

$$t_{AB} := \left(\frac{1}{2} \cdot l \cdot \frac{M_{BA}}{EI} \right) \cdot \left(\frac{2}{3} \cdot l \right) - \left(\frac{1}{2} \cdot l \cdot \frac{M_{AB}}{EI} \right) \cdot \left(\frac{1}{3} \cdot l \right) - \frac{Ax_A}{EI}$$

$$\frac{1}{3} \frac{l^2 M_{BA}}{EI} - \frac{1}{6} \frac{l^2 M_{AB}}{EI} - \frac{Ax_A}{EI} \quad (1)$$

$$t_{BA} := \left(\frac{1}{2} \cdot l \cdot \frac{M_{AB}}{EI} \right) \cdot \left(\frac{2}{3} \cdot l \right) - \left(\frac{1}{2} \cdot l \cdot \frac{M_{BA}}{EI} \right) \cdot \left(\frac{1}{3} \cdot l \right) + \frac{Ax_B}{EI}$$

$$\frac{1}{3} \frac{l^2 M_{AB}}{EI} - \frac{1}{6} \frac{l^2 M_{BA}}{EI} + \frac{Ax_B}{EI} \quad (2)$$

$$\text{sistema} := \left\{ \theta_A - \psi_{AB} = \frac{t_{BA}}{l}, \theta_B - \psi_{AB} = \frac{t_{AB}}{l} \right\}$$

$$\left\{ \theta_A - \psi_{AB} = \frac{\frac{1}{3} \frac{l^2 M_{AB}}{EI} - \frac{1}{6} \frac{l^2 M_{BA}}{EI} + \frac{Ax_B}{EI}}{l}, \theta_B - \psi_{AB} = \frac{\frac{1}{3} \frac{l^2 M_{BA}}{EI} - \frac{1}{6} \frac{l^2 M_{AB}}{EI} - \frac{Ax_A}{EI}}{l} \right\} \quad (3)$$

solve(sistema, {M[AB], M[BA]});

$$\left\{ M_{AB} = \frac{2 (\theta_B EIl - 3 \psi_{AB} EIl + 2 \theta_A EIl - 2 Ax_B + Ax_A)}{l^2}, M_{BA} = \frac{2 (\theta_A EIl - 3 \psi_{AB} EIl + 2 \theta_B EIl - Ax_B + 2 Ax_A)}{l^2} \right\} \quad (4)$$

$$M_{AB} = \frac{2 (\theta_B EIl - 3 \psi_{AB} EIl + 2 \theta_A EIl - 2 Ax_B + Ax_A)}{l^2}$$

$$M_{AB} = \frac{2 (\theta_B EIl - 3 \psi_{AB} EIl + 2 \theta_A EIl - 2 Ax_B + Ax_A)}{l^2} \quad (5)$$

Quitando los términos debidos al momento de viga simple,

$$M_{AB} = \frac{2 (\theta_B EIl - 3 \psi_{AB} EIl + 2 \theta_A EIl - 2 Ax_B + Ax_A)}{l^2}$$

$$M_{AB} = \frac{2 (\theta_B EIl - 3 \psi_{AB} EIl + 2 \theta_A EIl - 2 Ax_B + Ax_A)}{l^2} \quad (6)$$

simplify

$$M_{AB} = - \frac{2 EI (-\theta_B + 3 \psi_{AB} - 2 \theta_A)}{l}$$

$$M_{BA} = \frac{2 (\theta_A EIl - 3 \psi_{AB} EIl + 2 \theta_B EIl - Ax_B + 2 Ax_A)}{l^2}$$

$$M_{BA} = \frac{2 (\theta_A EI l - 3 \psi_{AB} EI l + 2 \theta_B EI l - Ax_B + 2 Ax_A)}{l^2} \quad (7)$$

Quitando los términos debidos al momento de viga simple,

$$M_{BA} = \frac{2 (\theta_A EI l - 3 \psi_{AB} EI l + 2 \theta_B EI l)}{l^2}$$

$$M_{BA} = \frac{2 (\theta_A EI l - 3 \psi_{AB} EI l + 2 \theta_B EI l)}{l^2} \quad (8)$$

simplify

$$M_{BA} = - \frac{2 EI (-\theta_A + 3 \psi_{AB} - 2 \theta_B)}{l} \quad (9)$$