x)EJ = -53/29xFb^2 +104/87x^2Fb -49/348x^3F$

SPOSTAMENTI NODALI

$u_A = 0$	$u_B = -56/29(Fb^3/EJ)$	$u_{CCD} = -271/58(Fb^3/EJ)$	$u_D = -56/29(Fb^3/EJ)$
$v_A = 0$	$v_B = 0$	$v_C = 0$	$v_D = 0$
$\varphi_A = 0$	$\varphi_B = -110/87(Fb^2/EJ)$	$\varphi_C = 0$	$\varphi_D = 53/29(Fb^2/EJ)$

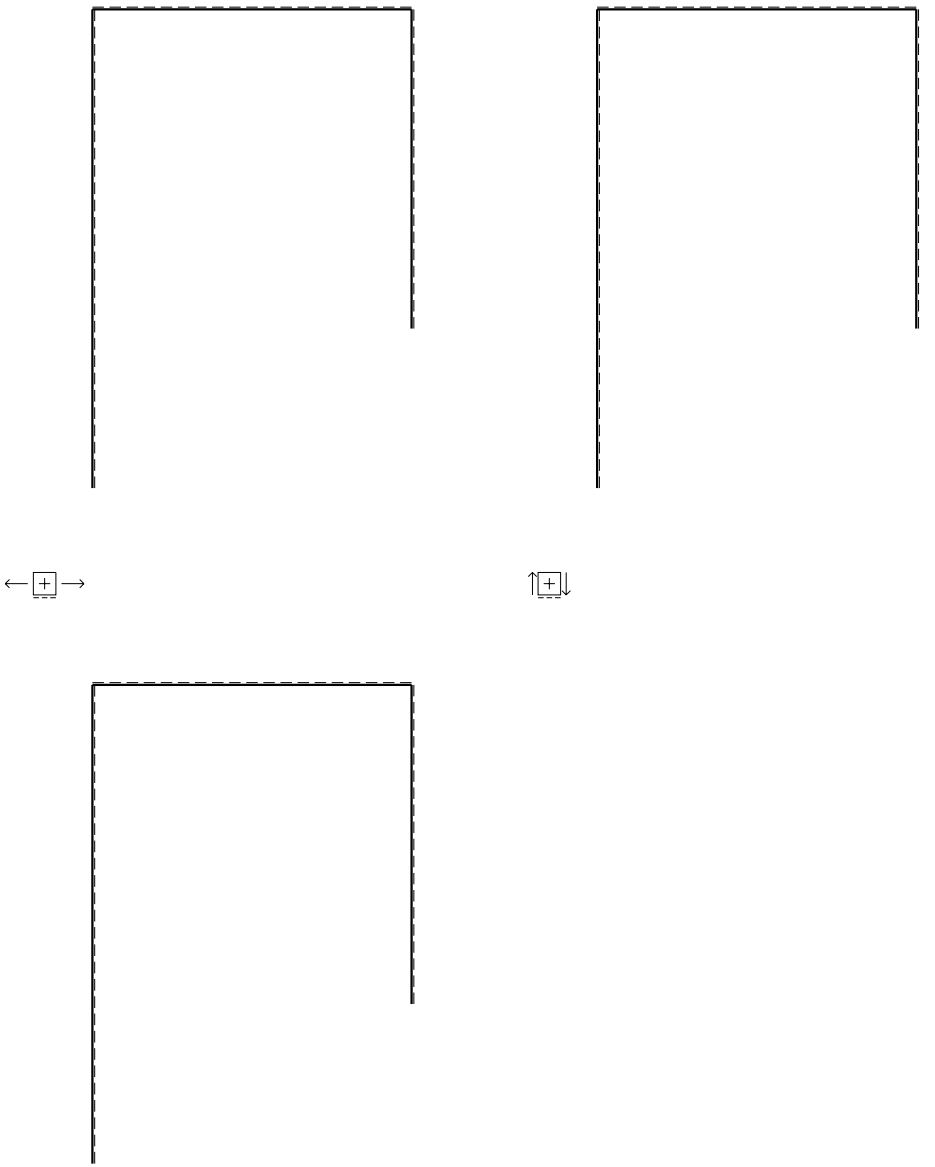


$H_B = -2F$
$p_{DC} = q = F/b$
$\theta_{AB} = 3\theta = 3\alpha T/b = 3bF/E$

$k_D = 3EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{CB} = 3/2EJ$

$EJ_{DC} = EJ$

Dato: pattino in A con molla long. // al pattino.
Svolgere l'analisi cinematica.
Risolvere con PLV e LE.
Tracciare la deformata elastica.
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.
Esprimere la linea elastica delle aste.
Calcolare spostamento e rotazione di tutti i nodi.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Curvatura θ asta AB positiva se convessa a destra con inizio A.



