

$$W_C = -1/2W = -1/2Fb$$

$$p_{BF} = q = F/b$$

$$p_{DG} = q = F/b$$

$$EJ_{AB} = EJ$$

$$EJ_{BC} = EJ$$

$$EJ_{CD} = EJ$$

$$EJ_{DE} = EJ$$

$$EJ_{BF} = EJ$$

$$EJ_{DG} = EJ$$

Verso effettivo dei carichi riportato nel disegno.

Calcolare reazioni vincolari della struttura e delle aste.

Tracciare i diagrammi delle azioni interne nelle aste.

Esprimere le funzioni delle azioni interne nelle aste.

Calcolare spostamento e rotazione di tutti i nodi.

u_A v_A ϕ_A spostamento assoluto del nodo A.

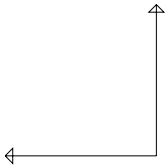
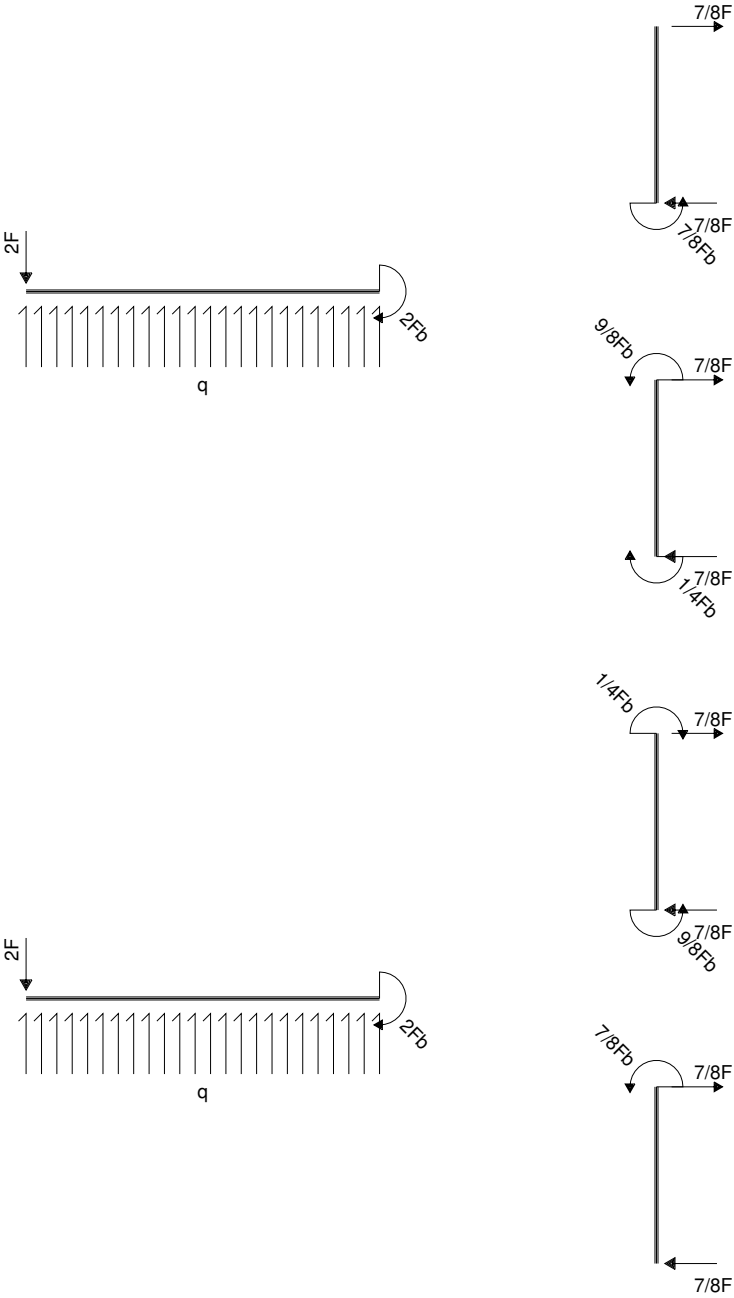
J_{AB} x_{AB} ϕ_{AB} riferimento locale asta AB con origine in A.

