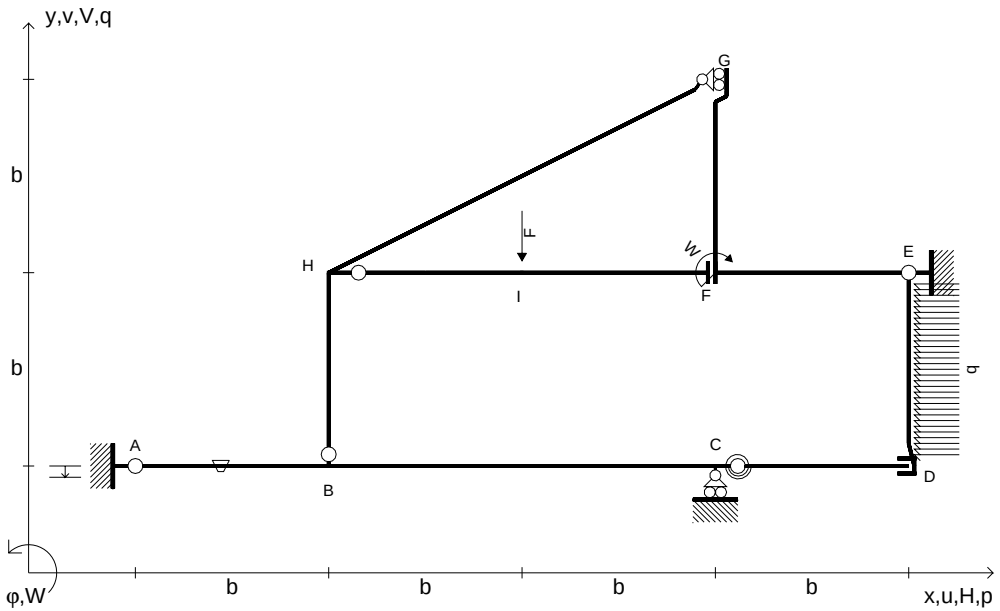

$V_I = -F$
$W_F = -W = -Fb$
$p_{ED} = -q = -F/b$
$\theta_{AB} = -\theta = -\alpha T/b = -bF/EJ$
$v_A = -\delta = -b^3F/EJ$
$k_{CD} = 4EJ/b$

