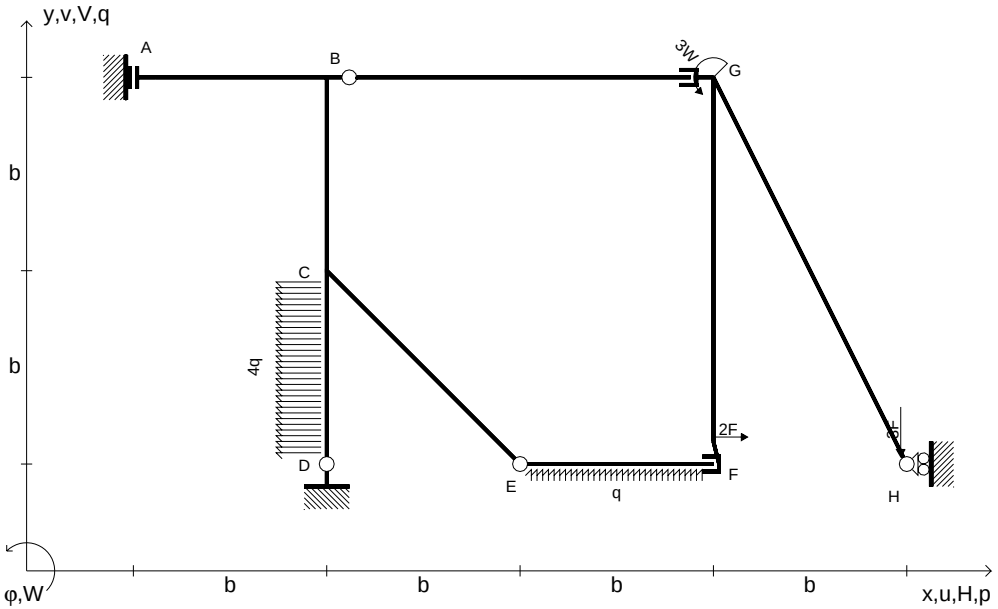



$V_{HG} = -3F$ $p_{CD} = -4q = -4F/b$ $EJ_{CD} = EJ$ $EJ_{CE} = EJ$ $EJ_{BG} = EJ$

$H_{FG} = 2F$ $q_{EF} = q = F/b$ $EJ_{BC} = EJ$ $EJ_{GH} = EJ$

$W_G = 3W = 3Fb$ $EJ_{AB} = EJ$ $EJ_{EF} = EJ$ $EJ_{GF} = EJ$

*Svolgere e riportare su questo foglio
l'analisi cinematica.
*Riportare le reazioni vincolari finali
in forma grafica e analitica.
*Riportare i diagrammi quotati
delle azioni interne.
*Indicare chiaramente i sistemi di riferimento
adottati per le espressioni della linea elastica
*Allegare l'elaborato.
.
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.
Esprimere la linea elastica delle aste. AB CD BC
$J_{YZ}$ - $x_{YZ}$ - $\theta_{YZ}$ riferimento locale asta YZ con origine in Y.



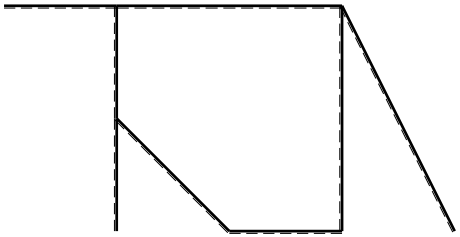


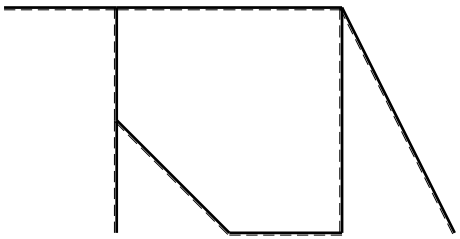
Indicare il verso del riferimento locale AB oppure BA

