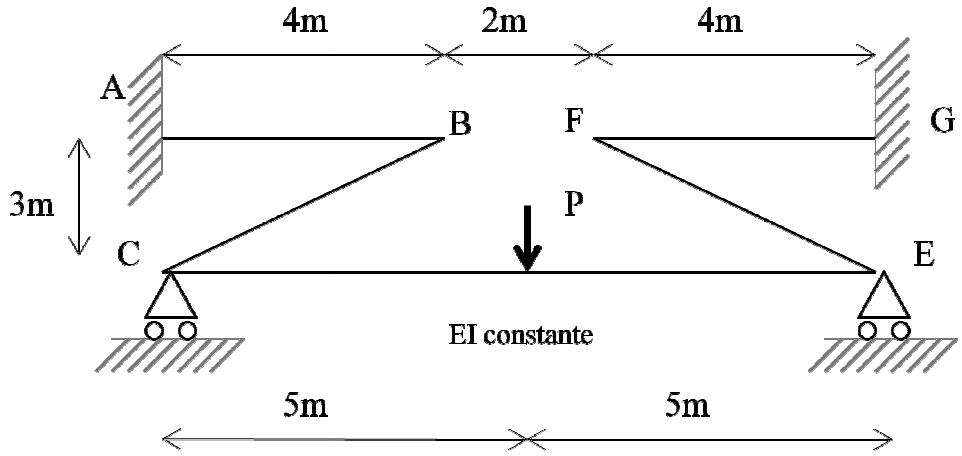
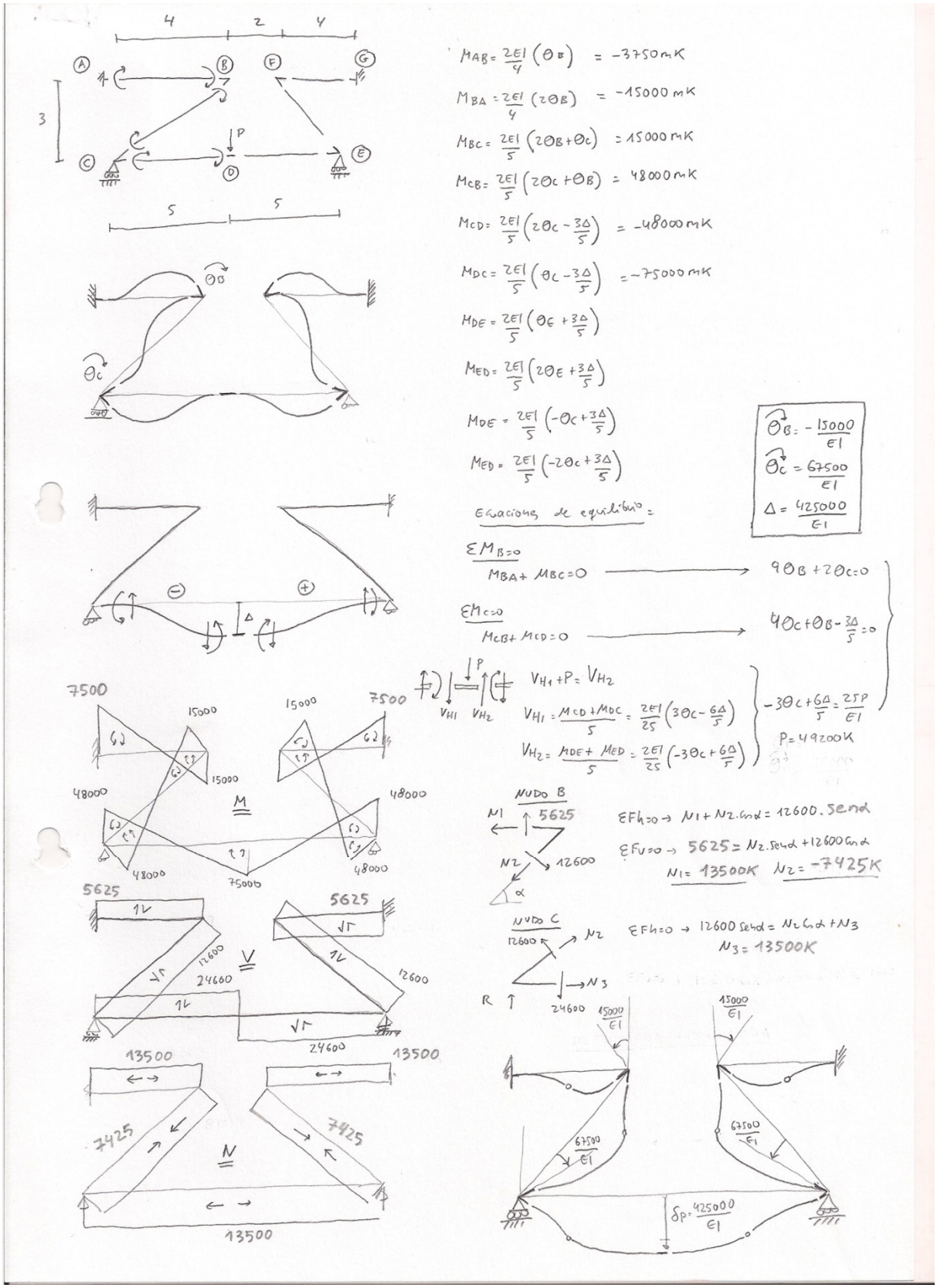
Ejercicio 8: por el método de Maney