$EJ_{AB} = EJ$
$EJ_{BC} = EJ$
$EJ_{CD} = EJ$
$EJ_{ED} = EJ$
$EJ_{EF} = EJ$
$EJ_{FG} = EJ$

$EJ_{GH} = EJ$
$EJ_{HI} = EJ$
$EJ_{IF} = EJ$
$EJ_{HB} = EJ$

ANALISI STRUTTURE IPERSTATICHE
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2) Reazioni calcolate
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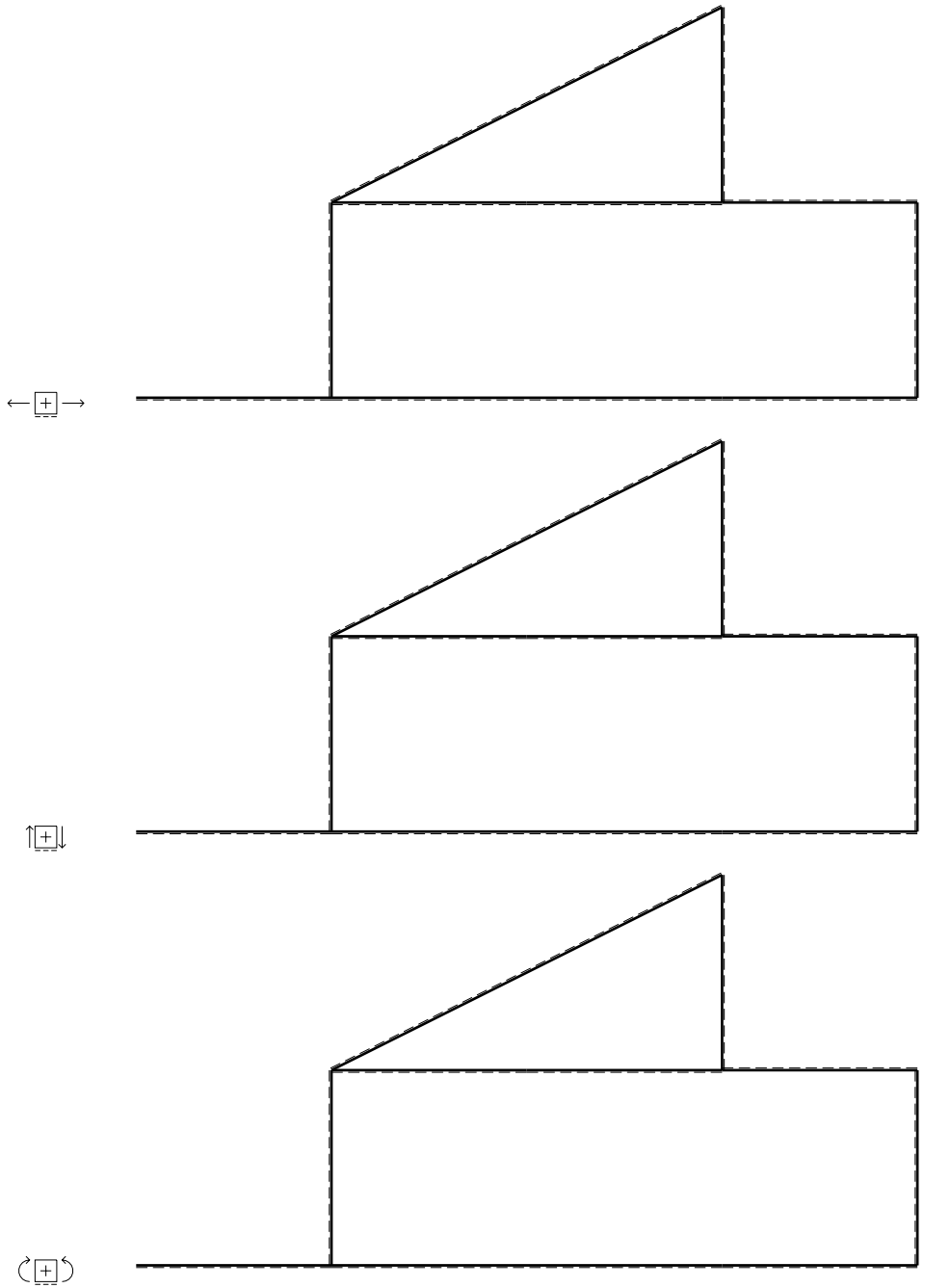
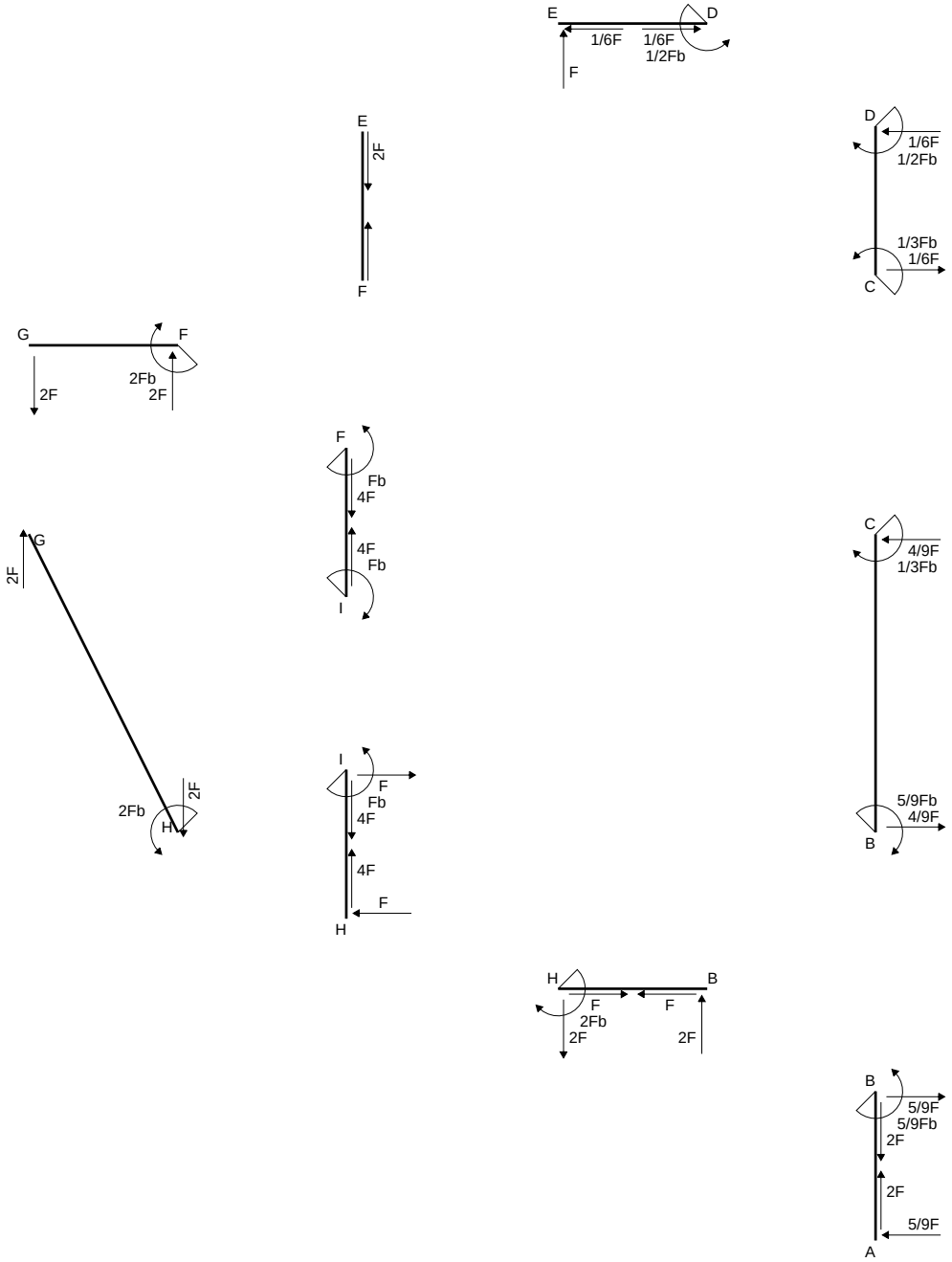
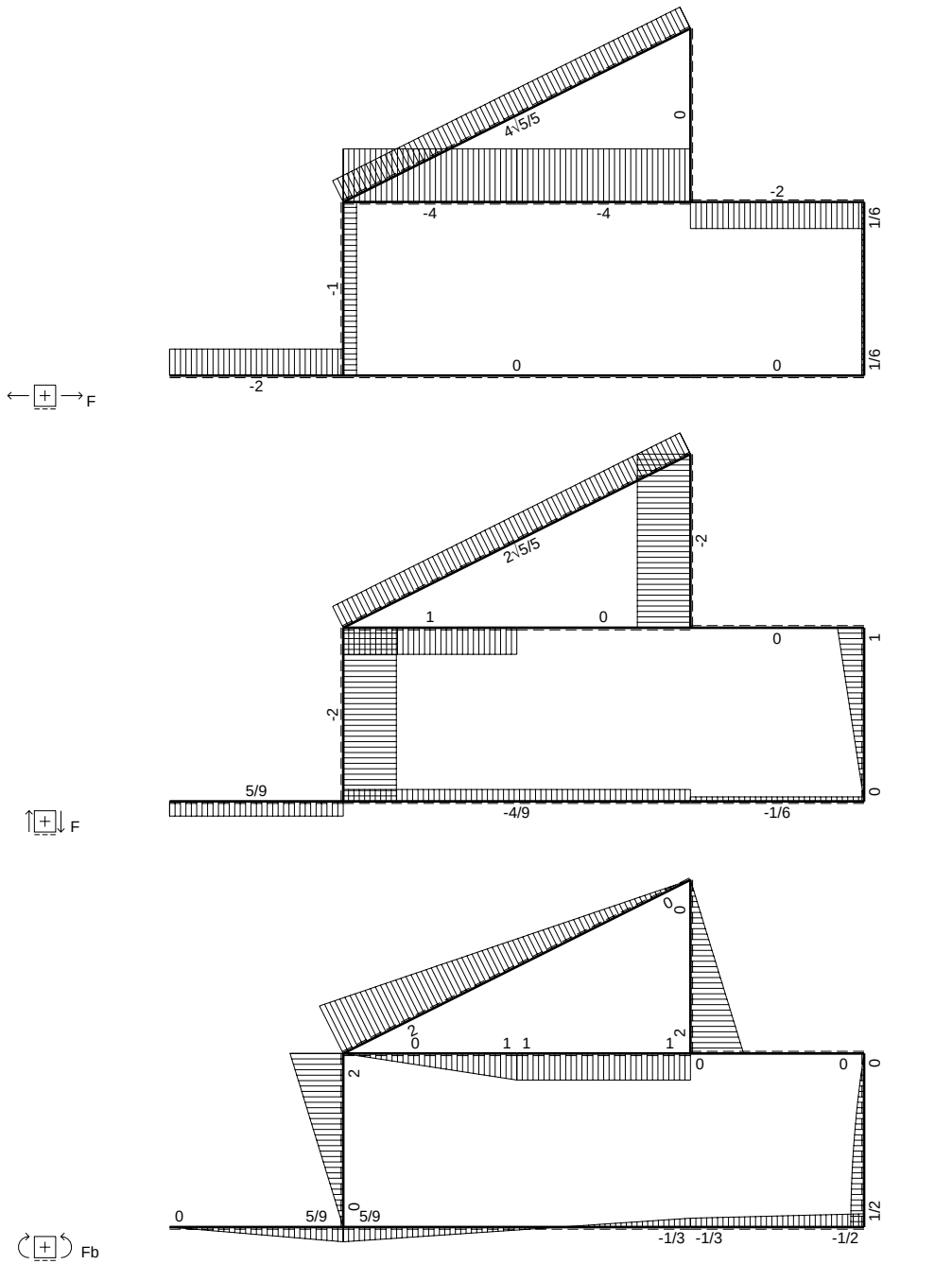
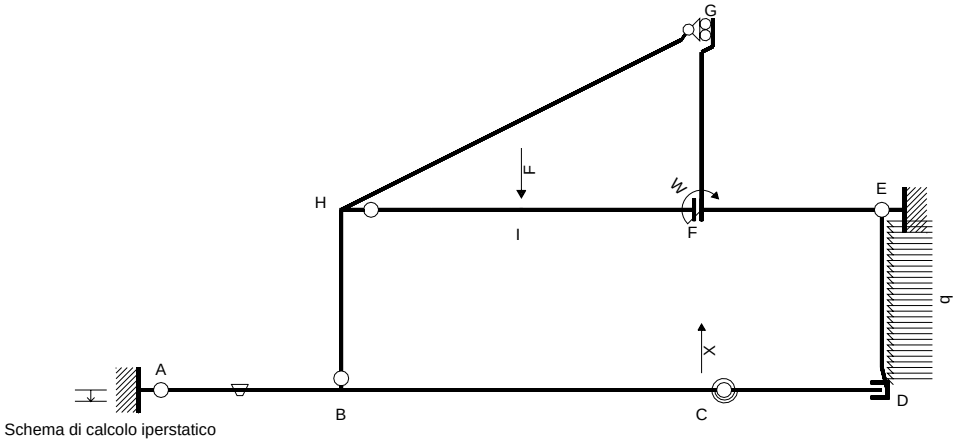
Sul retro:
4) Analisi cinematica
5) Diagrammi delle strutture M0 e M*
6) Equazione del PLV
7) Reazione vincolare calcolata
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi quotati delle azioni interne nelle aste.
Carichi di aste curve misurati in proiezione sugli assi x,y.
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.
Spostamento verticale assoluto v imposto al nodo A.

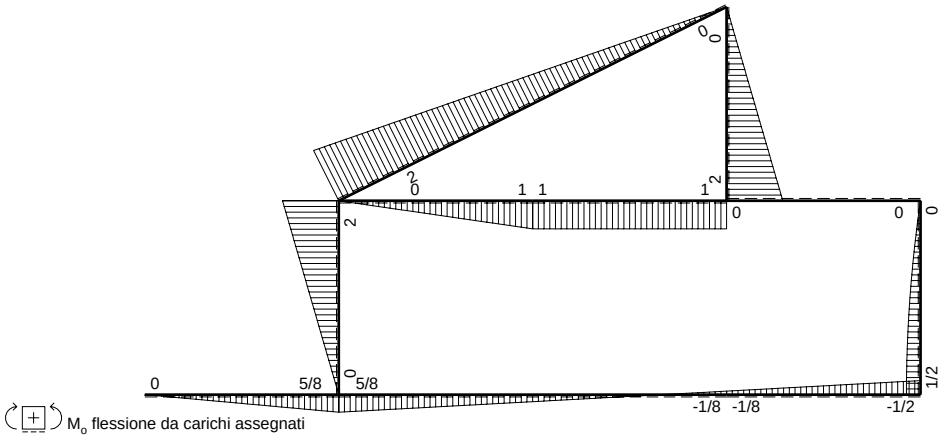



E
D
1/6F
1/6F
1/2Fb
F
E
2F
F
D
1/6F
1/2Fb
1/3Fb
1/6F
C
G
F
2Fb
2F
2F
F
Fb
4F
4F
Fb
I
C
4/9F
1/3Fb
G
2F
2Fb
H
2F
I
F
Fb
4F
4F
F
H
5/9Fb
4/9F
B
H
B
F
F
2Fb
2F
2F
B
5/9F
5/9Fb
2F
2F
5/9F
A

