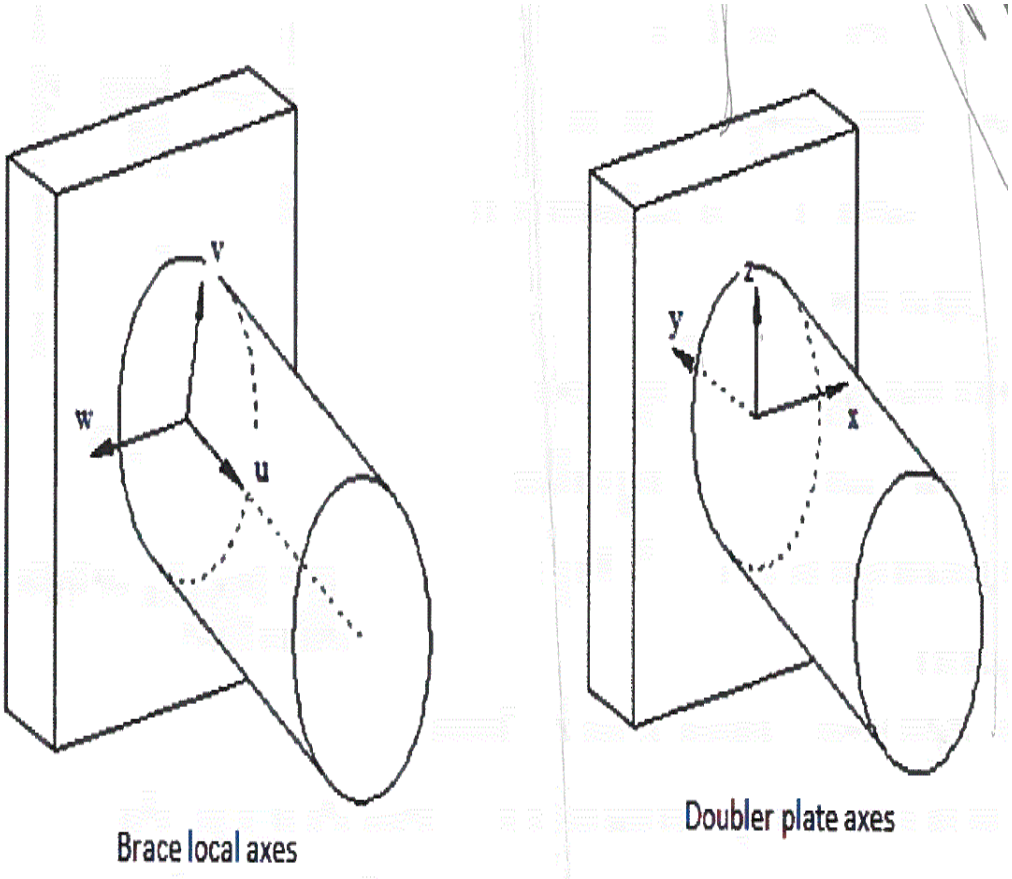
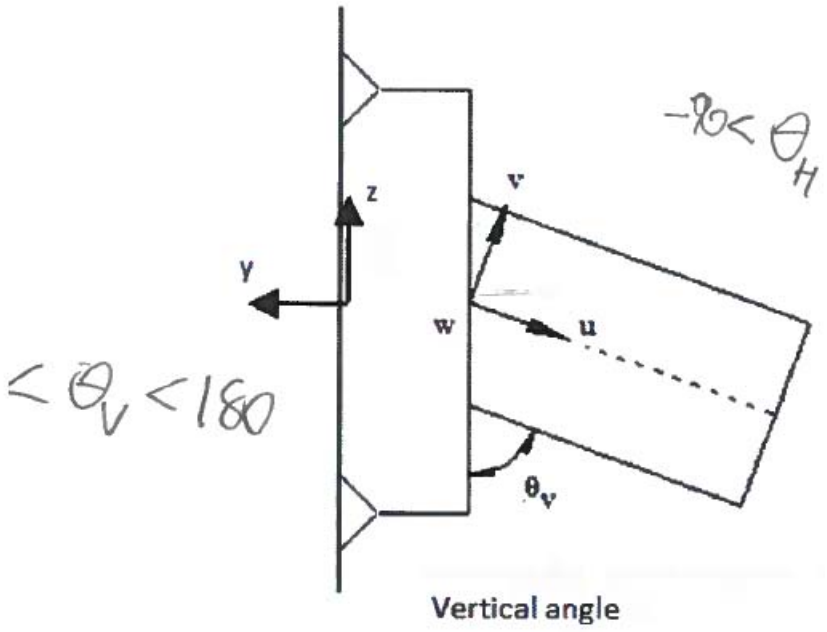
I will be transforming quantities from brace local axis to plate axis as shown in the figure



