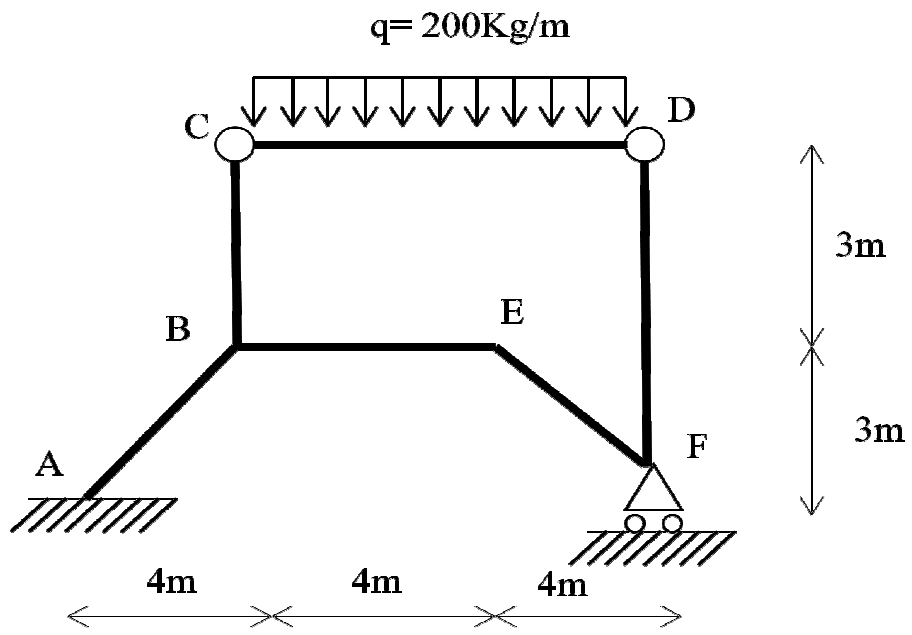


Ejercicio 11: por el método de Cross



Suponiendo  $EI$  cte, determinar los diagramas de solicitaciones empleando el método de Cross

# Solución

$M_{AB} = M_{BA} = -\frac{6E}{25} \delta_{AB} = -40\alpha$   
 $M_{BC} = \frac{3E}{9} \cdot 0.6 \delta_{AB} = 33.33\alpha$   
 $M_{BE} = M_{EB} = \frac{6E \cdot 1.6 \delta_{AB}}{16} = 100\alpha$   
 $M_{EF} = M_{FE} = -\frac{6E}{25} \delta_{AB} = -40\alpha$

$\delta_{BC} = 0.6 \delta_{AB}$   
 $\delta_{CD} = 0.8 \delta_{AB}$   
 $\delta_{EF} = \delta_{AB}$   
 $\delta_{BE} = 1.6 \delta_{AB}$

$m_{BC} = \frac{3E}{9} \delta_{BC} = 100\beta$   
 $m_{FD} = \frac{3E}{36} \delta_{BC} = 25\beta$

$m_{BE} = m_{EB} = -\frac{6E}{16} \cdot 0.8 \delta_{EF} = -100\gamma$   
 $m_{EF} = m_{FE} = \frac{6E}{25} \delta_{EF} = 80\gamma$   
 $m_{ED} = \frac{3E}{36} \cdot 0.6 \delta_{EF} = 16.66\gamma$

$N_{CD} = \frac{m_{BC}}{3}$

$V_{CB} + V_{DF} = 0 \rightarrow 2m_{BC} + m_{FD} = 0 \rightarrow 2949\alpha - 136.3\beta + 41.86\gamma = 0$   
 $\sum M_n = 0 \rightarrow 1600 - 0.5m_{BC} + 0.5m_{AB} + 1.5m_{BA} + 1.5m_{EF} + 0.5m_{FE} = 0$   
 $\rightarrow 1600 - 208.55\alpha + 85.01\beta + 137.31\gamma = 0$   
 $\sum M_o = 0 \rightarrow 2m_{EB} + m_{BE} + 1.5m_{FD} = 0 \rightarrow 192.07\alpha + 186.7\beta - 221.67\gamma = 0$

$\alpha = 38.197$   
 $\beta = 18.861$   
 $\gamma = 34.685$

$A_B = -1201.3 \text{ mK}$   
 $A_A = -882.44 \text{ mK}$   
 $C_C = 135.70 \text{ mK}$   
 $D_D = -271.63 \text{ mK}$   
 $E_E = 745.78 \text{ mK}$   
 $B_B = -169.19 \text{ mK}$   
 $F_F = 169.15 \text{ mK}$   
 $E = 271.63 \text{ mK}$