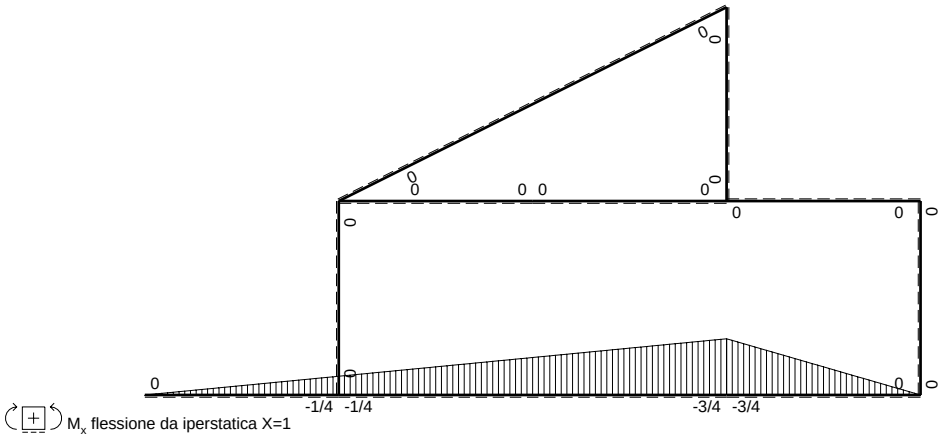

F
4√5/5
0
-2
-4
-4
1/6
-1
0
0
1/6
-2
F
2√5/5
-2
1
0
0
1
-2
5/9
-4/9
-1/6
0
Fb
0
0
2
0
1 1
1
2
2
0
0
0
0
5/9
0
5/9
-1/3 -1/3
-1/2
1/2



Schema di calcolo iperstatico



M_0 flessione da carichi assegnati



M_x flessione da iperstatica X=1

PROCEDIMENTO E RISULTATI Nome: PLV.001

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Quadro contributi PLV per iperstatica $X=V_C$

→	$M_x(x)$	$M_o(x)$	θ	M_xM_o	$M_x\theta$	M_xM_x	$\int M_x(M_o/EJ+\theta)dx$	$\int XM_xM_x/EJdx$
AB b	-1/4x	5/8Fx	-Fb/EJ	$-5/32Fx^2$	1/4Fxb/EJ	$1/16x^2$	$(-5/96+1/8)Fb^3/EJ$	$1/48Xb^3/EJ$
BA b	1/4b-1/4x	-5/8Fb+5/8Fx	Fb/EJ	$-5/32Fb^2+5/16Fbx-5/32Fx^2$	$1/4Fb^2/EJ-1/4Fxb/EJ$	$1/16b^2-1/8bx+1/16x^2$		
BC 2b	-1/4b-1/4x	5/8Fb-3/8Fx	0	$-5/32Fb^2-1/16Fbx+3/32Fx^2$	0	$1/16b^2+1/8bx+1/16x^2$	$(-3/16+0)Fb^3/EJ$	$13/24Xb^3/EJ$
CB 2b	3/4b-1/4x	1/8Fb-3/8Fx	0	$3/32Fb^2-5/16Fbx+3/32Fx^2$	0	$9/16b^2-3/8bx+1/16x^2$		
CD b	-3/4b+3/4x	-1/8Fb-3/8Fx	0	$3/32Fb^2+3/16Fbx-9/32Fx^2$	0	$9/16b^2-9/8bx+9/16x^2$	$(3/32+0)Fb^3/EJ$	$3/16Xb^3/EJ$
DC b	3/4x	1/2Fb-3/8Fx	0	$3/8Fbx-9/32Fx^2$	0	$9/16x^2$		
ED b	0	$Fx-1/2qx^2$	0	0	0	0	0+0	0
DE b	0	$-1/2Fb+1/2qx^2$	0	0	0	0		
EF b	0	0	0	0	0	0	0+0	0
FE b	0	0	0	0	0	0		
FG b	0	2Fb-2Fx	0	0	0	0	0+0	0
GF b	0	-2Fx	0	0	0	0		
GH $\sqrt{5}$b	0	$2\sqrt{5}/5Fx$	0	0	0	0	0	0
HI b	0	Fx	0	0	0	0	0+0	0
IH b	0	-Fb+Fx	0	0	0	0		
IF b	0	Fb	0	0	0	0	0+0	0
FI b	0	-Fb	0	0	0	0		
HB b	0	2Fb-2Fx	0	0	0	0	0+0	0
BH b	0	-2Fx	0	0	0	0		
CD	molla asta $-W_{1CD}(W_{oCD}+XW_{1CD})/k_{CD}$						$3/128Fb^3/EJ$	$9/64Xb^3/EJ$
A	cedimento nodo $-V_{1A}u_A$						$-1/4Fb^3/EJ$	
	totali						$-95/384Fb^3/EJ$	$57/64Xb^3/EJ$
	iperstatica $X=V_C$						5/18F	

Sviluppi di calcolo iperstatica

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$L^{XX}_{AB} = \int_o^b (1/16\ x^2/b^2)\ b^2\ 1/EJ\ dx = [1/48\ x^3/b^2]_o^b\ b^2\ 1/EJ$

$= (1/48\ b)\ b^2\ 1/EJ\ = 1/48\ b^3/EJ$

$L^{XX}_{BA} = \int_o^b (1/16 -1/8\ x/b +1/16\ x^2/b^2)\ b^2\ 1/EJ\ dx = [1/16\ x -1/16\ x^2/b +1/48\ x^3/b^2]_o^b\ b^2\ 1/EJ$

$= (1/16\ b -1/16\ b +1/48\ b)\ b^2\ 1/EJ\ = 1/48\ b^3/EJ$

$L^{XX}_{BC} = \int_o^{2b} (1/16 +1/8\ x/b +1/16\ x^2/b^2)\ b^2\ 1/EJ\ dx = [1/16\ x +1/16\ x^2/b +1/48\ x^3/b^2]_o^{2b}\ b^2\ 1/EJ$

$= (1/8\ b +1/4\ b +1/6\ b)\ b^2\ 1/EJ\ = 13/24\ b^3/EJ$

$L^{XX}_{CB} = \int_o^{2b} (9/16 -3/8\ x/b +1/16\ x^2/b^2)\ b^2\ 1/EJ\ dx = [9/16\ x -3/16\ x^2/b +1/48\ x^3/b^2]_o^{2b}\ b^2\ 1/EJ$

$= (9/8\ b -3/4\ b +1/6\ b)\ b^2\ 1/EJ\ = 13/24\ b^3/EJ$

$L^{XX}_{CD} = \int_o^b (9/16 -9/8\ x/b +9/16\ x^2/b^2)\ b^2\ 1/EJ\ dx + 3/4\ \ 3/4\ \ 1/4\ \ b^3/EJ$

$= [9/16\ x -9/16\ x^2/b +3/16\ x^3/b^2]_o^b\ b^2\ 1/EJ\ + 3/4\ \ 3/4\ \ 1/4\ \ b^3/EJ$

$= (9/16\ b -9/16\ b +3/16\ b)\ b^2\ 1/EJ\ + 3/4\ \ 3/4\ \ 1/4\ \ b^3/EJ = 21/64\ \ b^3/EJ$

$L^{XX}_{DC} = \int_o^b (9/16\ x^2/b^2)\ b^2\ 1/EJ\ dx + 3/4\ \ 3/4\ \ 1/4\ \ b^3/EJ = [3/16\ x^3/b^2]_o^b\ b^2\ 1/EJ\ + 3/4\ \ 3/4\ \ 1/4\ \ b^3/EJ$

$= (3/16\ b)\ b^2\ 1/EJ\ + 3/4\ \ 3/4\ \ 1/4\ \ b^3/EJ = 21/64\ \ b^3/EJ$

$L^{Xo}_{AB} = \int_o^b (-5/32\ x^2/b^2)\ Fb^2\ 1/EJ\ dx + \int_o^b (1/4\ x/b)\ \theta\ dx = [-5/96\ x^3/b^2]_o^b\ Fb^2\ 1/EJ\ + [1/8\ x^2/b]_o^b\ \theta$