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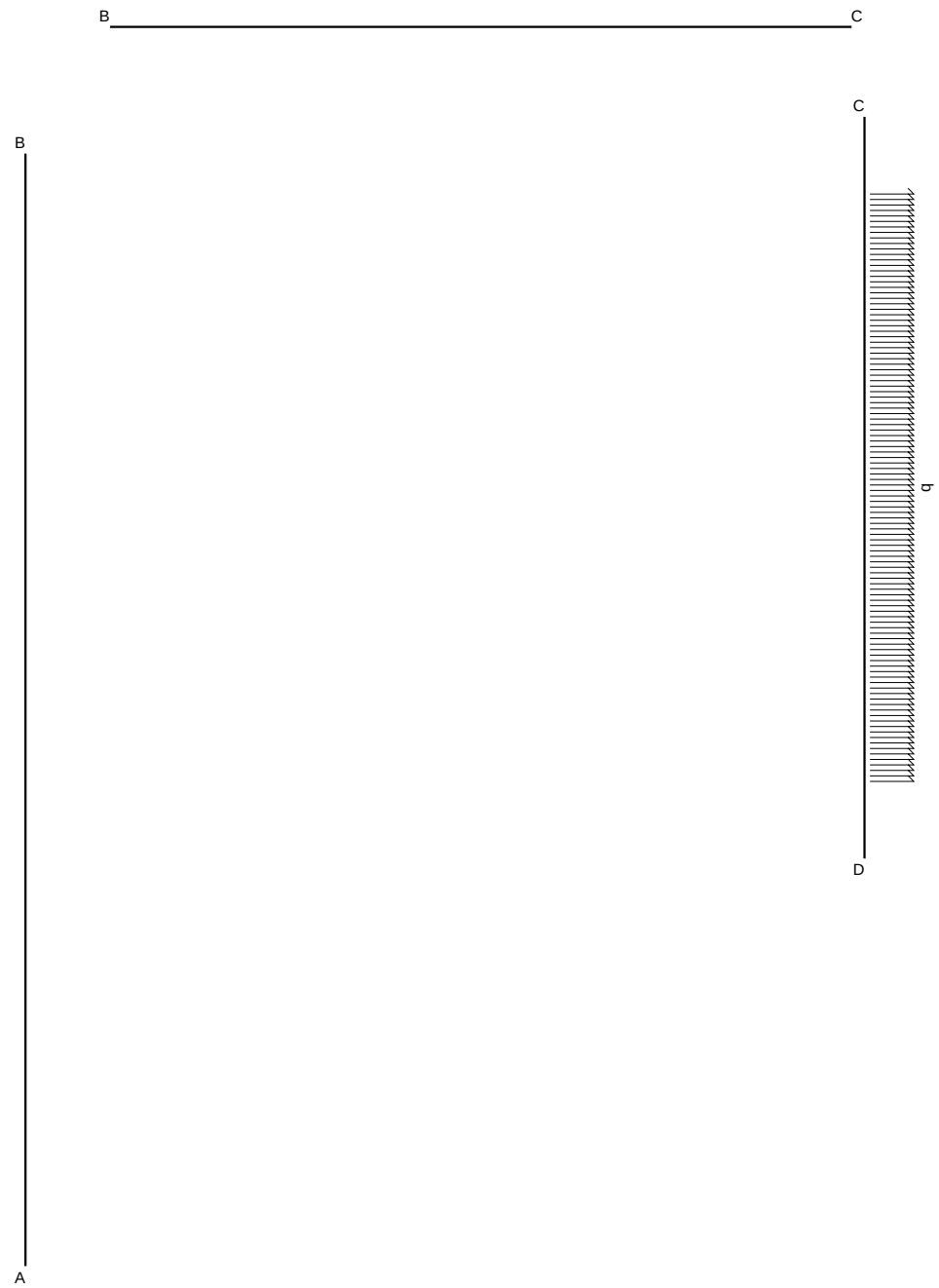
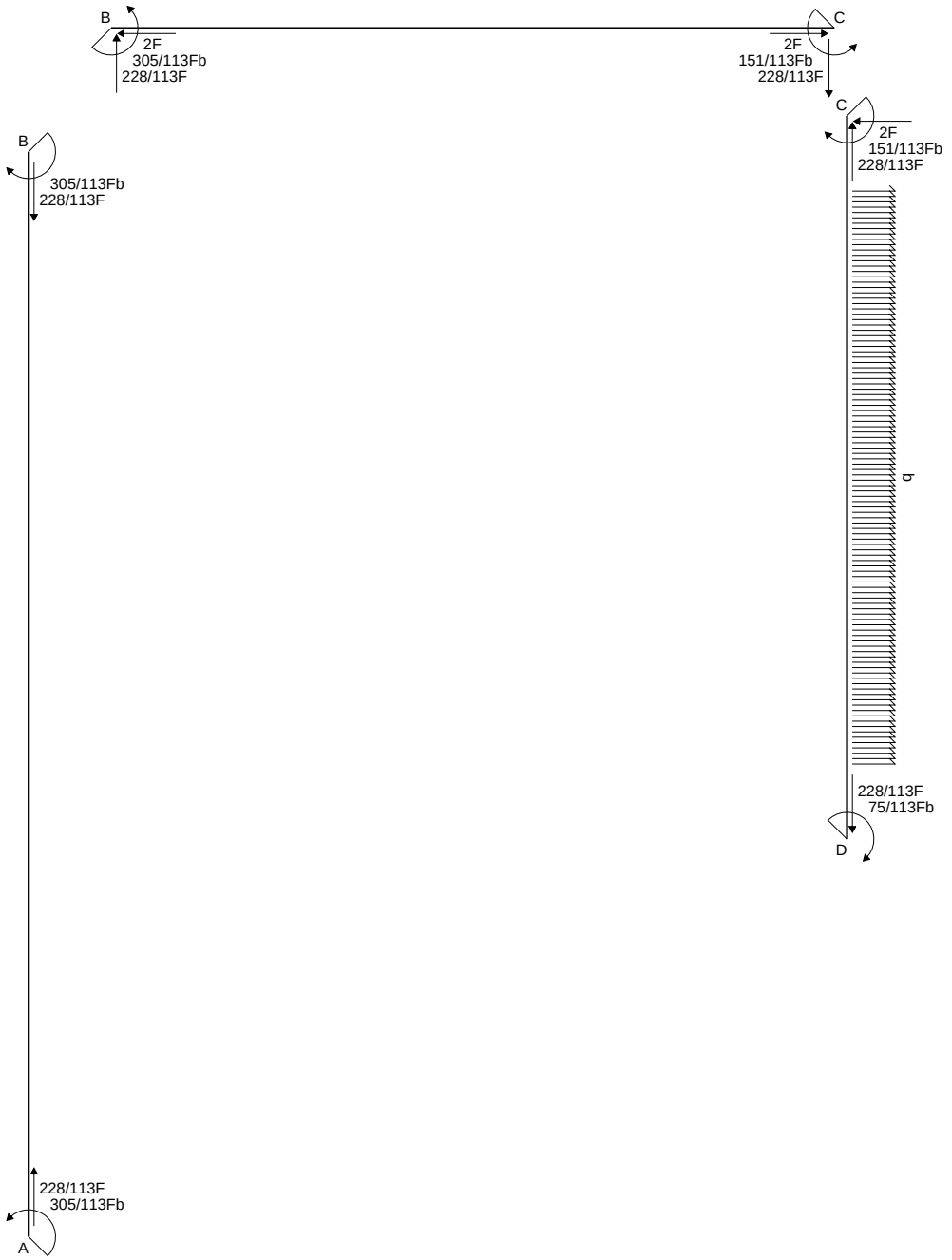
