

ORIGIN := 0

$l := 9 \text{ ft}$

Number of distributed loads:

$z := 1$

$zz := 0 \dots z$

$zz = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ $l_{zz} := l = \begin{bmatrix} 9 \\ 9 \end{bmatrix} \text{ ft}$

Start Load

End Load

Load start from R1

Load end from R1

$$ws_1 := 1 \frac{\text{kip}}{\text{ft}}$$

$$we_1 := 0 \frac{\text{kip}}{\text{ft}}$$

$$zs_1 := 0 \text{ ft}$$

$$ze_1 := 18 \text{ ft}$$

$$ws_2 := 1 \frac{\text{kip}}{\text{ft}}$$

$$we_2 := 0 \frac{\text{kip}}{\text{ft}}$$

$$zs_2 := 9 \text{ ft}$$

$$ze_2 := 11 \text{ ft}$$

Vector definitions:

$$ws = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} \frac{\text{kip}}{\text{ft}}$$

$$we = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \frac{\text{kip}}{\text{ft}}$$

$$zs = \begin{bmatrix} 0 \\ 0 \\ 9 \end{bmatrix} \text{ ft}$$

$$ze = \begin{bmatrix} 0 \\ 18 \\ 11 \end{bmatrix} \text{ ft}$$

$$ws_{zz} = \begin{bmatrix} 0 \\ 1 \end{bmatrix} \frac{\text{kip}}{\text{ft}}$$

$$we_{zz} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \frac{\text{kip}}{\text{ft}}$$

$$zs_{zz} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \text{ ft}$$

$$ze_{zz} = \begin{bmatrix} 0 \\ 18 \end{bmatrix} \text{ ft}$$

Make sure loads don't extend past beam end

$$zs_{zz} := \text{if}(zs_{zz} \leq l, zs_{zz}, l) \quad zs_{zz} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \text{ ft}$$

$$ze_{zz} := \text{if}(ze_{zz} \leq l, ze_{zz}, l) \quad ze_{zz} = \begin{bmatrix} 0 \\ 9 \end{bmatrix} \text{ ft}$$

Distributed load area

$$A_{zz} := \left((ze_{zz} - zs_{zz}) \cdot \left(.5 \cdot (we_{zz} + ws_{zz}) \cdot \frac{\text{ft}^2}{\text{kip}} \right) \right) = \begin{bmatrix} 0 \\ 4.5 \end{bmatrix} \text{ ft}^2$$

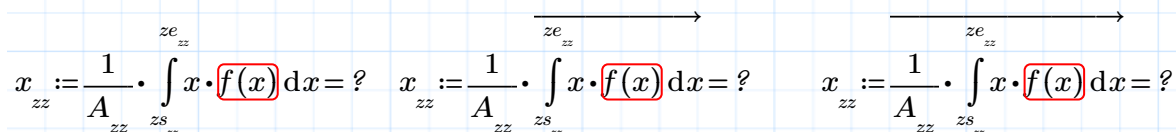
$$A_{zz} := \text{if}(A_{zz} \neq 0, A_{zz}, 0.0000000001 \text{ ft}^2)$$

$$A_{zz} = \begin{bmatrix} 1 \cdot 10^{-10} \\ 4.5 \end{bmatrix} \text{ ft}^2$$

Distributed load function

$$f(x) := \left(\frac{(we_{zz} - ws_{zz}) \cdot \frac{\text{ft}^2}{\text{kip}}}{(ze_{zz} - zs_{zz})} \right) \cdot x + ws_{zz} \cdot \frac{\text{ft}^2}{\text{kip}}$$

Location of centroid from left side



$$x_{zz} := \frac{1}{A_{zz}} \cdot \int_{zs_{zz}}^{ze_{zz}} x \cdot f(x) dx = ? \quad x_{zz} := \frac{1}{A_{zz}} \cdot \int_{zs_{zz}}^{ze_{zz}} x \cdot f(x) dx = ? \quad x_{zz} := \frac{1}{A_{zz}} \cdot \int_{zs_{zz}}^{ze_{zz}} x \cdot f(x) dx = ?$$