<> ESAME 15/01/2019 - APPELLO 01 - IPERSTATICA

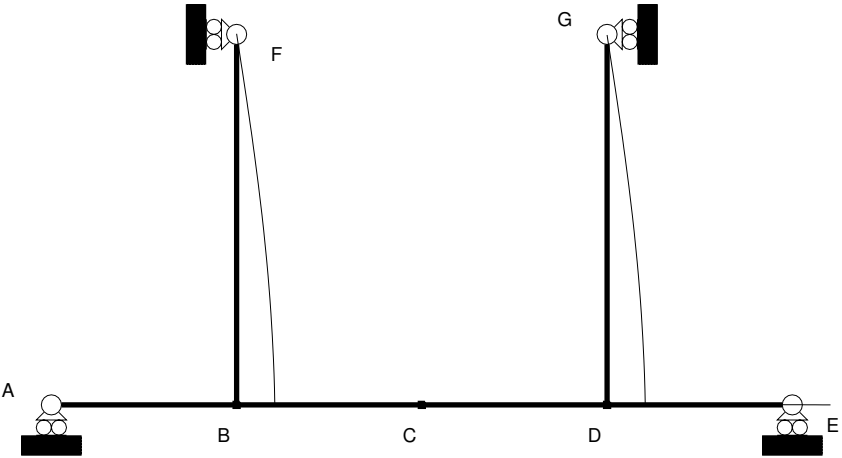
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<> Struttura 1: Iperstatica Test 1