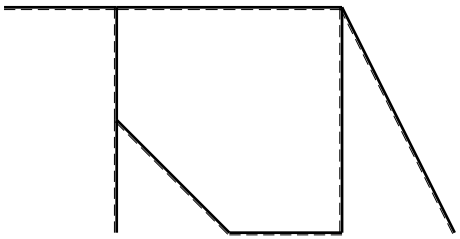
AB BA y(x)EJ=

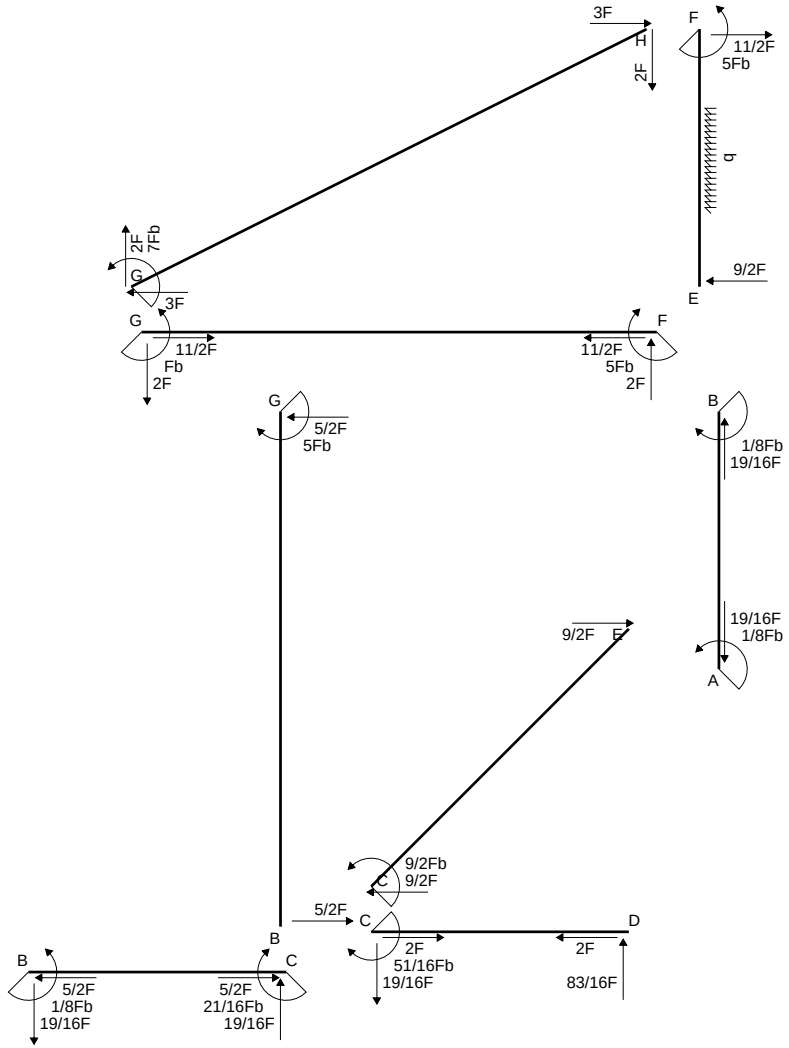
CD DC y(x)EJ=

BC CB y(x)EJ=



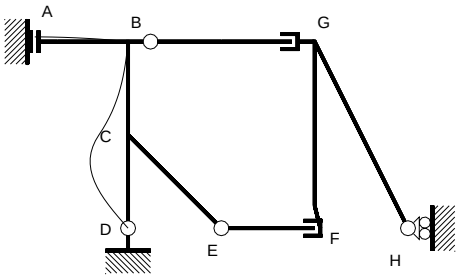




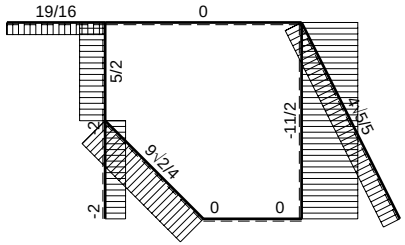

3F
H
2F
F
11/2F
5Fb
q
9/2F
E
2F
7Fb
G
3F
G
11/2F
Fb
2F
11/2F
5Fb
2F
F
G
5/2F
5Fb
B
1/8Fb
19/16F
19/16F
1/8Fb
A
9/2F
E
9/2Fb
9/2F
C
5/2F
C
2F
51/16Fb
19/16F
D
2F
83/16F
B
B
C
5/2F
1/8Fb
19/16F
5/2F
21/16Fb
19/16F