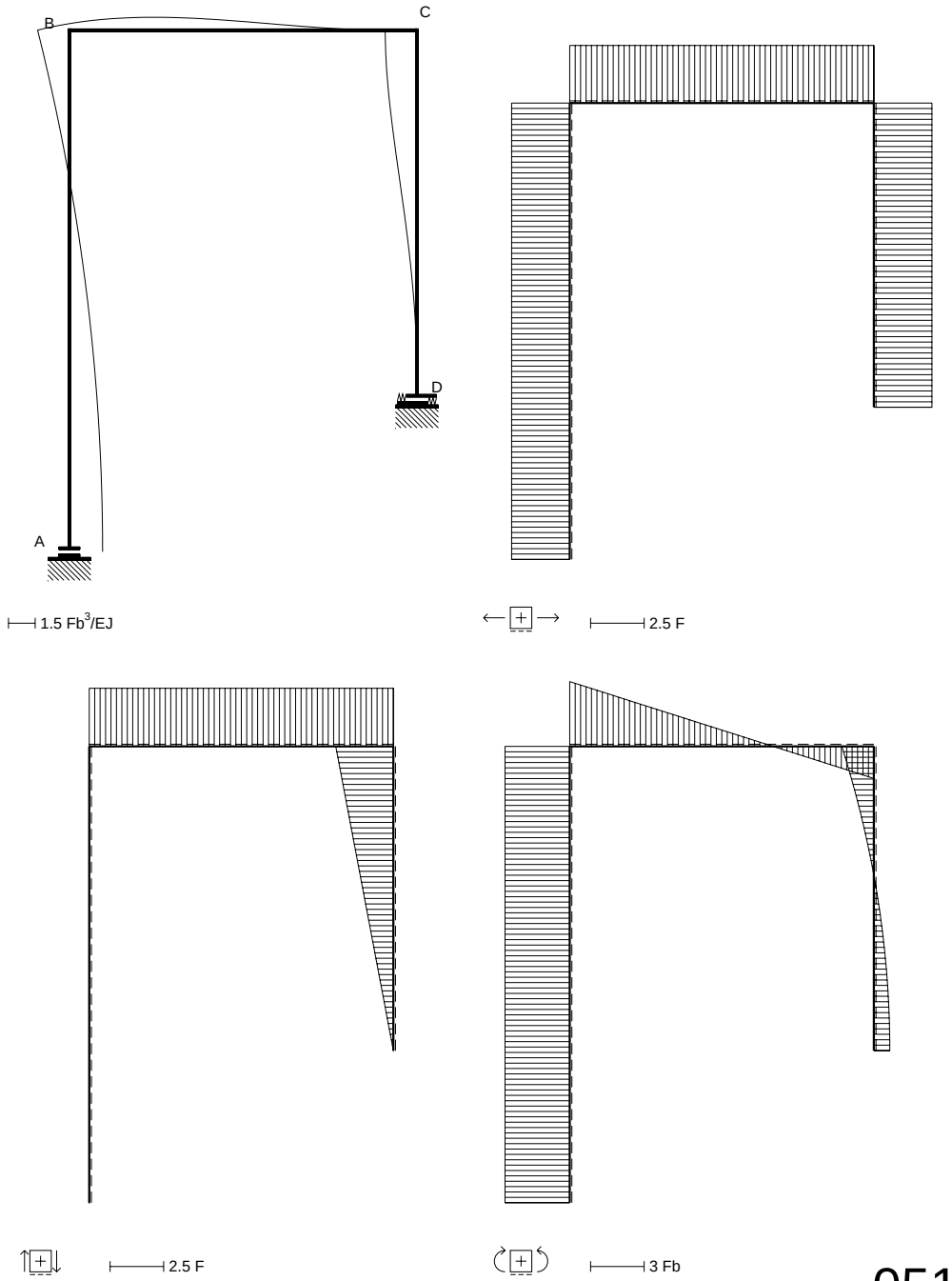