$= (-5/96\ b)\ Fb^2\ 1/EJ\ + (1/8\ b)\ \theta\ = 7/96\ Fb^3/EJ$

$L^{Xo}_{BA} = \int_o^b (-5/32 +5/16\ x/b -5/32\ x^2/b^2)\ Fb^2\ 1/EJ\ dx + \int_o^b (-1/4 +1/4\ x/b)\ \theta\ dx$

$= [-5/32\ x +5/32\ x^2/b -5/96\ x^3/b^2]_o^b\ Fb^2\ 1/EJ\ + [-1/4\ x +1/8\ x^2/b]_o^b\ \theta$

$= (-5/32\ b +5/32\ b -5/96\ b)\ Fb^2\ 1/EJ\ + (-1/4\ b +1/8\ b)\ \theta\ = 7/96\ Fb^3/EJ$

$L^{Xo}_{BC} = \int_o^{2b} (-5/32 -1/16\ x/b +3/32\ x^2/b^2)\ Fb^2\ 1/EJ\ dx = [-5/32\ x -1/32\ x^2/b +1/32\ x^3/b^2]_o^{2b}\ Fb^2\ 1/EJ$

$= (-5/16\ b -1/8\ b +1/4\ b)\ Fb^2\ 1/EJ\ = -3/16\ Fb^3/EJ$

$L^{Xo}_{CB} = \int_o^{2b} (3/32 -5/16\ x/b +3/32\ x^2/b^2)\ Fb^2\ 1/EJ\ dx = [3/32\ x -5/32\ x^2/b +1/32\ x^3/b^2]_o^{2b}\ Fb^2\ 1/EJ$

$= (3/16\ b -5/8\ b +1/4\ b)\ Fb^2\ 1/EJ\ = -3/16\ Fb^3/EJ$

$L^{Xo}_{CD} = \int_o^b (3/32 +3/16\ x/b -9/32\ x^2/b^2)\ Fb^2\ 1/EJ\ dx + 3/4\ \ 1/8\ \ 1/4\ \ Fb^3/EJ$

$= [3/32\ x +3/32\ x^2/b -3/32\ x^3/b^2]_o^b\ Fb^2\ 1/EJ\ + 3/4\ \ 1/8\ \ 1/4\ \ Fb^3/EJ$

$= (3/32\ b +3/32\ b -3/32\ b)\ Fb^2\ 1/EJ\ + 3/4\ \ 1/8\ \ 1/4\ \ Fb^3/EJ = 15/128\ \ Fb^3/EJ$

$L^{Xo}_{DC} = \int_o^b (3/8\ x/b -9/32\ x^2/b^2)\ Fb^2\ 1/EJ\ dx + 3/4\ \ 1/8\ \ 1/4\ \ Fb^3/EJ$

$= [3/16\ x^2/b -3/32\ x^3/b^2]_o^b\ Fb^2\ 1/EJ\ + 3/4\ \ 1/8\ \ 1/4\ \ Fb^3/EJ$

$= (3/16\ b -3/32\ b)\ Fb^2\ 1/EJ\ + 3/4\ \ 1/8\ \ 1/4\ \ Fb^3/EJ = 15/128\ \ Fb^3/EJ$

PROCEDIMENTO E RISULTATI Nome: PLV.001

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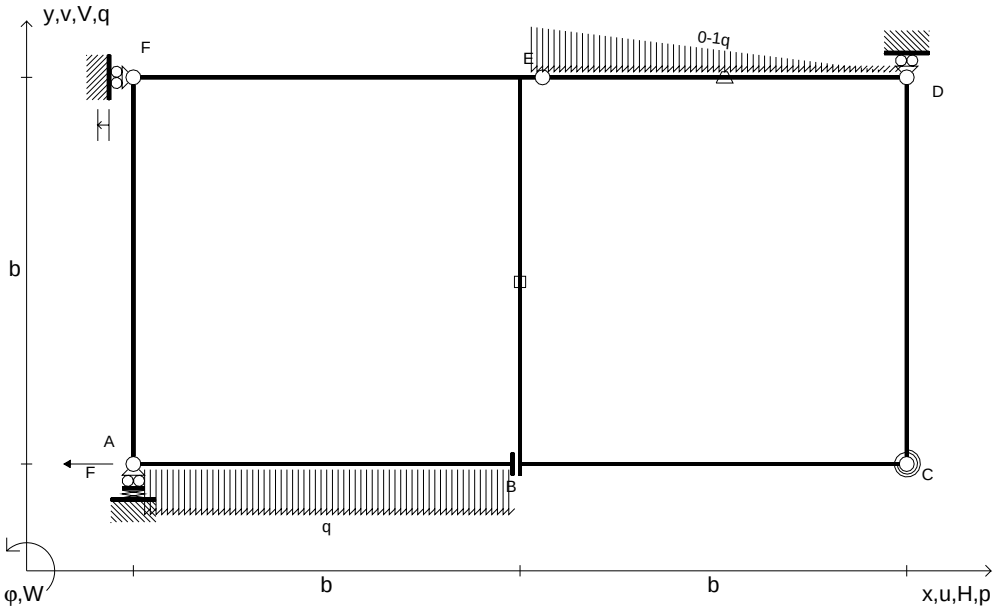

$H_A = -F$
$q_{ED} = -q = -F/b$
$q_{AB} = -q = -F/b$
$\varepsilon_{EB} = -\alpha T = -b^2F/EJ$
$\theta_{DE} = -\theta = -\alpha T/b = -bF/EJ$

$u_F = -\delta = -b^3F/EJ$
$k_{CD} = 4EJ/b$
$k_A = 4EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{BC} = EJ$

$EJ_{CD} = EJ$
$EJ_{DE} = EJ$
$EJ_{EB} = EJ$
$EJ_{EF} = EJ$
$EJ_{FA} = EJ$

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7) Reazione vincolare calcolata
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi quotati delle azioni interne nelle aste.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Elongazione termica specifica ε assegnata su asta EB.
Curvatura θ asta DE positiva se convessa a destra con inizio D.
Spostamento orizzontale assoluto u imposto al nodo F.

