

$$\text{kip} := 1000 \cdot \text{lbf} \qquad \text{MPa} := 10^6 \cdot \text{Pa} \qquad \text{ORIGIN} := 1$$

$$P := 6 \cdot \text{kip} \qquad L := 10 \cdot \text{ft} \qquad I_0 := 10000 \cdot \text{cm}^4 \qquad E := 200000 \cdot \text{MPa} \qquad I(x) := I_0 - \frac{x}{2 \cdot L} \cdot \frac{I_0}{4} \qquad I(2 \cdot L) = 7500 \text{ cm}^4$$

$$M\Big(x,M_1,R_1,R_2\Big) := M_1 + R_1 \cdot x + R_2 \Bigg(\left\{\begin{array}{ll} x - L & \text{if } x > L \\ 0 & \text{otherwise} \end{array}\right.\Bigg) + (-P) \cdot \left\{\begin{array}{ll} x - \frac{L}{2} & \text{if } x > \frac{L}{2} \\ 0 & \text{otherwise} \end{array}\right.$$

$$V\Big(x,M_1,R_1,R_2\Big) := \frac{d}{dx}M\Big(x,M_1,R_1,R_2\Big)$$

$$\text{Slope}\Big(X,M_1,R_1,R_2\Big) := \frac{1}{E} \cdot \int_{0 \cdot \text{ft}}^X \frac{M\Big(x,M_1,R_1,R_2\Big)}{I(x)} \, dx \qquad \text{slope at left support is implicitly set zero}$$

so we can't use the slope and deflection and slope at left support as conditions, we have used them implicitly in the definition of Slope and Deflection that so get a true value directly for the retained variables

$$\delta\Big(X,M_1,R_1,R_2\Big) := \int_{0 \cdot \text{ft}}^X \text{Slope}\Big(x,M_1,R_1,R_2\Big) \, dx \qquad \text{deflection at left support is implicitly set zero}$$

$$M_1 := 10 \cdot \text{ft} \cdot \text{kip} \qquad R_1 := 1 \cdot \text{kip} \qquad R_2 := 2 \cdot \text{kip} \qquad \text{unwarranted guesses to feed the solution algorithm}$$

Given

$$\delta\Big(L,M_1,R_1,R_2\Big) = 0 \cdot \text{ft} \qquad \delta\Big(2 \cdot L,M_1,R_1,R_2\Big) = 0 \cdot \text{ft} \qquad M\Big(2 \cdot L,M_1,R_1,R_2\Big) = 0 \cdot \text{ft} \cdot \text{kip}$$

$$\text{Result} := \text{Find}\Big(M_1,R_1,R_2\Big)$$

$$M_1 := \text{Result}_1 \qquad R_1 := \text{Result}_2 \qquad R_2 := \text{Result}_3$$

$$M_1 = -9.956 \text{ ft} \cdot \text{kip} \qquad R_1 = 3.697 \text{ kip} \qquad R_2 = 2.601 \text{ kip}$$

$$R_3 := P - R_1 - R_2 \qquad R_3 = -0.298 \text{ kip}$$