DEFORMATA (coordinate locali)
AB y(x)EJ =
CB y(x)EJ =
DC y(x)EJ =

SPOSTAMENTI NODALI

u_{AAB} =	u_B =	u_C =	u_D =
v_A =	v_B =	v_C =	v_D =
φ_A =	φ_B =	φ_C =	φ_D =





REAZIONI IPERSTATICHE

$X = W_{BA}$ $Y = W_{CB}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: φ_{AB} K_{AB} φ_{CB} K_{CB} φ_{DC} K_{DC}

Relazioni di congruenza

$y'_{AB}(0) = 0$

$y'_{AB}(3b) - y'_{CB}(2b) = 0$

$y'_{CB}(0) - y'_{DC}(2b) = 0$

$y'_{DC}(0) = 0$

$y_{CB}(0) = 0$

$y_{CB}(2b) = 0$

$y_{DC}(0) - 1/3H_D b^3/EJ = 0$

$y_{DC}(2b) - y_{AB}(3b) = 0$

$M_{AB} = Xb$

$EJy = 3EJ\theta + Xb$

$EJy = 3EJ\theta x + Xb + EJ\varphi_{AB}$

$EJy = 3/2EJ\theta x2 + Xb + EJ\varphi_{AB}x + EJK_{AB}$

$M_{CB} = -1/2X + 1/2Y - Yb$

$EJy = -1/3X + 1/3Y - 2/3Yb$

$EJy = -1/3X + 1/3Y - 2/3Yb + EJ\varphi_{CB}$

$EJy = -1/3X + 1/3Y - 2/3Yb + EJ\varphi_{CB}x + EJK_{CB}$

$M_{DC} = 2Fb - 1/2qx^2 - Yb$

$EJy = 2Fb - 1/2qx^2 - Yb$

$EJy = 2Fbx - 1/6qx^3 - Yb + EJ\varphi_{DC}$

$EJy = Fbx2 - 1/24qx^4 - Yb + EJ\varphi_{DC}x + EJK_{DC}$

Condizioni al contorno

	$\varphi_{AB}b$	K_{AB}	$\varphi_{CB}b$	K_{CB}	$\varphi_{DC}b$	K_{DC}	Xb^2/EJ	Yb^2/EJ		Fb^3/EJ	αTb
y'_{AB}	1	0	0	0	0	0	0	0		0	0
y'_{BA}	1	0	-1	0	0	0	11/3	2/3		0	-9
y'_{CB}	0	0	1	0	-1	0	0	2		8/3	0
y'_{DC}	0	0	0	0	1	0	0	0	=	0	0
y_{CB}	0	0	0	1	0	0	0	0		0	0
y_{BC}	0	0	2	1	0	0	-4/9	-8/9		0	0
y_{DC}	0	0	0	0	0	1	0	0		0	0
y_{CD}	-3	-1	0	0	2	1	-9/2	-2		-10/3	27/2

Soluzione

		Fb^3/EJ
$\varphi_{AB}b$		0
$\varphi_{CB}b$		-2/339
$\varphi_{DC}b$		0
Xb^2/EJ	=	-305/113
K_{CB}		0
Yb^2/EJ		151/113
K_{DC}		0
K_{AB}		-235/339

DEFORMATA (coordinate locali)

AB $y(x)EJ = -235/339Fb^3 + 17/113x^2Fb$

BA $y(x)EJ = 224/339Fb^3 - 102/113xFb^2 + 17/113x^2Fb$

CB $y(x)EJ = -2/339xFb^2 - 151/339x^2Fb + 76/339x^3F$

BC $y(x)EJ = -102/113xFb^2 + 305/339x^2Fb - 76/339x^3F$

DC $y(x)EJ = 75/226x^2Fb - 1/24x^4q$

CD $y(x)EJ = 224/339Fb^3 + 2/339xFb^2 - 151/226x^2Fb + 1/3x^3F - 1/24x^4q$

SPOSTAMENTI NODALI

$u_{AAB} = 235/339(Fb^3/EJ)$	$u_B = -224/339(Fb^3/EJ)$	$u_C = -224/339(Fb^3/EJ)$	$u_D = 0$
$v_A = 0$	$v_B = 0$	$v_C = 0$	$v_D = 0$
$\varphi_A = 0$	$\varphi_B = 102/113(Fb^2/EJ)$	$\varphi_C = -2/339(Fb^2/EJ)$	$\varphi_D = 0$