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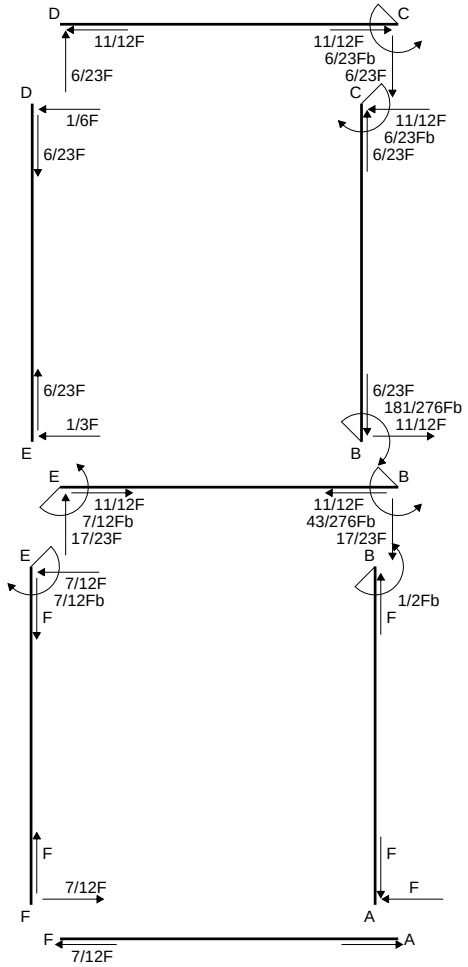
D
C
11/12F
11/12F
6/23Fb
6/23F
6/23F
D
C
1/6F
11/12F
6/23Fb
6/23F
6/23F
6/23F
1/3F
6/23F
181/276Fb
11/12F
E
B
E
B
11/12F
11/12F
7/12Fb
43/276Fb
17/23F
17/23F
E
B
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1/2Fb
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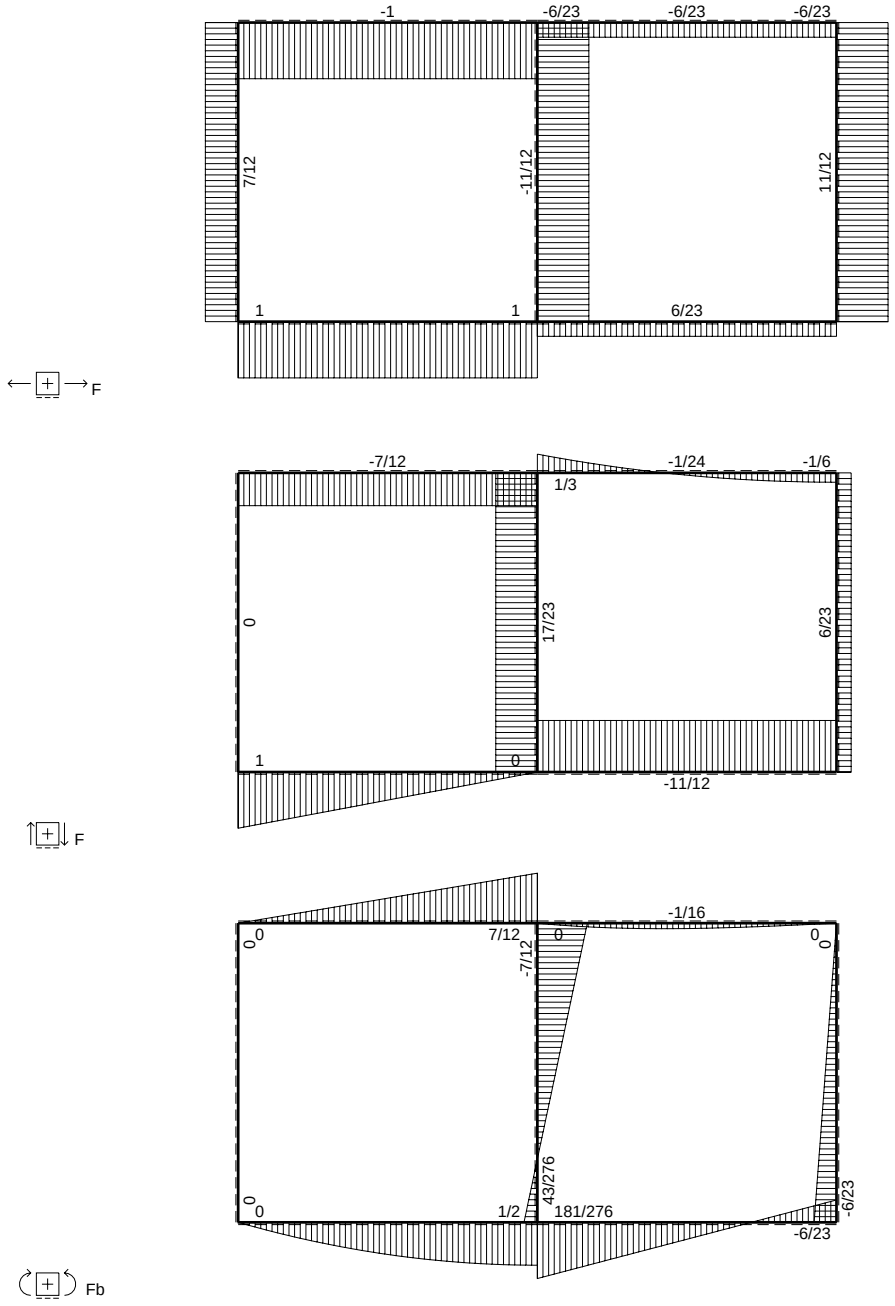
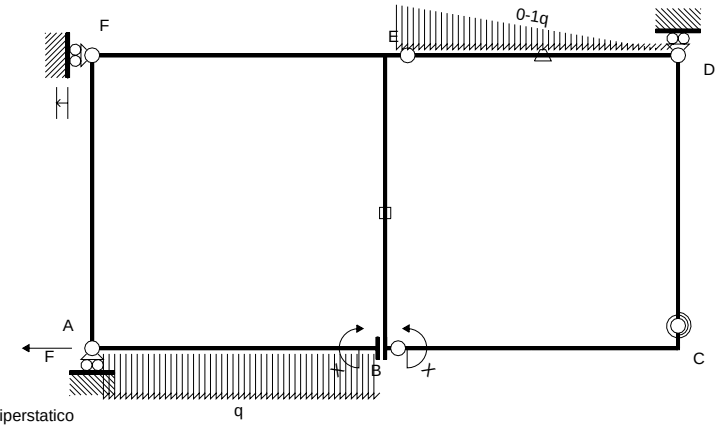
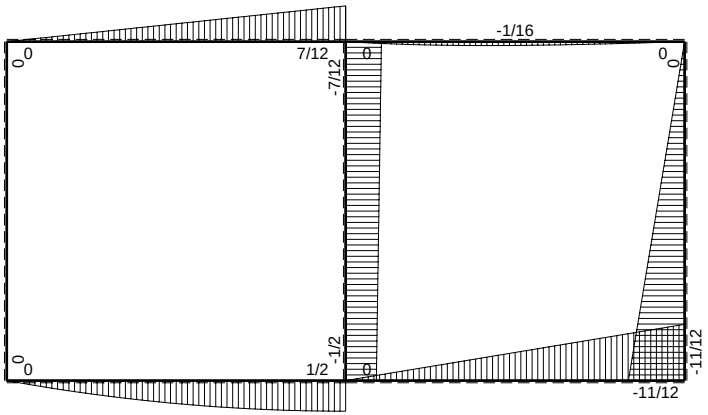
7/12F
F
F
F
A
F
A
7/12F

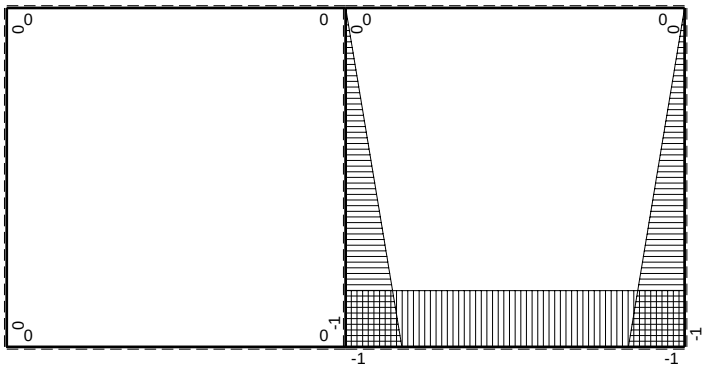

-1
-6/23
-6/23
-6/23
7/12
-11/12
11/12
1
1
6/23
F
-7/12
-1/24
-1/6
1/3
0
17/23
6/23
1
0
-11/12
F
-1/16
0
7/12
0
0
0
-7/12
0
0
43/276
-6/23
0
1/2
181/276
-6/23
Fb



Schema di calcolo iperstatico



M_o flessione da carichi assegnati



M_x flessione da iperstatica X=1

Quadro contributi PLV per iperstatica $X=W_{BC}$

→	$M_x(x)$	$M_o(x)$	θ	M_xM_o	$M_x\theta$	M_xM_x	$\int M_x(M_o/EJ+\theta)dx$	$\int XM_xM_x/EJdx$
AB b	0	Fx-1/2qx^2	0	0	0	0	0+0	0
BA b	0	-1/2Fb+1/2qx^2	0	0	0	0		
BC b	-1	-11/12Fx	0	11/12Fx	0	1	(11/24+0)Fb^2/EJ	Xb/EJ
CB b	1	11/12Fb-11/12Fx	0	11/12Fb-11/12Fx	0	1		
CD b	-1+x/b	-11/12Fb+11/12Fx	0	11/12Fb-11/6Fx+11/12Fx^2/b	0	1-2x/b+x^2/b^2	(11/36+0)Fb^2/EJ	1/3Xb/EJ
DC b	x/b	11/12Fx	0	11/12Fx^2/b	0	x^2/b^2		
DE b	0	-1/6Fx+1/6qx^3/b	-Fb/EJ	0	0	0	0+0	0
ED b	0	1/3Fx-1/2qx^2+1/6qx^3/b	Fb/EJ	0	0	0		
EB b	-x/b	-7/12Fb+1/12Fx	0	7/12Fx-1/12Fx^2/b	0	x^2/b^2	(19/72+0)Fb^2/EJ	1/3Xb/EJ
BE b	1-x/b	1/2Fb+1/12Fx	0	1/2Fb-5/12Fx-1/12Fx^2/b	0	1-2x/b+x^2/b^2		
EF b	0	7/12Fb-7/12Fx	0	0	0	0	0+0	0
FE b	0	-7/12Fx	0	0	0	0		
FA b	0	0	0	0	0	0	0+0	0
AF b	0	0	0	0	0	0		
CD	molla asta $-W_{1CD}(W_{oCD}+XW_{1CD})/k_{CD}$						11/48Fb^2/EJ	1/4Xb/EJ
	totali						181/144Fb^2/EJ	23/12Xb/EJ
	iperstatica $X=W_{BC}$						-181/276Fb	