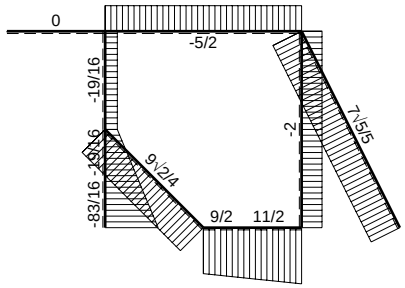



A
B
G
C
D
E
F
H

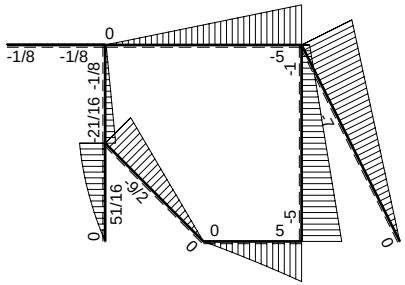
1 $Fb^3/EJ$


19/16
0
5/2
-11/2
7,5/5
-2
9/2
9/4
-2
0
0

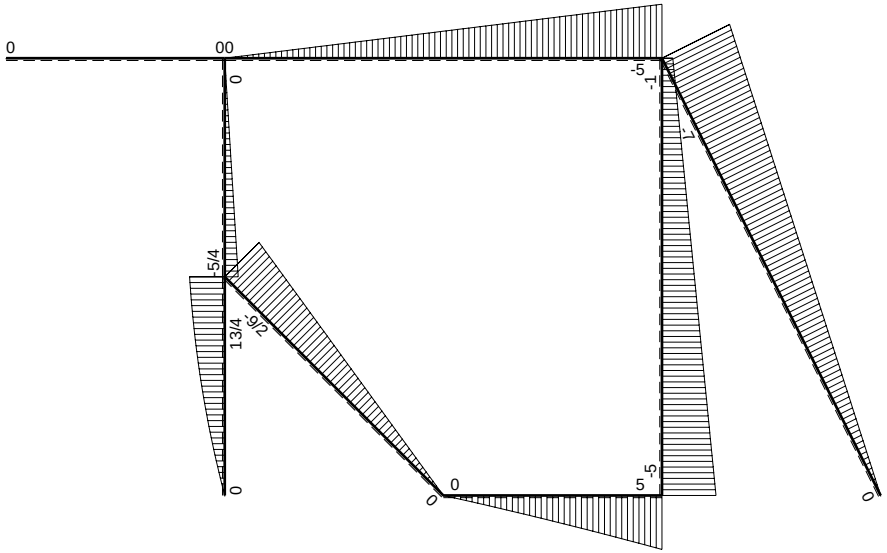
F


0
-5/2
-19/16
-2
7,5/5
-19/16
9/2
9/4
-83/16
9/2
11/2

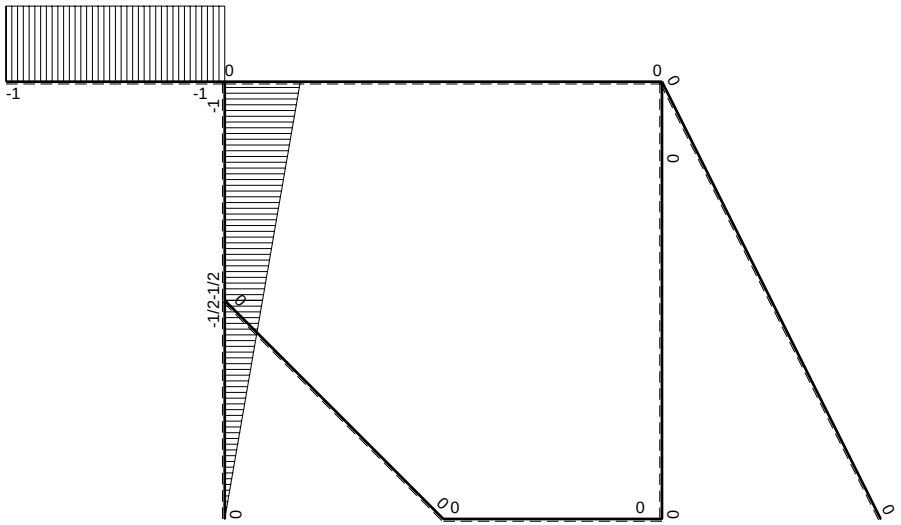
F


0
-1/8
-1/8
-5
-1
-1/8
21/16
1
51/16
9/2
0
0
5
-5
0
0

Fb



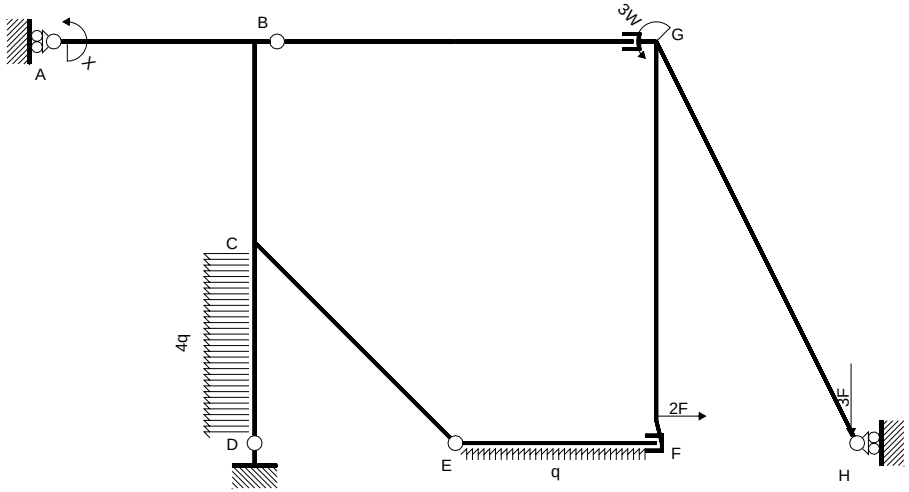

Azione flettente $M_o$




Azione flettente $M_X$








Calcolo iperstatico

REAZIONI IPERSTATICHE

$X = W_{AB}$

DETERMINAZIONE DELLA DEFORMATA ELASTICA

Costanti di integrazione: $\varphi_{AB}$ $K_{AB}$ $\varphi_{CD}$ $K_{CD}$ $\varphi_{BC}$ $K_{BC}$

Relazioni di congruenza

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

