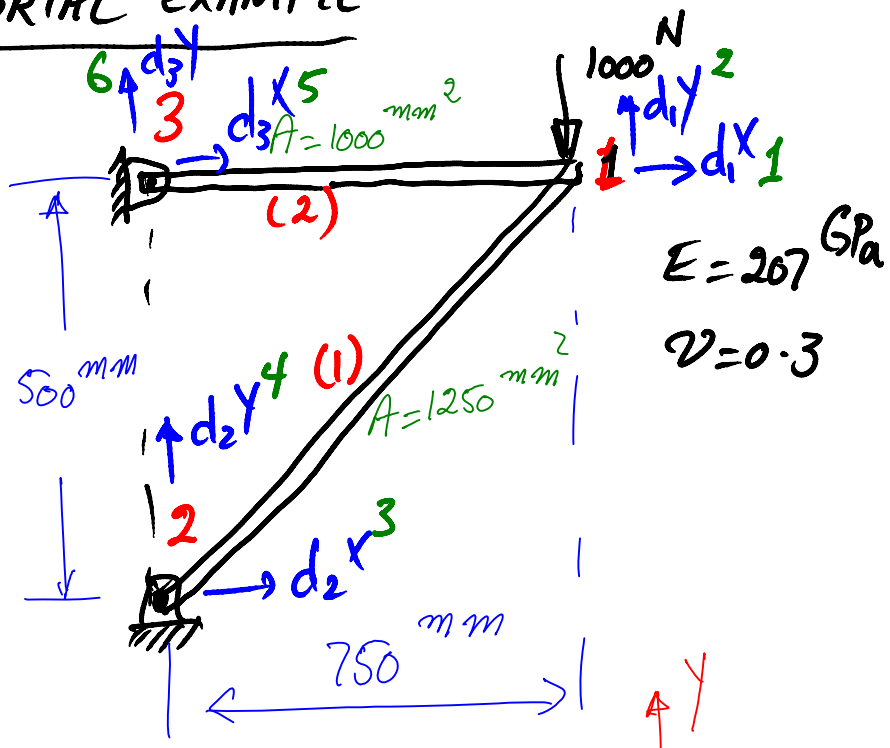
TRUSS TUTORIAL EXAMPLE

DETERMINE DISP'S, STRESSES IN MEMBERS.

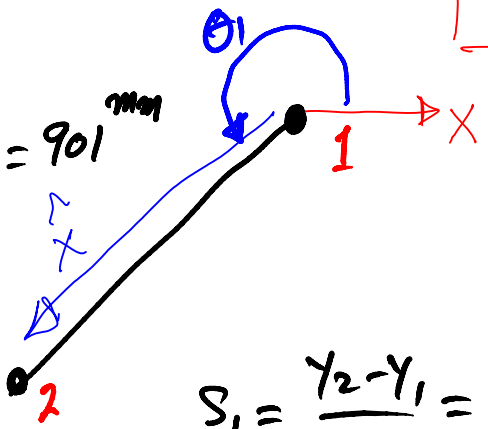


ELEMENT (1):

$$L_1=\sqrt{(X_1-X_2)^2+(Y_1-Y_2)^2}=901\ mm$$

$X_1=750 \quad Y_1=500$

$X_2=0 \quad Y_2=0$



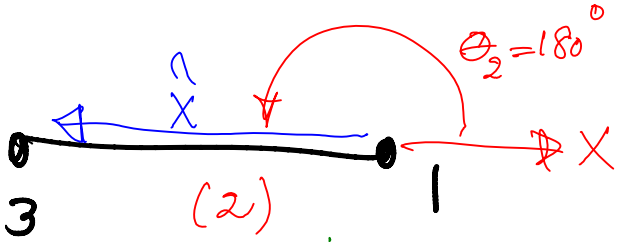
$$C_1=\frac{X_2-X_1}{L_1}=\frac{0-750}{901}=-0.832$$

$$S_1=\frac{Y_2-Y_1}{L_1}=\frac{0-500}{901}$$

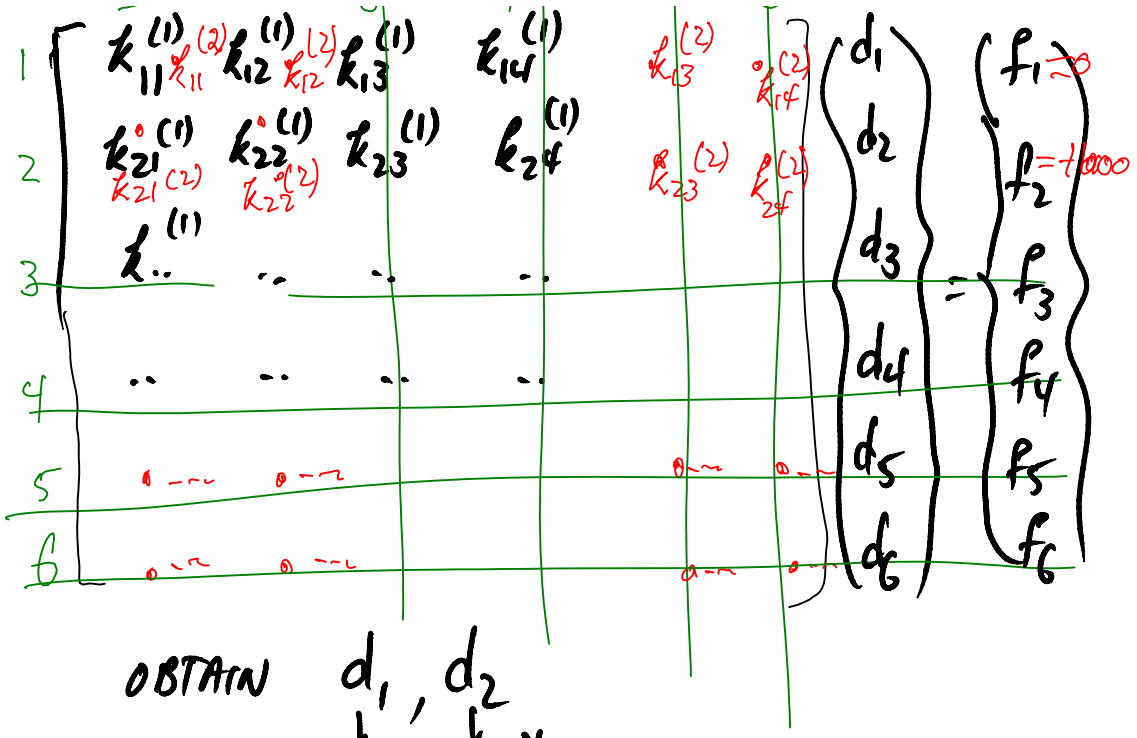
$$S_1=-0.555$$

$$\frac{A_1E_1}{L_1}=\frac{1250(207)\times 1000}{901}=\frac{[mm^2]\left[\frac{N}{mm^2}\right]}{[mm]}\equiv\frac{N}{mm}$$

ELEM. (2)



1 2 3 4 5 6



OBTAIN d_1, d_2

$\downarrow d_1x \quad \downarrow d_1y$

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

$$d^{(1)} = \begin{Bmatrix} d_1^x \\ d_1^y \\ 0 \\ 0 \end{Bmatrix}$$

$$\hat{d}^{(1)} = [T_1]\{d^{(1)}\}$$

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

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

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

$$\sigma^{(1)} = E\epsilon_1$$