Empleando el método de Maney determinar:

a) Los diagramas de solicitaciones
b) El desplazamiento final de P
c) La deformada aproximada

Solución


4 2 4
3
5 5
A B F G C D E P
θ_B
θ_C
$M_{AB} = \frac{2EI}{4}(\theta_B) = -3750\,mK$
$M_{BA} = \frac{2EI}{4}(2\theta_B) = -15000\,mK$
$M_{BC} = \frac{2EI}{5}(2\theta_B + \theta_C) = 15000\,mK$
$M_{CB} = \frac{2EI}{5}(2\theta_C + \theta_B) = 48000\,mK$
$M_{CD} = \frac{2EI}{5}(2\theta_C - \frac{3\Delta}{5}) = -48000\,mK$
$M_{DC} = \frac{2EI}{5}(\theta_C - \frac{3\Delta}{5}) = -75000\,mK$
$M_{DE} = \frac{2EI}{5}(\theta_E + \frac{3\Delta}{5})$
$M_{ED} = \frac{2EI}{5}(2\theta_E + \frac{3\Delta}{5})$
$M_{DE} = \frac{2EI}{5}(-\theta_C + \frac{3\Delta}{5})$
$M_{ED} = \frac{2EI}{5}(-2\theta_C + \frac{3\Delta}{5})$
$\theta_B = -\frac{15000}{EI}$
$\theta_C = \frac{67500}{EI}$
$\Delta = \frac{425000}{EI}$
Ecuaciones de equilibrio:
$\Sigma M_B = 0$
$M_{BA} + M_{BC} = 0 \rightarrow 9\theta_B + 2\theta_C = 0$
$\Sigma M_C = 0$
$M_{CB} + M_{CD} = 0 \rightarrow 4\theta_C + \theta_B - \frac{3\Delta}{5} = 0$
$V_{H1} + P = V_{H2}$
$V_{H1} = \frac{M_{CD} + M_{DC}}{5} = \frac{2EI}{25}(3\theta_C - \frac{6\Delta}{5})$
$V_{H2} = \frac{M_{DE} + M_{ED}}{5} = \frac{2EI}{25}(-3\theta_C + \frac{6\Delta}{5})$
$-3\theta_C + \frac{6\Delta}{5} = \frac{25P}{EI}$
$P = 49200K$
M
V
N
NUDO B
$\Sigma F_h = 0 \rightarrow N_1 + N_2 \cos\alpha = 12600 \cdot \operatorname{sen}\alpha$
$\Sigma F_v = 0 \rightarrow 5625 = N_2 \operatorname{sen}\alpha + 12600 \cos\alpha$
$N_1 = 13500K \quad N_2 = -7425K$
NUDO C
$\Sigma F_h = 0 \rightarrow 12600 \operatorname{sen}\alpha = N_2 \cos\alpha + N_3$
$N_3 = 13500K$
$\delta_P = \frac{425000}{EI}$