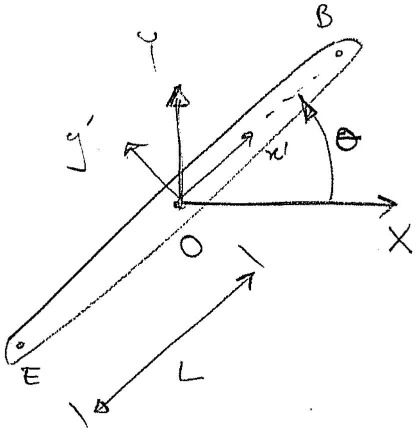
Example : Assemble A



$\vec{f}$: unit vector along Ox'

$\vec{g}$: Unit vector along Oy'

$\vec{k}$: Unit vector perpendicular on the $(Ox'y')$ plane.

Based on the information in the figure:

$$\vec{f} = \cos\theta\,\vec{i} + \sin\theta\,\vec{j} + 0\cdot\vec{k} \Rightarrow f = \begin{bmatrix} c\theta \\ s\theta \\ 0 \end{bmatrix}$$

$$\vec{g} = -\sin\theta\cdot\vec{i} + \cos\theta\,\vec{j} + 0\cdot\vec{k} \Rightarrow g = \begin{bmatrix} -s\theta \\ c\theta \\ 0 \end{bmatrix}$$

$$\vec{h} = 0\cdot\vec{i} + 0\cdot\vec{j} + 1\cdot\vec{k} \Rightarrow h = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

Then, $A = [f \ g \ h] = \begin{bmatrix} c\theta & -s\theta & 0 \\ s\theta & c\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$\vec{OB}$ in L-RF : $\bar{b} = \begin{bmatrix} L \\ 0 \\ 0 \end{bmatrix}$ $\qquad$ $\vec{OB}$ in G-RF : $b = A\cdot\bar{b} = \begin{bmatrix} Lc\theta \\ Ls\theta \\ 0 \end{bmatrix}$

$\vec{OE}$ in L-RF : $\bar{e} = \begin{bmatrix} -L \\ 0 \\ 0 \end{bmatrix}$ $\qquad$ $\vec{OE}$ in G-RF : $e = A\cdot\bar{e} = \begin{bmatrix} -Lc\theta \\ -Ls\theta \\ 0 \end{bmatrix}$