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

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

$y_{AB}(b) = 0$

$y_{CD}(b) = 0$

$y_{BC}(0) = 0$

$y_{BC}(b) - y_{CD}(0) = 0$

$M_{AB} = -X$

$EJy''_{AB} = -X$

$EJy'_{AB} = -Xx + EJ\varphi_{AB}$

$EJy_{AB} = -1/2Xx^2 + EJ\varphi_{AB}x + EJK_{AB}$

$M_{BA} = X$

$EJy''_{BA} = X$

$EJy'_{BA} = Xx + EJ\varphi_{BA}$

$EJy_{BA} = 1/2Xx^2 + EJ\varphi_{BA}x + EJK_{BA}$

$M_{CD} = -5/4Fx +13/4Fb -2qx^2 +1/2Xx/b -1/2X$
$EJy''_{CD} = -5/4Fx +13/4Fb -2qx^2 +1/2Xx/b -1/2X$
$EJy'_{CD} = -5/8Fx^2 +13/4Fbx -2/3qx^3 +1/4Xx^2/b -1/2Xx +EJ\varphi_{CD}$
$EJy_{CD} = -5/24Fx^3 +13/8Fbx^2 -1/6qx^4 +1/12Xx^3/b -1/4Xx^2 +EJ\varphi_{CD}x +EJK_{CD}$