Sviluppi di calcolo iperstatica

$L_{BC}^{XX} = \int_o^b (1)\ 1/EJ\ dx = [\ x\ ]_o^b\ 1/EJ$

$= (\ b\ )\ 1/EJ\ =\ b/EJ$

$L_{CB}^{XX} = \int_o^b (1)\ 1/EJ\ dx = [\ x\ ]_o^b\ 1/EJ$

$= (\ b\ )\ 1/EJ\ =\ b/EJ$

$L_{CD}^{XX} = \int_o^b (1 - 2\ x/b + x^2/b^2)\ 1/EJ\ dx + 1\ \ 1\ \ 1/4\ \ b/EJ = [\ x - x^2/b + 1/3\ x^3/b^2\ ]_o^b\ 1/EJ\ + 1\ \ 1\ \ 1/4\ \ b/EJ$

$= (\ b - b + 1/3\ b\ )\ 1/EJ\ + 1\ \ 1\ \ 1/4\ \ b/EJ = 7/12\ \ b/EJ$

$L_{DC}^{XX} = \int_o^b (\ x^2/b^2\ )\ 1/EJ\ dx + 1\ \ 1\ \ 1/4\ \ b/EJ = [1/3\ x^3/b^2\ ]_o^b\ 1/EJ\ + 1\ \ 1\ \ 1/4\ \ b/EJ$

$= (1/3\ b)\ 1/EJ\ + 1\ \ 1\ \ 1/4\ \ b/EJ = 7/12\ \ b/EJ$

$L_{EB}^{XX} = \int_o^b (\ x^2/b^2\ )\ 1/EJ\ dx = [1/3\ x^3/b^2\ ]_o^b\ 1/EJ$

$= (1/3\ b)\ 1/EJ\ = 1/3\ \ b/EJ$

$L_{BE}^{XX} = \int_o^b (1 - 2\ x/b + x^2/b^2)\ 1/EJ\ dx = [\ x - x^2/b + 1/3\ x^3/b^2\ ]_o^b\ 1/EJ$

$= (\ b - b + 1/3\ b\ )\ 1/EJ\ = 1/3\ \ b/EJ$

$L_{BC}^{Xo} = \int_o^b (11/12\ x/b)\ Fb\ 1/EJ\ dx = [11/24\ x^2/b\ ]_o^b\ Fb\ 1/EJ$

$= (11/24\ b)\ Fb\ 1/EJ\ = 11/24\ \ Fb^2/EJ$

$L_{CB}^{Xo} = \int_o^b (11/12 - 11/12\ x/b)\ Fb\ 1/EJ\ dx = [11/12\ x - 11/24\ x^2/b\ ]_o^b\ Fb\ 1/EJ$

$= (11/12\ b - 11/24\ b)\ Fb\ 1/EJ\ = 11/24\ \ Fb^2/EJ$

$L_{CD}^{Xo} = \int_o^b (11/12 - 11/6\ x/b + 11/12\ x^2/b^2)\ Fb\ 1/EJ\ dx + 1\ \ 11/12\ \ 1/4\ \ Fb^2/EJ$

$= [11/12\ x - 11/12\ x^2/b + 11/36\ x^3/b^2\ ]_o^b\ Fb\ 1/EJ\ + 1\ \ 11/12\ \ 1/4\ \ Fb^2/EJ$

$= (11/12\ b - 11/12\ b + 11/36\ b)\ Fb\ 1/EJ\ + 1\ \ 11/12\ \ 1/4\ \ Fb^2/EJ = 77/144\ \ Fb^2/EJ$

$L_{DC}^{Xo} = \int_o^b (11/12\ x^2/b^2)\ Fb\ 1/EJ\ dx + 1\ \ 11/12\ \ 1/4\ \ Fb^2/EJ$

$= [11/36\ x^3/b^2\ ]_o^b\ Fb\ 1/EJ\ + 1\ \ 11/12\ \ 1/4\ \ Fb^2/EJ$

$= (11/36\ b)\ Fb\ 1/EJ\ + 1\ \ 11/12\ \ 1/4\ \ Fb^2/EJ = 77/144\ \ Fb^2/EJ$

$L_{EB}^{Xo} = \int_o^b (7/12\ x/b - 1/12\ x^2/b^2)\ Fb\ 1/EJ\ dx = [7/24\ x^2/b - 1/36\ x^3/b^2\ ]_o^b\ Fb\ 1/EJ$

$= (7/24\ b - 1/36\ b)\ Fb\ 1/EJ\ = 19/72\ \ Fb^2/EJ$

$L_{BE}^{Xo} = \int_o^b (1/2 - 5/12\ x/b - 1/12\ x^2/b^2)\ Fb\ 1/EJ\ dx = [1/2\ x - 5/24\ x^2/b - 1/36\ x^3/b^2\ ]_o^b\ Fb\ 1/EJ$

