Example 3.2

Calculate the shear flow distribution for the idealised C-section in Figure 2, assuming that skins carry only shear stresses and booms carry only direct stresses.
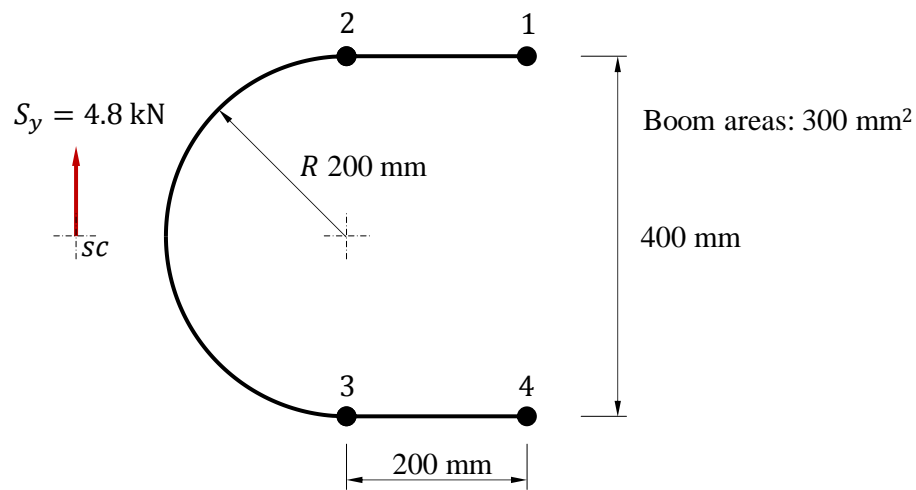

Figure 2: Open C-section with semi-circular member loaded through its shear centre.

3.2

$$q = \left| -\frac{S_y}{I_{xx}} \right| \Sigma A_i y_i$$

$$I_{xx} = \Sigma A_i y_i^2 = 4.8 \cdot 10^6 \text{ mm}^4$$

$$\frac{S_y}{I_{xx}} = \boxed{10^{-4} \text{ N/mm}^4}$$

Initially $q = 0$

Afterwards

$$q = -10^{-4} \Sigma A_i y_i$$

$$q_{12} = (10^{-4})(300 \text{ mm}^2)(200 \text{ mm})$$

$$\boxed{q_{12} = -6 \text{ N/mm}}$$