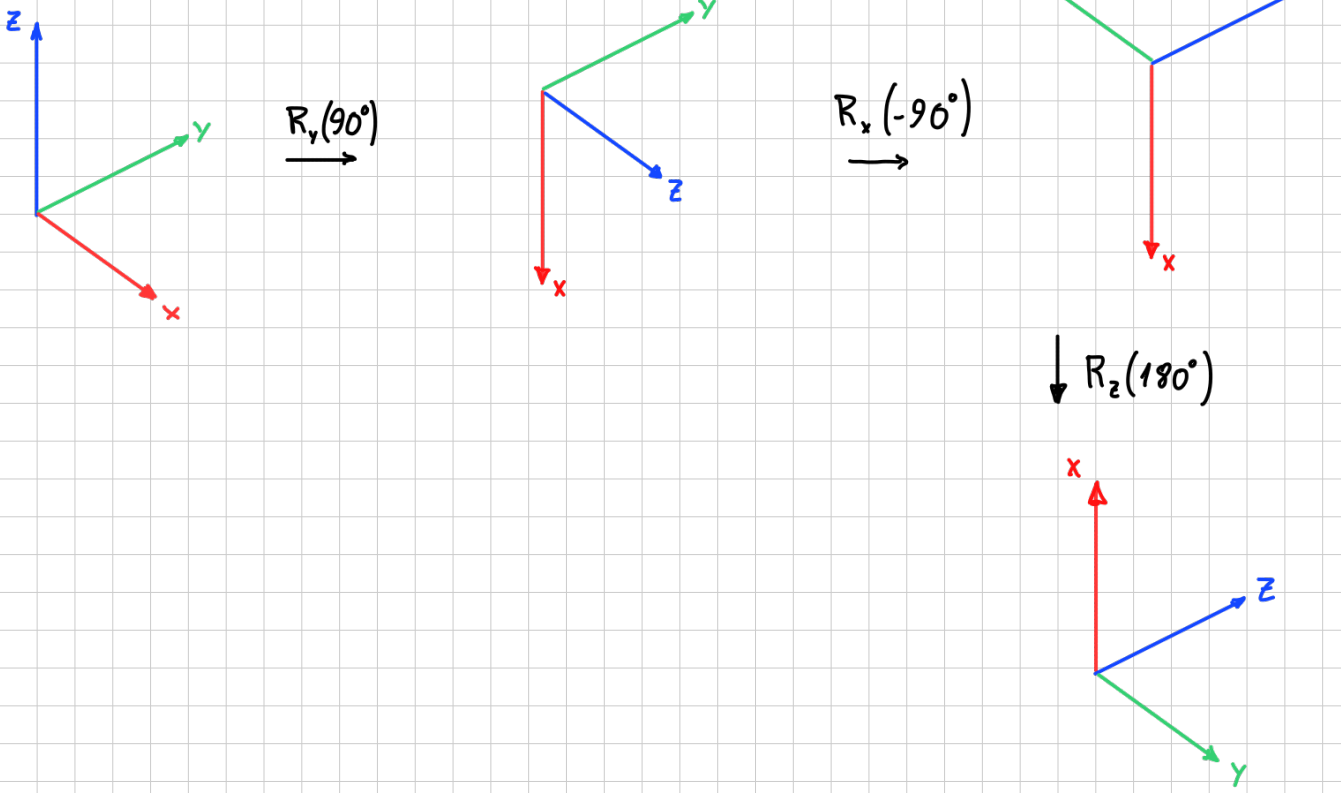
TP Nº 1 : Fecha de entrega 3/8

1)



2)

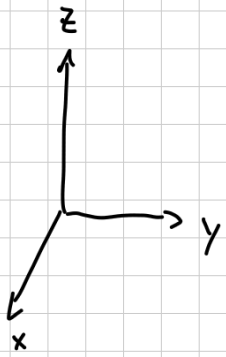
a) $$R_x(4\pi/7) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos(4\pi/7) & -\operatorname{sen}(4\pi/7) \\ 0 & \operatorname{sen}(4\pi/7) & \cos(4\pi/7) \end{bmatrix}$$

$$R_y(\pi/2) = \begin{bmatrix} \cos(\pi/2) & 0 & \operatorname{sen}(\pi/2) \\ 0 & 1 & 0 \\ -\operatorname{sen}(\pi/2) & 0 & \cos(\pi/2) \end{bmatrix}$$

