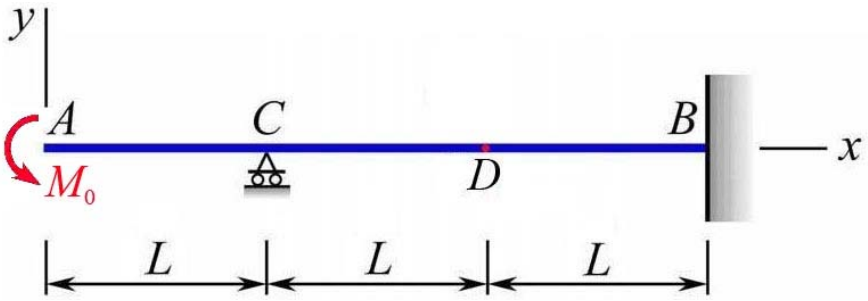
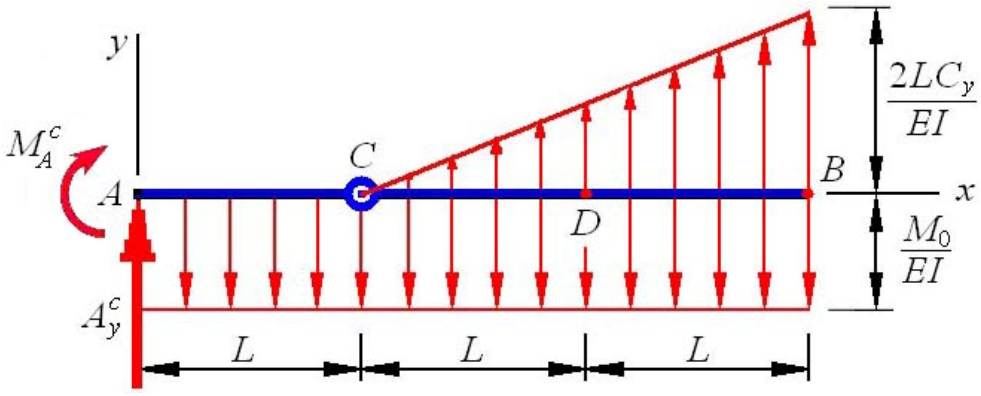
MEEG 3013 Quiz #10.m27.082

The beam shown has constant flexural rigidity *EI*. Using the *conjugate beam method*, determine (*a*) the reaction $\mathbf{C}_y$ at *C*, (*b*) the slope θ_A and deflection y_A at *A*, (*c*) the slope θ_D at *D*.





②

$M_C^c = 0:$ $\quad \frac{4L}{3}\cdot\left(\frac{1}{2}\cdot 2L\cdot\frac{2LC_y}{EI}\right) - L\cdot\left(2L\cdot\frac{M_0}{EI}\right) = 0 \qquad C_y = \frac{3M_0}{4L}$

$+\uparrow \Sigma F_y^c = 0:$ $\quad A_y^c + \frac{1}{2}\cdot(2L)\cdot\frac{2LC_y}{EI} - 3L\cdot\frac{M_0}{EI} = 0 \qquad A_y^c = \frac{3M_0L}{2EI}$

$M_C^c = 0:$ $\quad M_A^c + LA_y^c - \frac{L}{2}\cdot\frac{M_0L}{EI} = 0 \qquad M_A^c = -\frac{M_0L^2}{EI}$

$\therefore$ $\quad \mathbf{C}_y = \frac{3M_0}{4L}\uparrow$ ② $\qquad \theta_A = +\frac{3M_0L}{2EI}$ ② $\qquad y_A = -\frac{M_0L^2}{EI}$ ②

$\theta_D = V_D^c = A_y^c + \frac{L}{2}\cdot\frac{LC_y}{EI} - \frac{2M_0L}{EI} \qquad \theta_D = -\frac{M_0L}{8EI}$ ②