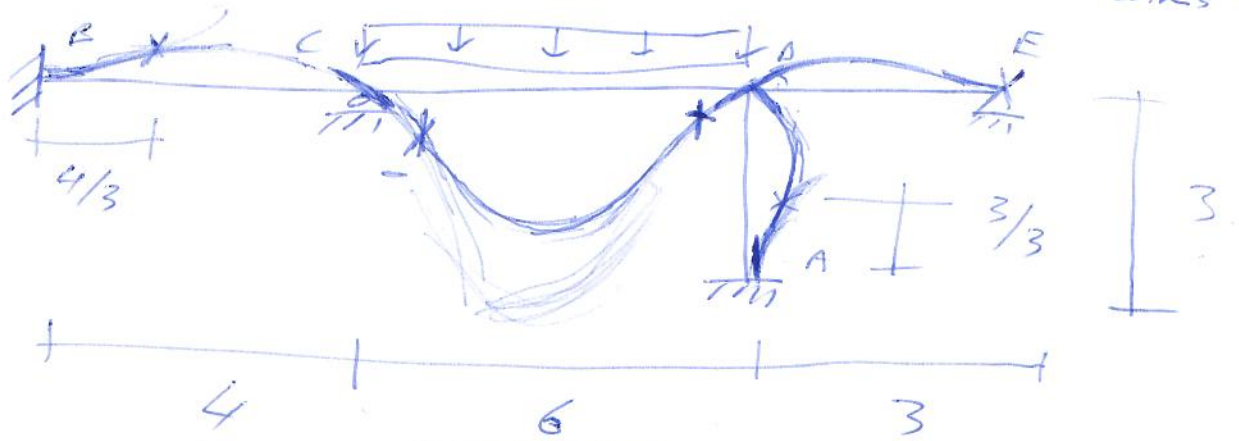


$$EI_{beams} = 2$$

$$EI_{columns} = 1$$

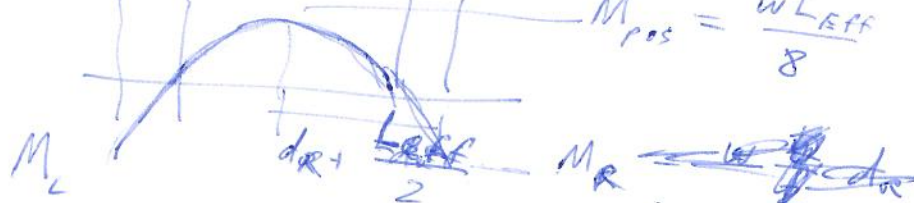


$$= k_L \text{ (at C)} \quad \text{---} \quad k_R \text{ (at D)} =$$

$$\frac{0.92 k_L}{3 + 4k_L} \times L = d_L$$

$$d_R = \frac{0.92 k_R}{3 + 4k_R} \times L$$

$$M_{pos} = \frac{w L_{eff}^2}{8}$$



- Find k_R, k_L
- Find d_R, d_L, L_{eff}
- Find M_+, M_-, M_R

$$k_R = \frac{3 \left(\frac{EI}{L} \right)_{DE} + 4 \left(\frac{EI}{L} \right)_{DA}}{4 \left(\frac{EI}{L} \right)_{CD}} = \frac{3 \times \frac{2}{3} + 4 \times \frac{1}{3}}{4 \times \frac{2}{6}}$$

$$\Rightarrow k_R = 2.5$$

$$k_L = \frac{4 \left(\frac{EI}{L} \right)_{BC}}{4 \left(\frac{EI}{L} \right)_{CD}} = \frac{4 \times \frac{2}{4}}{4 \times \frac{2}{6}} = 1.5$$

$$k_L = 1.5$$

$$d_R = \frac{0.92 \times 2.5}{3 + 4 \times 2.5} \times 6 = 1.06$$

$$d_L = \frac{0.92 \times 1.5}{3 + 4 \times 1.5} \times 6 = 0.92$$

$$\left. \begin{array}{l} L_{eff} = 6 - 1.06 - 0.92 \\ L_{eff} = 4.02 \end{array} \right\}$$

$$M_{pos} = 100 \times \frac{4.02^2}{8} = 202 \quad (\text{Exact } \sim 212)$$

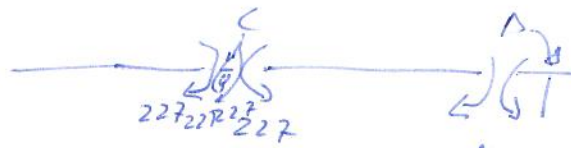
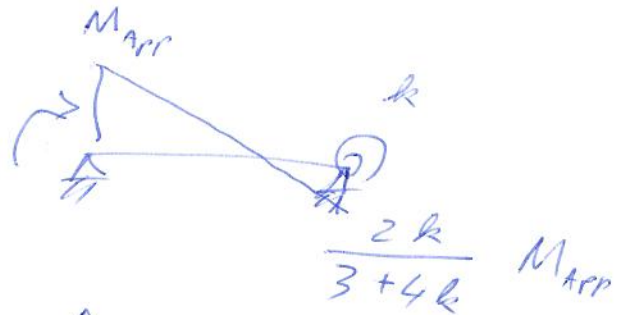
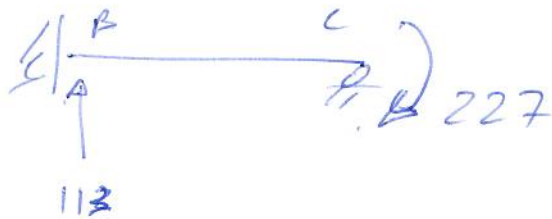
$$M_R = \frac{100}{2} \times 1.06 \times (1.06 + 4.02) = 270 \quad (\sim 265)$$

$$M_L = \frac{100}{2} \times 0.92 \times (0.92 \times 4.02) = 227 \quad (\sim 212)$$