$= (1/2\ b - 5/24\ b - 1/36\ b)\ Fb\ 1/EJ\ = 19/72\ \ Fb^2/EJ$

PROCEDIMENTO E RISULTATI Nome: PLV.002

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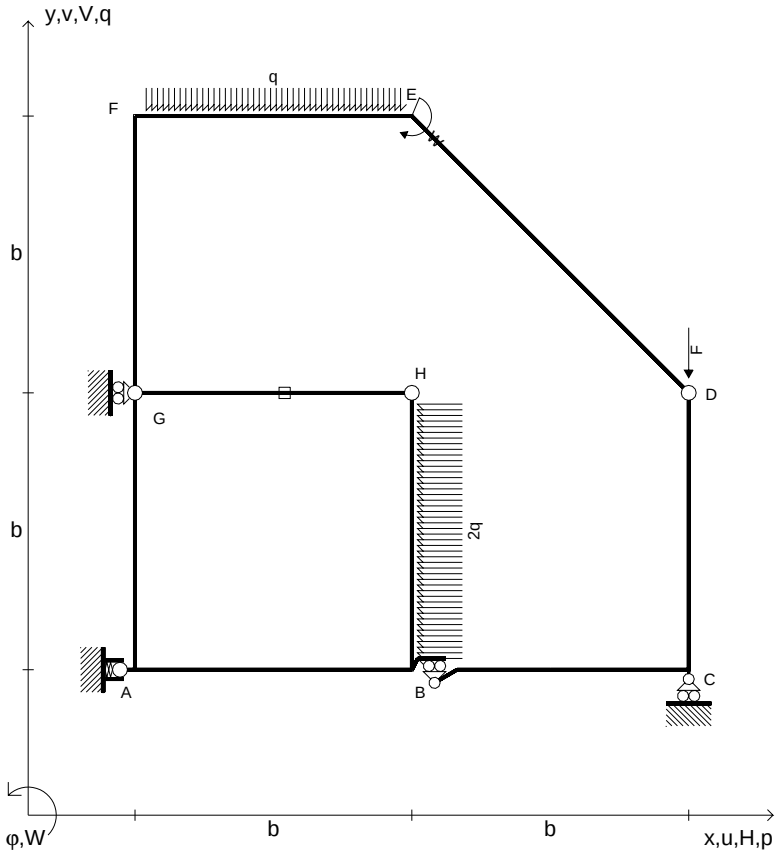
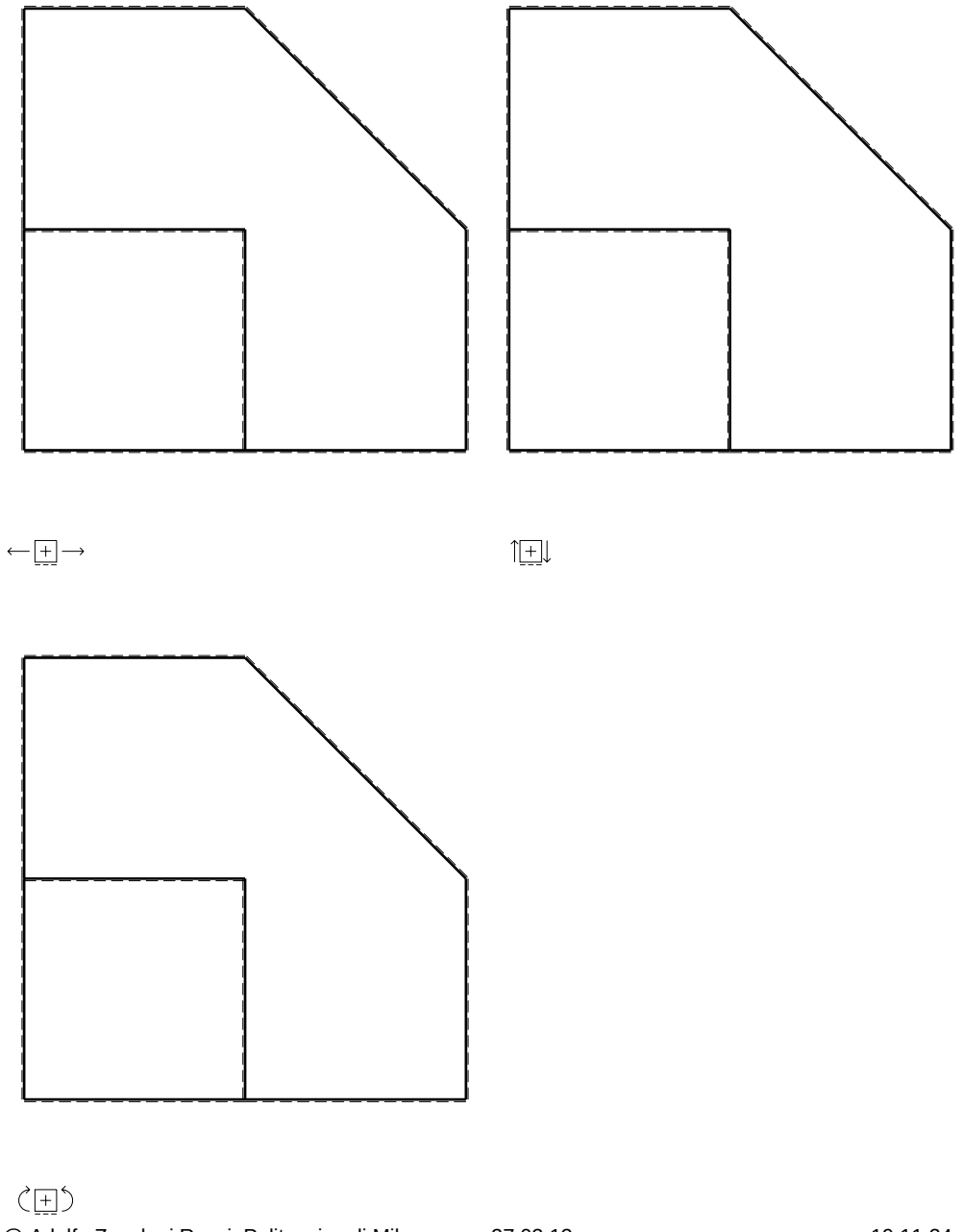
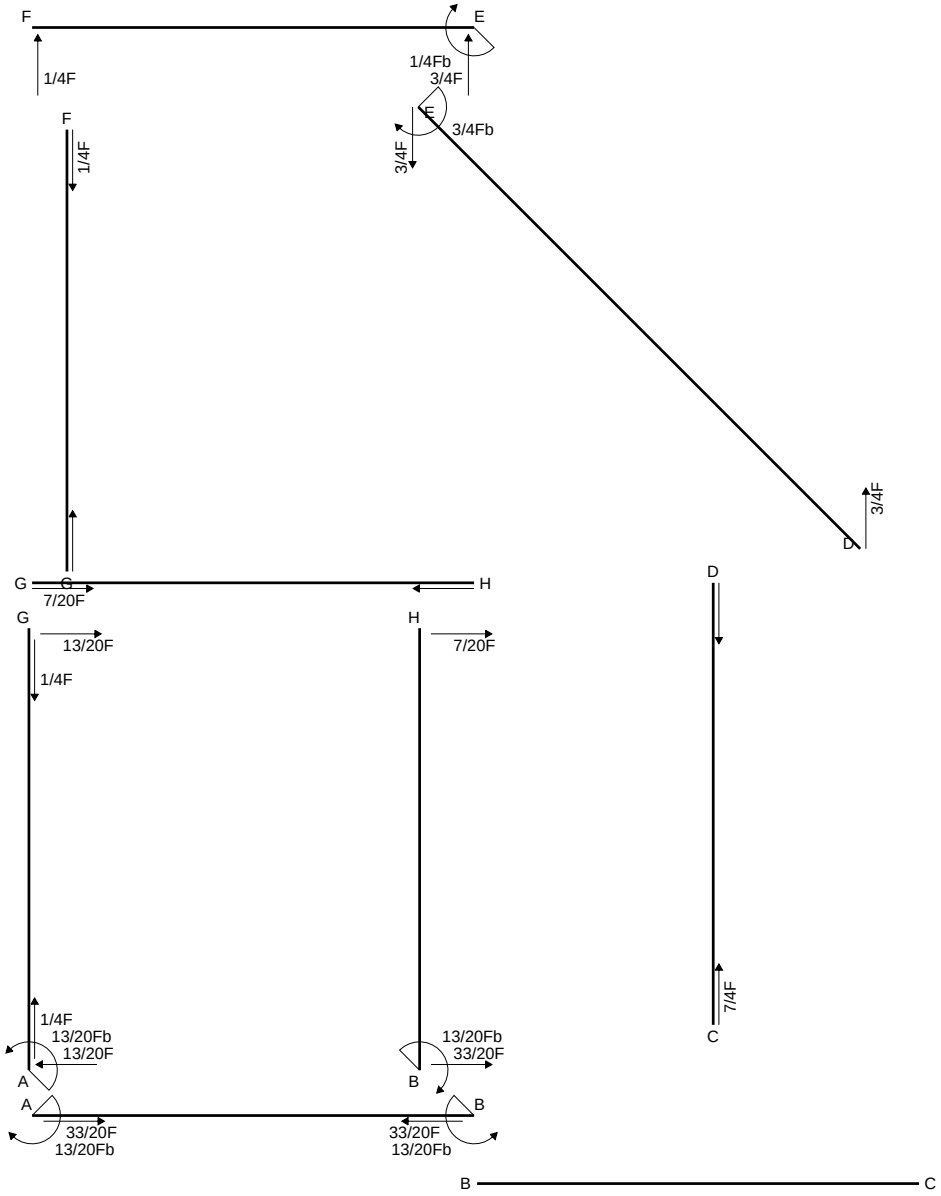
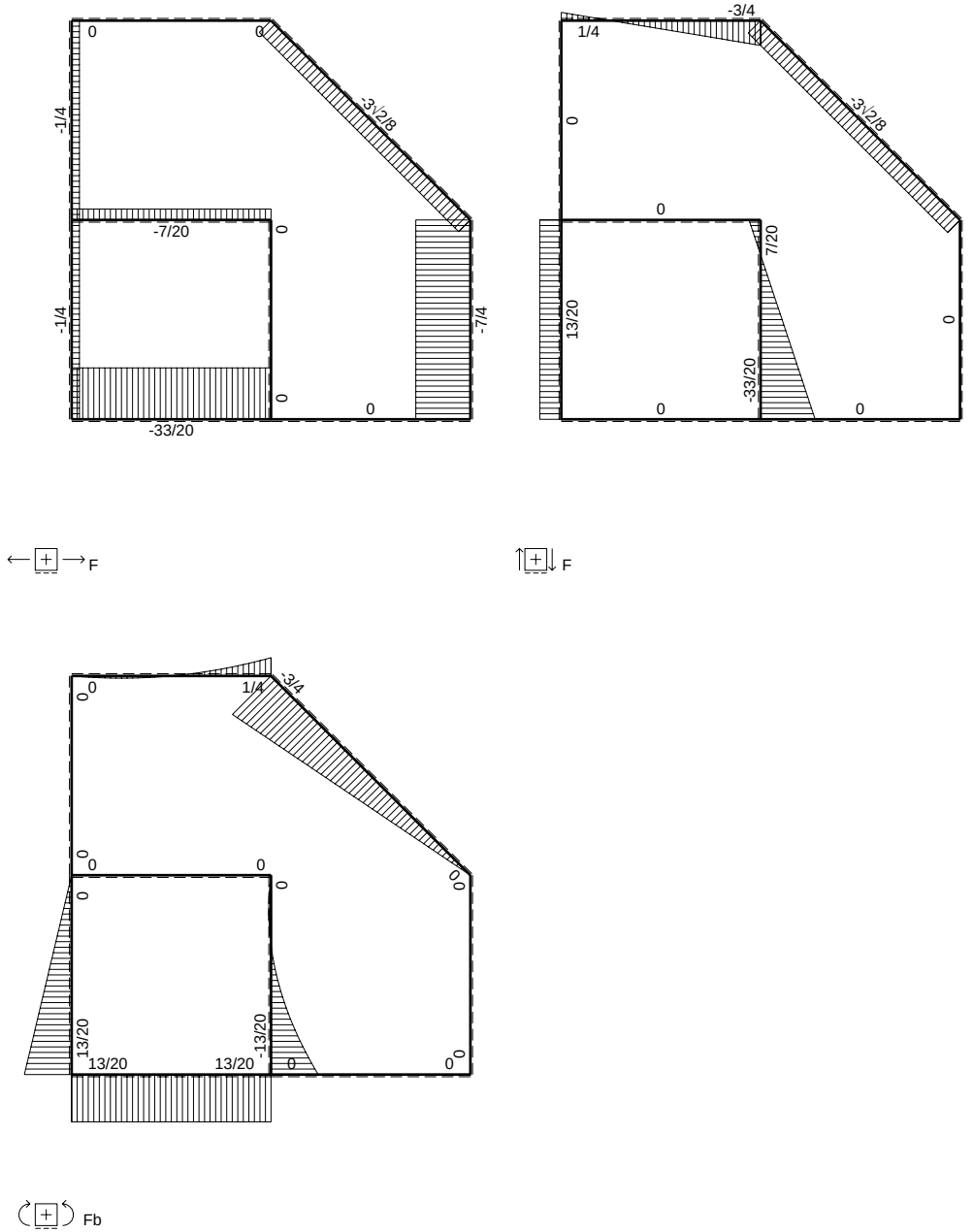
$V_D = -F$
$W_E = -W = -Fb$
$q_{EF} = -q = -F/b$
$p_{HB} = -2q = -2F/b$
$\varepsilon_{GH} = -\alpha T = -b^2F/EJ$
$k_A = 4EJ/b^3$
$EJ_{AB} = EJ$
$EJ_{BC} = EJ$
$EJ_{CD} = EJ$
$EJ_{DE} = EJ$
$EJ_{EF} = EJ$
$EJ_{FG} = EJ$
$EJ_{GA} = EJ$
$EJ_{GH} = EJ$
$EJ_{HB} = EJ$



