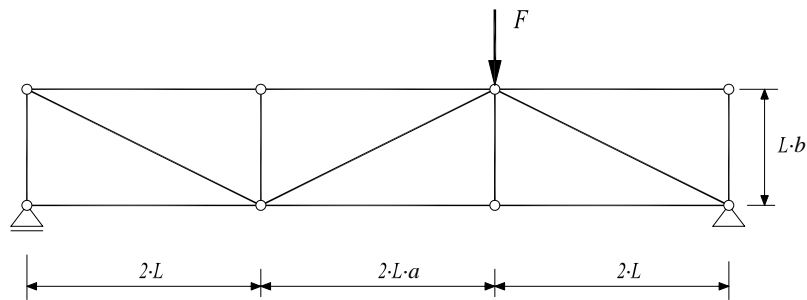


Task 1

Displacements, forces with Matlab...

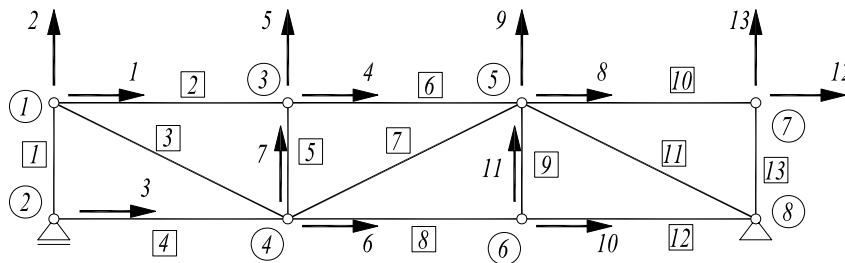


$$F = 100 \text{ N}$$

$$E = 210 \text{ kN/mm}^2$$

$$A = 1 \text{ cm}^2$$

$$L = 1 \text{ m}$$



$$\text{dofs} = \begin{bmatrix} 1 & 2 \\ 3 & -1 \\ 4 & 5 \\ 6 & 7 \\ 8 & 9 \\ 10 & 11 \\ 12 & 13 \\ -1 & -1 \end{bmatrix}$$

The stiffness matrix of the truss element with coordinates of nodes $n_1(x_1, y_1)$, $n_2(x_2, y_2)$ in global coordinate system is given as:

$$\mathbf{k}^e = \frac{EA}{L} \begin{bmatrix} c \cdot c & c \cdot s & -c \cdot c & -c \cdot s \\ c \cdot s & s \cdot s & -c \cdot s & -s \cdot s \\ -c \cdot c & -c \cdot s & c \cdot c & c \cdot s \\ -c \cdot s & -s \cdot s & c \cdot s & s \cdot s \end{bmatrix}$$

$$c = \frac{x_2 - x_1}{L} \quad s = \frac{y_2 - y_1}{L} \quad L = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$