$M_{DC} = -21/4Fx +2qx^2 +1/2Xx/b$
$EJy''_{DC} = -21/4Fx +2qx^2 +1/2Xx/b$
$EJy'_{DC} = -21/8Fx^2 +2/3qx^3 +1/4Xx^2/b +EJ\varphi_{DC}$
$EJy_{DC} = -7/8Fx^3 +1/6qx^4 +1/12Xx^3/b +EJ\varphi_{DC}x +EJK_{DC}$

$M_{BC} = -5/4Fx +1/2Xx/b -X$
$EJy''_{BC} = -5/4Fx +1/2Xx/b -X$
$EJy'_{BC} = -5/8Fx^2 +1/4Xx^2/b -Xx +EJ\varphi_{BC}$
$EJy_{BC} = -5/24Fx^3 +1/12Xx^3/b -1/2Xx^2 +EJ\varphi_{BC}x +EJK_{BC}$

$M_{CB} = -5/4Fx +5/4Fb +1/2Xx/b +1/2X$
$EJy''_{CB} = -5/4Fx +5/4Fb +1/2Xx/b +1/2X$
$EJy'_{CB} = -5/8Fx^2 +5/4Fbx +1/4Xx^2/b +1/2Xx +EJ\varphi_{CB}$
$EJy_{CB} = -5/24Fx^3 +5/8Fbx^2 +1/12Xx^3/b +1/4Xx^2 +EJ\varphi_{CB}x +EJK_{CB}$

Condizioni al contorno

| | $\varphi_{AB}b$ | $K_{AB}$ | $\varphi_{CD}b$ | $K_{CD}$ | $\varphi_{BC}b$ | $K_{BC}$ | $Xb^2/EJ$ | | $Fb^3/EJ$ |
|---|---|---|---|---|---|---|---|---|---|
| $y'_{AB}$ | 1 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 |
| $y'_{BA}$ | 1 | 0 | 0 | 0 | -1 | 0 | -1 | | 0 |
| $y'_{CD}$ | 0 | 0 | 1 | 0 | -1 | 0 | 3/4 | | -5/8 |
| $y_{BA}$ | 1 | 1 | 0 | 0 | 0 | 0 | -1/2 | = | 0 |
| $y_{DC}$ | 0 | 0 | 1 | 1 | 0 | 0 | -1/6 | | -5/4 |
| $y_{BC}$ | 0 | 0 | 0 | 0 | 0 | 1 | 0 | | 0 |
| $y_{CB}$ | 0 | 0 | 0 | -1 | 1 | 1 | -5/12 | | 5/24 |

Soluzione

| | $Fb^3/EJ$ |
|---|---|
| $\varphi_{AB}b$ | 0 |
| $\varphi_{BC}b$ | -1/8 |
| $\varphi_{CD}b$ | -27/32 |
| $K_{AB}$ | 1/16 |
| $K_{CD}$ | -37/96 |
| $K_{BC}$ | 0 |
| $Xb^2/EJ$ | 1/8 |

$K_{BA} = 0$ $\varphi_{BA} = -1/8Fb^2/EJ$

$K_{DC} = 0$ $\varphi_{DC} = 13/12Fb^2/EJ$

$K_{CB} = 37/96Fb^3/EJ$ $\varphi_{CB} = -27/32Fb^2/EJ$

DEFORMATA (coordinate locali)
AB $y(x)EJ = 1/16Fb^3 -1/16x^2Fb$
BA $y(x)EJ = 1/8xFb^2 -1/16x^2Fb$
CD $y(x)EJ = -37/96Fb^3 -27/32xFb^2 +51/32x^2Fb -19/96x^3F -1/6x^4q$
DC $y(x)EJ = -13/12xFb^2 +83/96x^3F -1/6x^4q$





BC $y(x)EJ = -1/8xFb^2 -1/16x^2Fb -19/96x^3F$
CB $y(x)EJ = -37/96Fb^3 +27/32xFb^2 -21/32x^2Fb +19/96x^3F$