ANALISI STRUTTURE IPERSTATICHE
PRINCIPIO DEI LAVORI VIRTUALI
Riportare sul fronte:
1) Declassamento Scelto
2) Reazioni calcolate
3) Diagrammi finali delle azioni interne
Sul retro:
4) Analisi cinematica
5) Diagrammi delle strutture M0 e M*
6) Equazione del PLV
7) Reazione vincolare calcolata
Carichi e deformazioni date hanno verso efficace in disegno.
Calcolare reazioni vincolari della struttura e delle aste.
Tracciare i diagrammi quotati delle azioni interne nelle aste.
J_{YZ} - x_{YZ} - θ_{YZ} riferimento locale asta YZ con origine in Y.
Elongazione termica specifica ε assegnata su asta GH.







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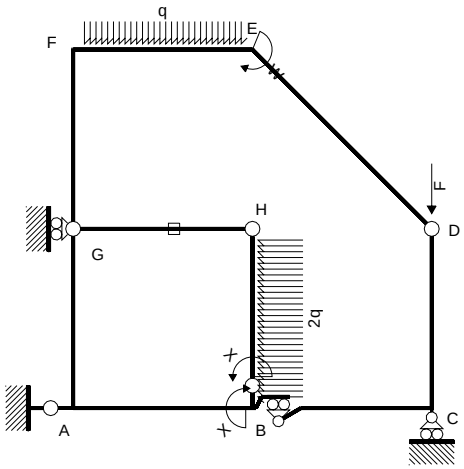
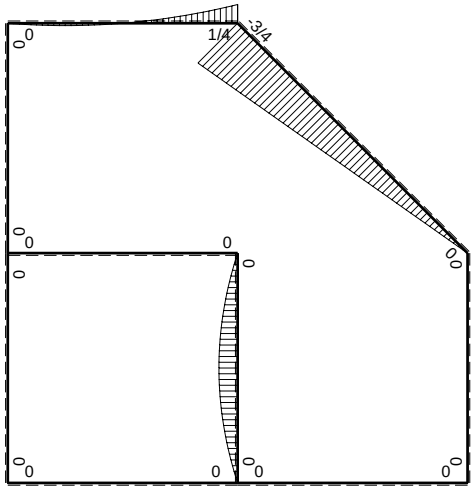
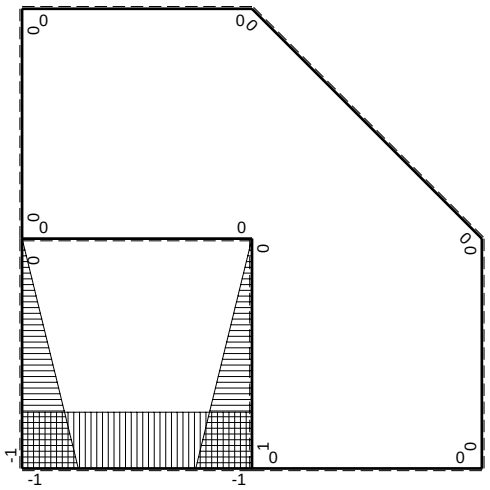


Schema di calcolo iperstatico



M_o flessione da carichi assegnati



M_x flessione da iperstatica X=1

Quadro contributi PLV per iperstatica $X=W_{BH}$

→	$M_x(x)$	$M_o(x)$	M_xM_o	M_xM_x	$\int M_xM_o/EJdx$	$\int XM_xM_x/EJdx$
AB b	-1	0	0	1	0	Xb/EJ
BA b	1	0	0	1		
BC b	0	0	0	0	0	0
CB b	0	0	0	0		
CD b	0	0	0	0	0	0
DC b	0	0	0	0		
DE √2b	0	$-3\sqrt{2}/8Fx$	0	0	0	0
EF b	0	$1/4Fb-3/4Fx+1/2qx^2$	0	0	0	0
FE b	0	$1/4Fx-1/2qx^2$	0	0		
FG b	0	0	0	0	0	0
GF b	0	0	0	0		
GA b	-x/b	0	0	x^2/b^2	0	1/3Xb/EJ
AG b	1-x/b	0	0	$1-2x/b+x^2/b^2$		
GH b	0	0	0	0	0	0
HG b	0	0	0	0		
HB b	x/b	$Fx-qx^2$	$Fx^2/b-qx^3/b$	x^2/b^2	$1/12Fb^2/EJ$	1/3Xb/EJ
BH b	-1+x/b	$-Fx+qx^2$	$Fx-2Fx^2/b+qx^3/b$	$1-2x/b+x^2/b^2$		
GH	elongazione asta $N_{1GH}\varepsilon_{GH}L_{GH}$				Fb^2/EJ	
	totali				$13/12Fb^2/EJ$	5/3Xb/EJ
	iperstatica $X=W_{BH}$				-13/20Fb	

Sviluppi di calcolo iperstatica

$L^{XX}_{AB} = \int_o^b (1)\ 1/EJ\ dx = [\ x\ ]_o^b\ 1/EJ$

$= (\ b\ )\ 1/EJ\ =\ b/EJ$

$L^{XX}_{BA} = \int_o^b (1)\ 1/EJ\ dx = [\ x\ ]_o^b\ 1/EJ$

$= (\ b\ )\ 1/EJ\ =\ b/EJ$

$L^{XX}_{GA} = \int_o^b (\ x^2/b^2\ )\ 1/EJ\ dx = [1/3\ x^3/b^2\ ]_o^b\ 1/EJ$

$= (1/3\ b\ )\ 1/EJ\ = 1/3\ \ b/EJ$

$L^{XX}_{AG} = \int_o^b (1 -2\ x/b + x^2/b^2\ )\ 1/EJ\ dx = [\ x - x^2/b +1/3\ x^3/b^2\ ]_o^b\ 1/EJ$

$= (\ b - b +1/3\ b\ )\ 1/EJ\ = 1/3\ \ b/EJ$

$L^{XX}_{HB} = \int_o^b (\ x^2/b^2\ )\ 1/EJ\ dx = [1/3\ x^3/b^2\ ]_o^b\ 1/EJ$

$= (1/3\ b\ )\ 1/EJ\ = 1/3\ \ b/EJ$

$L^{XX}_{BH} = \int_o^b (1 -2\ x/b + x^2/b^2\ )\ 1/EJ\ dx = [\ x - x^2/b +1/3\ x^3/b^2\ ]_o^b\ 1/EJ$

$= (\ b - b +1/3\ b\ )\ 1/EJ\ = 1/3\ \ b/EJ$

$L^{Xo}_{HB} = \int_o^b (\ x^2/b^2 - x^3/b^3\ )\ Fb\ 1/EJ\ dx = [1/3\ x^3/b^2 -1/4\ x^4/b^3\ ]_o^b\ Fb\ 1/EJ$

$= (1/3\ b -1/4\ b\ )\ Fb\ 1/EJ\ = 1/12\ \ Fb^2/EJ$

$L^{Xo}_{BH} = \int_o^b (\ x/b -2\ x^2/b^2 + x^3/b^3\ )\ Fb\ 1/EJ\ dx = [1/2\ x^2/b -2/3\ x^3/b^2 +1/4\ x^4/b^3\ ]_o^b\ Fb\ 1/EJ$

$= (1/2\ b -2/3\ b +1/4\ b\ )\ Fb\ 1/EJ\ = 1/12\ \ Fb^2/EJ$

PLV.003

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