I have generated the rotation matrices as follows

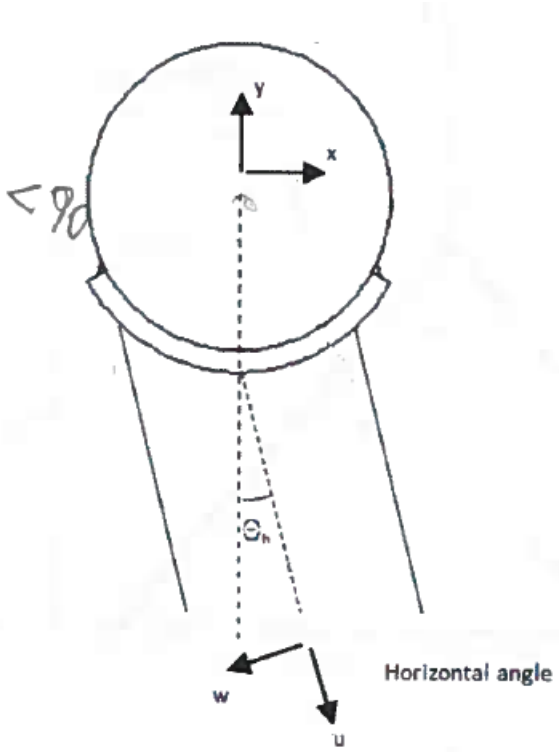
In order to get X(θv) from the below figure, my rotation matrices is just below the figure.



Symbolically

$$X(\theta v) := \begin{pmatrix} 0 & 0 & -1 \\ -\sin(\theta v) & -\cos(\theta v) & 0 \\ -\cos(\theta v) & \sin(\theta v) & 0 \end{pmatrix} \qquad x(\theta\_v) := \begin{pmatrix} Fx1 \\ Fy1 \\ Fz1 \end{pmatrix}$$

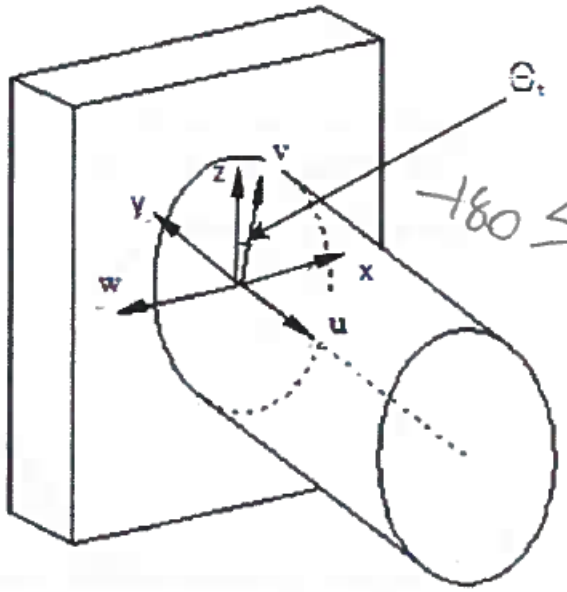
In order to get the rotation matrix Y(θh), for the figure below, my rotation matrix is just below the figure



Symbolically

$$Z(\theta h) := \begin{pmatrix} \sin(\theta h) & 0 & -\cos(\theta h) \\ -\cos(\theta h) & 0 & -\sin(\theta h) \\ 0 & 1 & 0 \end{pmatrix} \qquad z(\theta\_h) := \begin{pmatrix} Fx2 \\ Fy2 \\ Fz2 \end{pmatrix}$$

In order to get the rotation matrix Z(θt) from the figure below, I have the matrix just below the figure



$-180 \leq \theta_t \leq 180$

Transverse angle

Symbolically

$$Y(\theta t) := \begin{pmatrix} 0 & \sin(\theta t) & -\cos(\theta t) \\ -1 & 0 & 0 \\ 0 & \cos(\theta t) & -\sin(\theta t) \end{pmatrix}$$

$$y(\theta\_t) := \begin{pmatrix} Fx3 \\ Fy3 \\ Fz3 \end{pmatrix}$$

$$X(0) \cdot Z(0) \cdot Y(0) = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & 1 & 0 \end{pmatrix}$$

I had thought X(0)*Y(0)*Z(0) should have been:

$$\begin{pmatrix} 0 & 0 & -1 \\ -1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}$$