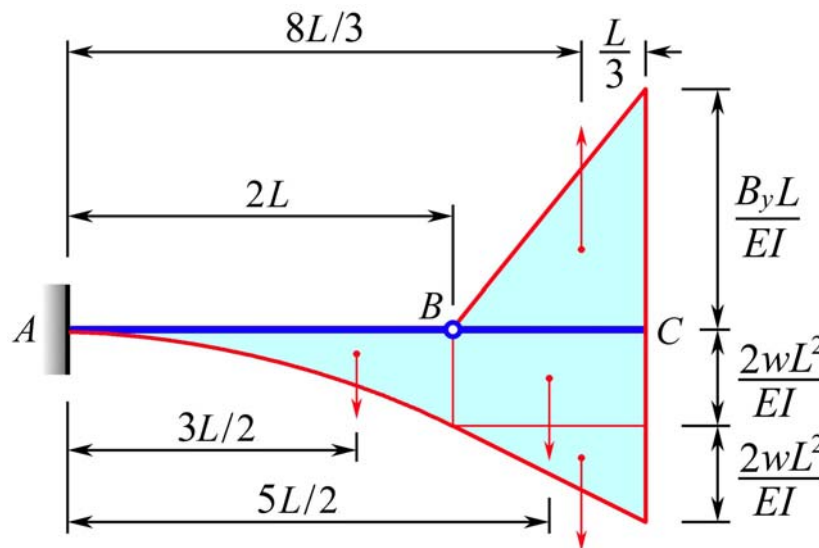
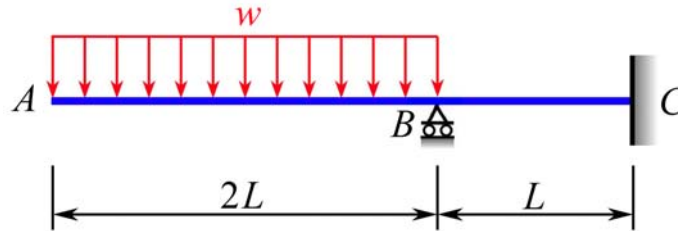


MEEG 3013 Quiz #10

The beam shown has a constant flexural rigidity EI . Using **conjugate beam method**, determine for the beam (a) the reaction \mathbf{B}_y at B , (b) the deflection y_A at A , (c) the slope θ_B at B .



$$M_B^c = 0: \frac{2L}{3} \cdot \frac{B_y L^2}{2EI} - \frac{L}{2} \cdot \frac{2wL^3}{EI} - \frac{2L}{3} \cdot \frac{wL^3}{EI} = 0 \quad \therefore B_y = 5wL \quad \textcircled{2}$$

$$y_A = M_A^c = \frac{8L}{3} \cdot \frac{B_y L^2}{2EI} - \frac{3L}{2} \cdot \frac{4wL^3}{3EI} - \frac{5L}{2} \cdot \frac{2wL^3}{EI} - \frac{8L}{3} \cdot \frac{wL^3}{EI} = -\frac{3wL^4}{EI} \quad \textcircled{2}$$

$$\theta_B = V_B^c = \frac{L}{2} \cdot \frac{6wL^2}{EI} - \frac{B_y L^2}{2EI} = \frac{wL^3}{2EI} \quad \textcircled{2}$$

$$\mathbf{B}_y = 5wL \uparrow$$

$$y_A = \frac{3wL^4}{EI} \downarrow$$

$$\theta_B = \frac{wL^3}{2EI} \curvearrowright$$

①