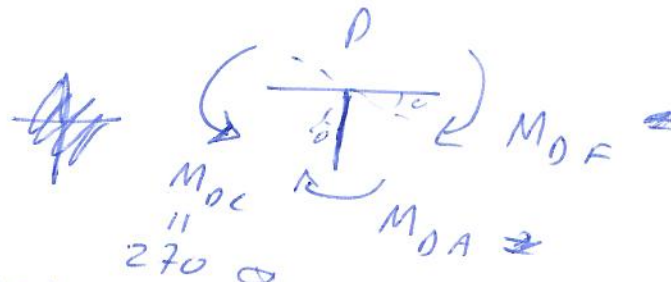
within 7% error

Other members

BC



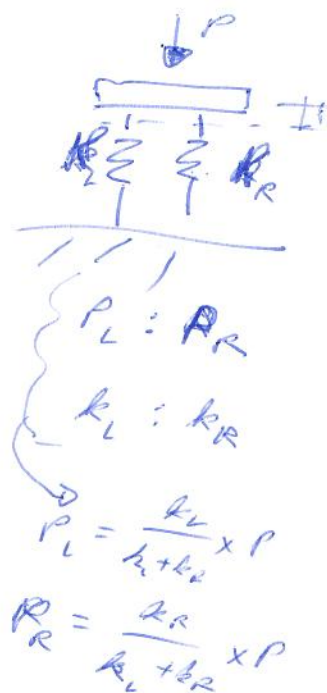
DE and DA

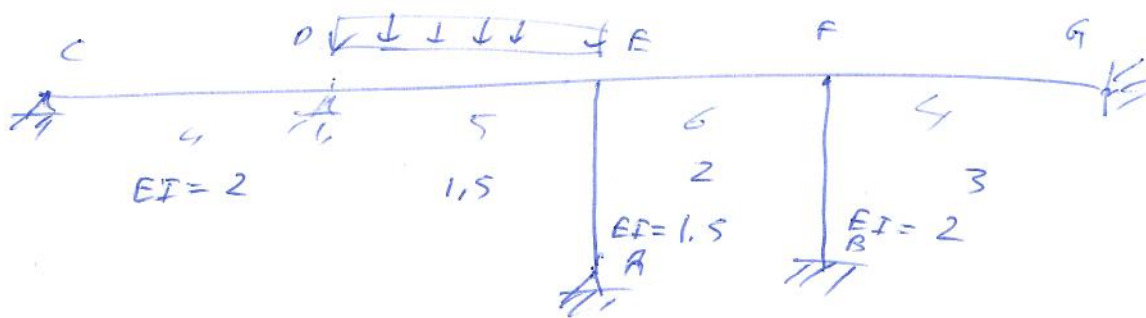
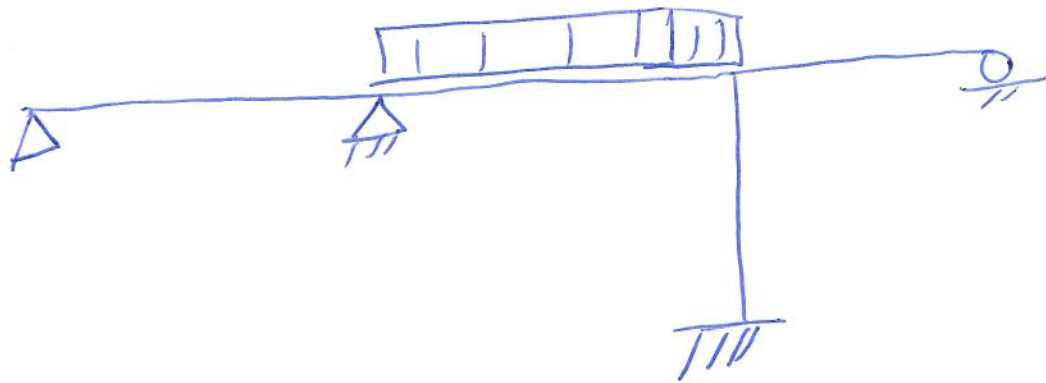


$$M_{DF} = \frac{3 \left(\frac{EI}{L} \right)_{DE}}{3 \left(\frac{EI}{L} \right)_{DE} + 4 \left(\frac{EI}{L} \right)_{DA}} \times M_{DE}$$

$$M_{DF} = \frac{3 \times \frac{2}{3}}{3 \times \frac{2}{3} + 4 \times \frac{1}{3}} \times 270 = \frac{3}{5} \times 270 = 162$$

$$M_{DA} = \frac{4 \times \frac{1}{3}}{3 \times \frac{2}{3} + 4 \times \frac{1}{3}} \times 270 = 108$$





Assignment 3