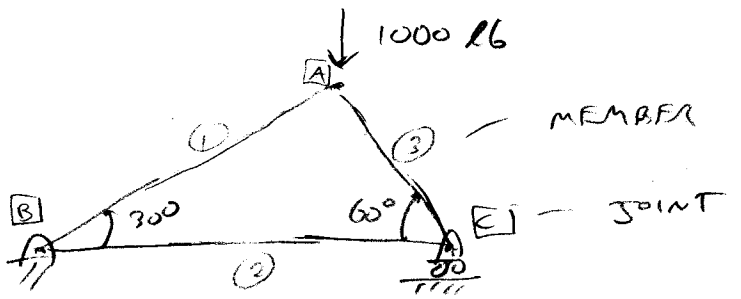
LINEAR ALGEBRAIC EQUATIONS PT 3

YOU MUST READ & LEARN THIS ON YOUR OWN (IF YOU DON'T KNOW ALREADY)

~~EX~~)

GIVEN: 3-MEMBER TRUSS LOADED AS SHOWN: (COMPLETELY)

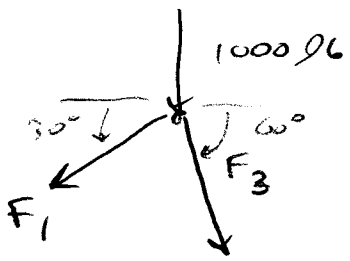


FIND: FORCE IN EACH MEMBER AND AT THE SUPPORTS

$(\Sigma F_x, \Sigma F_y)$

EQUIL. EQN.'s @ EACH JOINT ASSUMING FORCE IN EACH MEMBER IS IN TENSION (neg ans. ⇒ COMPRESSION)

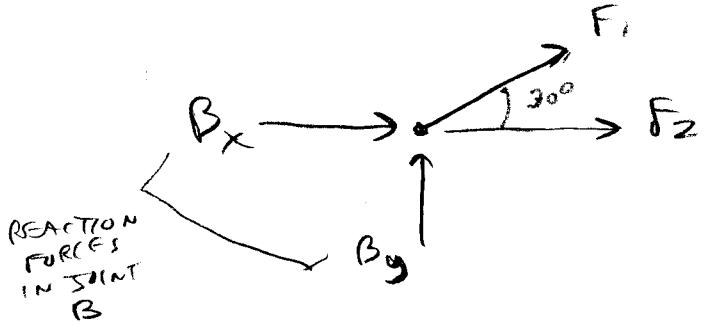
JOINT A



$$-F_1 \cos 30° + F_3 \cos 60° = 0 \quad (1)$$

$$-F_1 \sin 30° - F_3 \sin 60° - 1000 = 0 \quad (2)$$

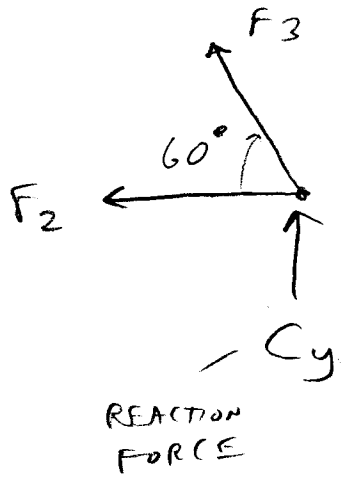
JOINT B



$$F_1 \cos 30° + F_2 + B_x = 0 \quad (3)$$

$$F_1 \sin 30° + B_y = 0 \quad (4)$$

JOINT C



$$-F_2 - F_3 \cos 60^\circ = 0 \quad (5)$$

$$F_3 \sin 60^\circ + C_y = 0 \quad (6)$$

IN MATRIX FORM:

$$\begin{bmatrix} -C_{30} & 0 & C_{60} & 0 & 0 & 0 \\ -S_{30} & 0 & -S_{60} & 0 & 0 & 0 \\ C_{30} & 1 & 0 & 1 & 0 & 0 \\ S_{30} & 0 & 0 & 0 & 1 & 0 \\ 0 & -1 & -C_{60} & 0 & 0 & 0 \\ 0 & 0 & S_{60} & 0 & 0 & 1 \end{bmatrix} \begin{Bmatrix} F_1 \\ F_2 \\ F_3 \\ B_x \\ B_y \\ C_y \end{Bmatrix} = \begin{Bmatrix} 0 \\ 1000 \\ 0 \\ 0 \\ 0 \\ 0 \end{Bmatrix}$$

$\cos(30^\circ)$

$\sin(30^\circ)$

COEF. MATRIX — UNKNOWNS VECTOR — CONSTANTS VECTOR

$$[A]\{x\} = \{B\}$$

DIMENSIONS: 6×6 $\quad 6 \times 1$ $\quad 6 \times 1$

ROWS — COLS — MUST BE THE SAME FOR MATRIX MULT.

DIM. OF RESULT