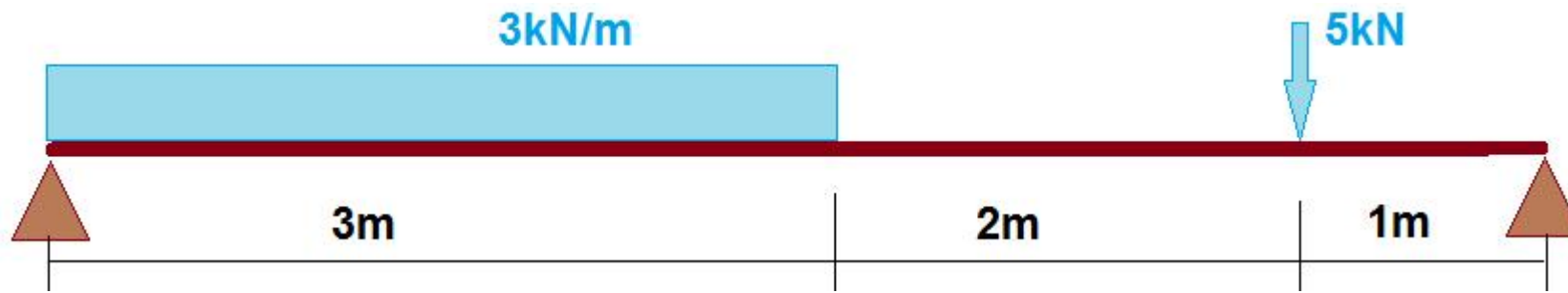


ORIGIN := 0



$$q := 3 \frac{\text{kN}}{\text{m}} \quad P := 5 \text{ kN}$$

$$L := 6 \text{ m} \quad b := 10 \text{ cm} \quad h := 18 \text{ cm} \quad L1 := 3 \text{ m} \quad L2 := 5 \text{ m} \quad n := 12$$

$$\Delta := \frac{L}{n} \quad J := b \cdot \frac{h^3}{12} \quad E := 10^7 \text{ kPa} \quad \alpha := \frac{\Delta^2}{E \cdot J} = 5.144 \times 10^{-7} \frac{1}{\text{N}}$$

$$R12 := \frac{P \cdot L2 + q \cdot \frac{L1^2}{2}}{L} \quad R0 := P + q \cdot L1 - R12$$

