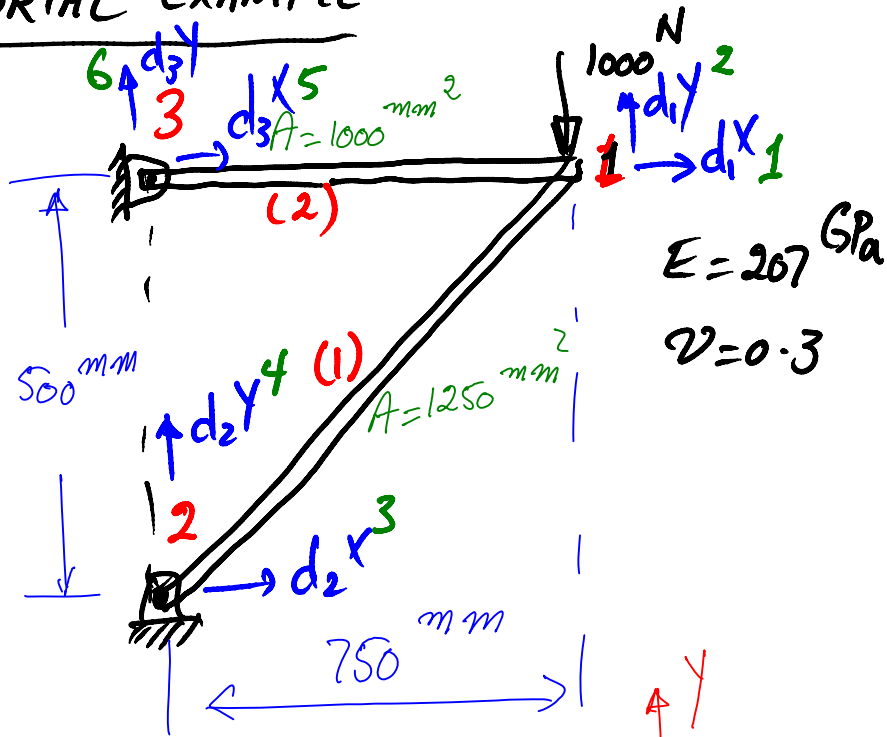


# TRUSS TUTORIAL EXAMPLE

DETERMINE  
DISP'S,  
STRESSES IN  
MEMBERS.



ELEMENT (1):

$$L_1 = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = 901 \text{ mm}$$

$$x_1 = 750 \quad y_1 = 500$$

$$x_2 = 0 \quad y_2 = 0$$

$$c_1 = \frac{x_2 - x_1}{L_1} = \frac{0 - 750}{901}$$

$$= -0.832$$

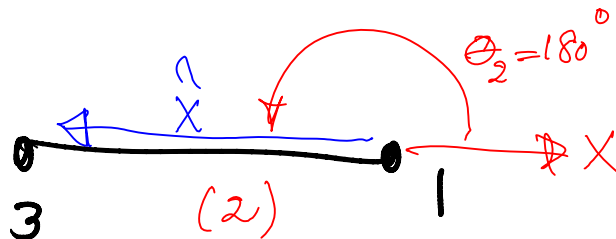
$$\frac{A_1 E_1}{L_1} = \frac{1250 (207) \times 1000}{901} = \frac{[mm^2] [N/mm^2]}{[mm]} = \frac{N}{mm}$$

$$s_1 = \frac{y_2 - y_1}{L_1} = \frac{0 - 500}{901}$$

$$s_1 = -0.555$$

$$\frac{[mm^2] [N/mm^2]}{[mm]} = \frac{N}{mm}$$

ELEM. (2)



$$\begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 \\ \hline 2 & (1) & (2) & (1) & (1) & (1) \\ \hline 1 & (2) & (1) & (1) & (2) & (1) \end{matrix}$$

$$\begin{array}{c}
 1 \\
 2 \\
 3 \\
 4 \\
 5 \\
 6
 \end{array}
 \left[ \begin{array}{cccc|cc|cc}
 k_{11}^{(1)} & k_{12}^{(1)} & k_{13}^{(1)} & k_{14}^{(1)} & 0 & 0 & d_1 & f_1 \\
 k_{21}^{(1)} & k_{22}^{(1)} & k_{23}^{(1)} & k_{24}^{(1)} & 0 & 0 & d_2 & f_2 \\
 k_{..}^{(1)} & .. & .. & .. & 0 & 0 & d_3 & f_3 \\
 .. & .. & .. & .. & 0 & 0 & d_4 & f_4 \\
 0 & 0 & 0 & 0 & 0 & 0 & d_5 & f_5 \\
 0 & 0 & 0 & 0 & 0 & 0 & d_6 & f_6
 \end{array} \right]$$

$k_{11}^{(1)}$   $k_{12}^{(1)}$   $k_{13}^{(1)}$   $k_{14}^{(1)}$   $k_{21}^{(1)}$   $k_{22}^{(1)}$   $k_{23}^{(1)}$   $k_{24}^{(1)}$   $k_{..}^{(1)}$   $0$   $0$   $0$   $0$   $0$   $0$

$k_{11}^{(2)}$   $k_{12}^{(2)}$   $k_{21}^{(2)}$   $k_{22}^{(2)}$   $k_{13}^{(2)}$   $k_{14}^{(2)}$   $k_{23}^{(2)}$   $k_{24}^{(2)}$

$f_1 = 0$   $f_2 = 1000$

OBTAIN  $d_1, d_2$

$\downarrow$   $\downarrow$   
 $d_{1,x}$   $d_{1,y}$

ELEMENT (1)  $\rightarrow$  GLOBAL DISP. VECTOR  $\Rightarrow$

$$d^{(1)} = \begin{Bmatrix} d_{1,x} \\ d_{1,y} \\ 0 \\ 0 \end{Bmatrix}$$

$$\hat{d}^{(1)} = [T_1] \begin{Bmatrix} d_{1,x} \\ d_{1,y} \\ 0 \\ 0 \end{Bmatrix}$$

$$= \begin{Bmatrix} \hat{d}_1 \\ \hat{d}_2 \end{Bmatrix}$$

$$[T_1] = \begin{bmatrix} c_1 & s_1 & 0 & 0 \\ 0 & 0 & c_1 & s_1 \end{bmatrix}$$

$$\epsilon^{(1)} = \frac{\hat{d}_2 - \hat{d}_1}{L_1}$$

$$\sigma^{(1)} = E \epsilon^{(1)}$$