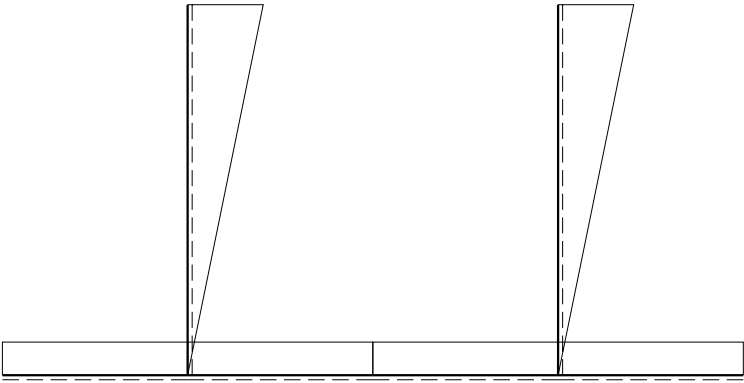
<> Struttura 2: Iperstatica Test 2



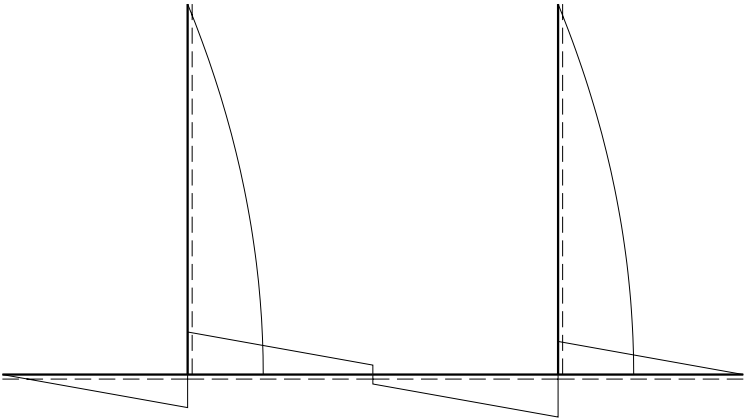
$8 Fb^3/EJ$



$2 F$



$2 Fb$



REAZIONI

$$V_A = -1/8(W/b) + qb = 7/8F$$

$$V_E = 1/8(W/b) - qb = -7/8F$$

$$H_F = -2qb = -2F$$

$$H_G = -2qb = -2F$$

$$H_{AB} = 0$$

$$V_{AB} = -1/8(W/b) + qb = 7/8F$$

$$W_{AB} = 0$$

$$H_{BA} = 0$$

$$V_{BA} = 1/8(W/b) - qb = -7/8F$$

$$W_{BA} = -1/8W + qb^2 = 7/8Fb$$

$$H_{BC} = 0$$

$$V_{BC} = -1/8(W/b) + qb = 7/8F$$

$$W_{BC} = 1/8W + qb^2 = 9/8Fb$$

$$H_{CB} = 0$$

$$V_{CB} = 1/8(W/b) - qb = -7/8F$$

$$W_{CB} = -1/4W = -1/4Fb$$

$$H_{CD} = 0$$

$$V_{CD} = -1/8(W/b) + qb = 7/8F$$

$$W_{CD} = -1/4W = -1/4Fb$$

$$H_{DC} = 0$$

$$V_{DC} = 1/8(W/b) - qb = -7/8F$$

$$W_{DC} = 1/8W + qb^2 = 9/8Fb$$

$$H_{DE} = 0$$

$$V_{DE} = -1/8(W/b) + qb = 7/8F$$

$$W_{DE} = -1/8W + qb^2 = 7/8Fb$$

$$H_{ED} = 0$$

$$V_{ED} = 1/8(W/b) - qb = -7/8F$$

$$W_{ED} = 0$$

$$H_{BF} = 0$$

$$V_{BF} = 0$$

$$W_{BF} = -2qb^2 = -2Fb$$

$$H_{FB} = -2qb = -2F$$

$$V_{FB} = 0$$

$$W_{FB} = 0$$

$$H_{DG} = 0$$

$$V_{DG} = 0$$

$$W_{DG} = -2qb^2 = -2Fb$$

$$H_{GD} = -2qb = -2F$$

$$V_{GD} = 0$$

$$W_{GD} = 0$$

SPOSTAMENTI NODALI

$$u_{AAB} = 1/24(Wb^2/EJ) + 4(qb^4/EJ) = 97/24(Fb^3/EJ)$$

$$v_A = 0$$

$$\phi_{AAB} = 1/12(Wb/EJ) - 1/6(qb^3/EJ) = -1/12(Fb^2/EJ)$$

$$u_B = 1/24(Wb^2/EJ) + 4(qb^4/EJ) = 97/24(Fb^3/EJ)$$

$$v_B = 1/16(Wb^2/EJ) = 1/16(Fb^3/EJ)$$

$$\phi_B = 1/48(Wb/EJ) + 1/3(qb^3/EJ) = 17/48(Fb^2/EJ)$$

$$u_C = 1/24(Wb^2/EJ) + 4(qb^4/EJ) = 97/24(Fb^3/EJ)$$

$$v_C = 0$$

$$\phi_C = -1/6(Wb/EJ) - 1/6(qb^3/EJ) = -1/3(Fb^2/EJ)$$

$$u_D = 1/24(Wb^2/EJ) + 4(qb^4/EJ) = 97/24(Fb^3/EJ)$$

$$v_D = -1/16(Wb^2/EJ) = -1/16(Fb^3/EJ)$$

$$\phi_D = 1/48(Wb/EJ) + 1/3(qb^3/EJ) = 17/48(Fb^2/EJ)$$

$$u_{EED} = 1/24(Wb^2/EJ) + 4(qb^4/EJ) = 97/24(Fb^3/EJ)$$

$$v_E = 0$$

$$\phi_{EED} = 1/12(Wb/EJ) - 1/6(qb^3/EJ) = -1/12(Fb^2/EJ)$$

$$u_F = 0$$

$$v_{FFB} = 1/16(Wb^2/EJ) = 1/16(Fb^3/EJ)$$

$$\phi_{FFB} = 1/48(Wb/EJ) + 3(qb^3/EJ) = 145/48(Fb^2/EJ)$$

$$u_G = 0$$

$$v_{GGD} = -1/16(Wb^2/EJ) = -1/16(Fb^3/EJ)$$

$$\phi_{GGD} = 1/48(Wb/EJ) + 3(qb^3/EJ) = 145/48(Fb^2/EJ)$$

AZIONI INTERNE (coordinate locali)

$$N_{AB} = 0$$

$$T_{AB} = 7/8F$$

$$M_{AB} = 7/8Fx$$

$$N_{BC} = 0$$

$$T_{BC} = 7/8F$$

$$M_{BC} = -9/8Fb + 7/8Fx$$

$$N_{CD} = 0$$

$$T_{CD} = 7/8F$$

$$M_{CD} = 1/4Fb + 7/8Fx$$

$$N_{DE} = 0$$

$$T_{DE} = 7/8F$$

$$M_{DE} = -7/8Fb + 7/8Fx$$

$$N_{BF} = 0$$

$$T_{BF} = -qx$$

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

$$N_{DG} = 0$$

$$T_{DG} = -qx$$

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