$$R0 = 7.583 \cdot \text{kN}$$

$$R12 = 6.417 \cdot \text{kN}$$

$$M1(x) := R0 \cdot x - q \cdot \frac{x^2}{2}$$

$$M2(x) := R0 \cdot x - q \cdot L1 \cdot \left( x - \frac{L1}{2} \right)$$

$$M3(x) := M2(x) - P \cdot (x - L2)$$

$$i := 0 .. n$$

$$X_i := i \cdot \Delta$$

$i := 0.. 6$

$M_i := M1(X_i)$

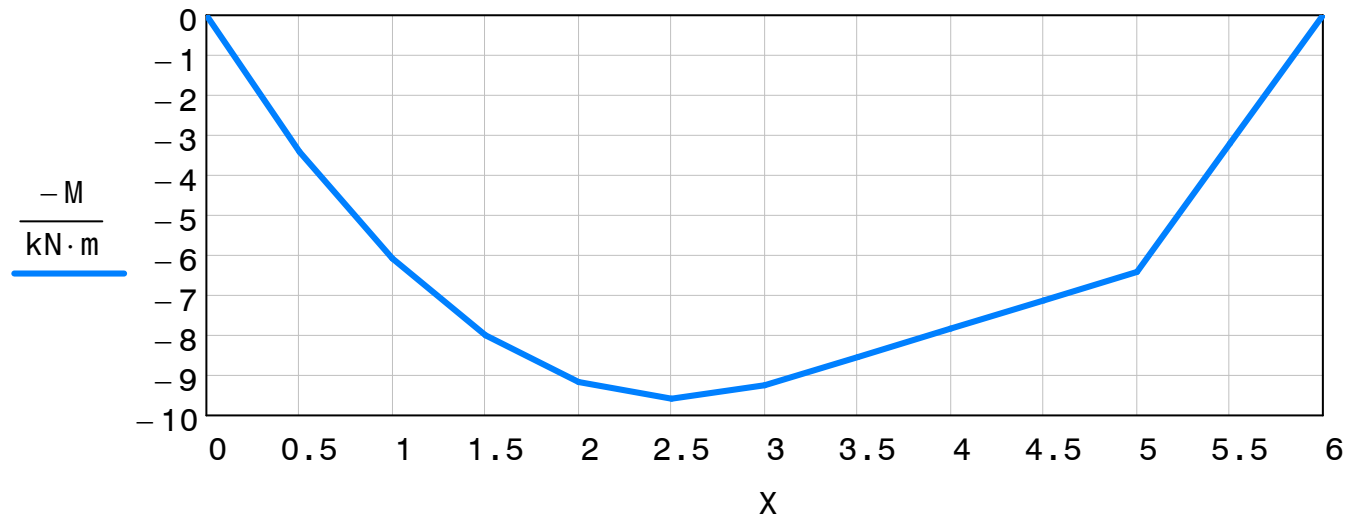
$i := 6.. 10$

$M_i := M2(X_i)$

$i := 11.. n$

$M_i := M3(X_i)$

|    |                    |    |     |
|----|--------------------|----|-----|
|    | 0                  |    | 0   |
| 0  | 0                  | 0  | 0   |
| 1  | $3.417 \cdot 10^3$ | 1  | 0.5 |
| 2  | $6.083 \cdot 10^3$ | 2  | 1   |
| 3  | $8 \cdot 10^3$     | 3  | 1.5 |
| 4  | $9.167 \cdot 10^3$ | 4  | 2   |
| 5  | $9.583 \cdot 10^3$ | 5  | 2.5 |
| 6  | $9.25 \cdot 10^3$  | 6  | 3   |
| 7  | $8.542 \cdot 10^3$ | 7  | 3.5 |
| 8  | $7.833 \cdot 10^3$ | 8  | 4   |
| 9  | $7.125 \cdot 10^3$ | 9  | 4.5 |
| 10 | $6.417 \cdot 10^3$ | 10 | 5   |
| 11 | $3.208 \cdot 10^3$ | 11 | 5.5 |
| 12 | 0                  | 12 | 6   |



$$A_{0,0} := 1 \quad A_{n,n} := 1$$

$$i := 1.. n - 1$$

$$A_{i,i} := -2$$

$$A_{i,i-1} := 1$$

$$A_{i,i+1} := 1$$

$$y := \text{lsolve}(A, \alpha \cdot M)$$

$$|A| = -12$$

$$A =$$

|    | 0 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|----|---|----|----|----|----|----|----|----|----|----|----|----|----|
| 0  | 1 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 1  | 1 | -2 | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 2  | 0 | 1  | -2 | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 3  | 0 | 0  | 1  | -2 | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 4  | 0 | 0  | 0  | 1  | -2 | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 5  | 0 | 0  | 0  | 0  | 1  | -2 | 1  | 0  | 0  | 0  | 0  | 0  | 0  |
| 6  | 0 | 0  | 0  | 0  | 0  | 1  | -2 | 1  | 0  | 0  | 0  | 0  | 0  |
| 7  | 0 | 0  | 0  | 0  | 0  | 0  | 1  | -2 | 1  | 0  | 0  | 0  | 0  |
| 8  | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 1  | -2 | 1  | 0  | 0  | 0  |
| 9  | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | -2 | 1  | 0  | 0  |
| 10 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | -2 | 1  | 0  |
| 11 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | -2 | 1  |
| 12 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  |

$$y =$$

|    | 0      |
|----|--------|
| 0  | 0      |
| 1  | -0.02  |
| 2  | -0.039 |
| 3  | -0.055 |
| 4  | -0.066 |
| 5  | -0.073 |
| 6  | -0.075 |
| 7  | -0.072 |
| 8  | -0.065 |
| 9  | -0.053 |
| 10 | -0.038 |
| 11 | -0.02  |
| 12 | 0      |

$$m$$