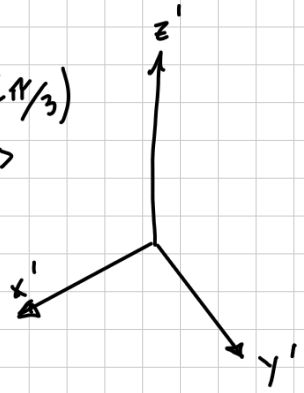
$$R_z(-\pi/3) = \begin{bmatrix} \cos(-\pi/3) & -\operatorname{sen}(-\pi/3) & 0 \\ \operatorname{sen}(-\pi/3) & \cos(-\pi/3) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$R = \begin{bmatrix} 0 & 0 & 1 \\ \dfrac{\operatorname{sen}(4\pi/7) - \sqrt{3}\cos(4\pi/7)}{2} & \dfrac{\cos(4\pi/7) + \sqrt{3}\operatorname{sen}(4\pi/7)}{2} & 0 \\ -\dfrac{\cos(4\pi/7) - \sqrt{3}\operatorname{sen}(4\pi/7)}{2} & \dfrac{\operatorname{sen}(4\pi/7) - \sqrt{3}\cos(4\pi/7)}{2} & 0 \end{bmatrix}$$

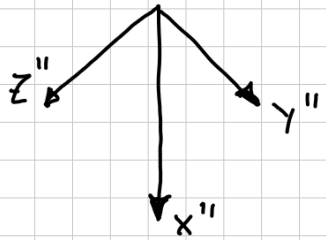
b)



$R_z(-\pi/3)$ →



$R_y(\pi/2)$ →



⇓

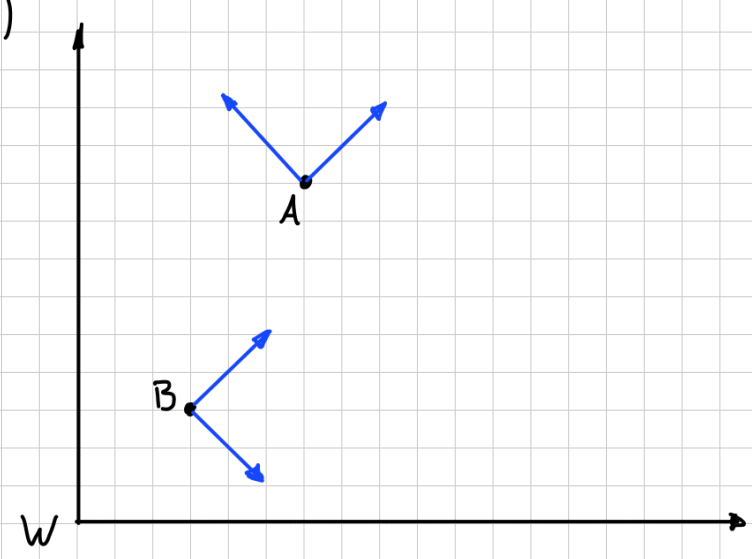
x" alineado con z

⇓

Gimbal Lock

3)

a)



b)

$$ {}^{w}\xi_{A} = \begin{bmatrix} \cos(45°) & -\operatorname{sen}(45°) & 2 \\ \operatorname{sen}(45°) & \cos(45°) & 3 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 1/\sqrt{2} & -1/\sqrt{2} & 2 \\ 1/\sqrt{2} & 1/\sqrt{2} & 3 \\ 0 & 0 & 1 \end{bmatrix} $$

$$ {}^{A}\xi_{w} = {}^{w}\xi_{A}^{-1} = \begin{bmatrix} -1/\sqrt{2} + \sqrt{2} & 1/\sqrt{2} & -5/\sqrt{2} \\ -1/\sqrt{2} & 1/\sqrt{2} & -1/\sqrt{2} \\ 0 & 0 & 1 \end{bmatrix} $$

$$ {}^{A}p_{1} = {}^{A}\xi_{w}\,{}^{w}p_{1} = \begin{bmatrix} \sqrt{2} - 1/\sqrt{2} \\ 3/\sqrt{2} \\ 1 \end{bmatrix} $$

c)

$$ {}^{A}\xi_{B} = \begin{bmatrix} 1/\sqrt{2} & 1/\sqrt{2} & 1 \\ -1/\sqrt{2} & 1/\sqrt{2} & 1 \\ 0 & 0 & 1 \end{bmatrix} \Rightarrow {}^{B}\xi_{A} = {}^{A}\xi_{B}^{-1} = \dots $$

$$ {}^{B}p_{2} = {}^{B}\xi_{A}\,{}^{A}p_{2} = $$

d)

$$ {}^{B}\xi_{w} = {}^{B}\xi_{A}\,{}^{A}\xi_{w} = \dots $$

4)

a) ${}^{W}\xi_{C_0} = {}^{W}\xi_{B_0}\,{}^{B}\xi_{C} \quad \Rightarrow \quad {}^{W}\xi_{C_i} = {}^{W}\xi_{C_0} \cdot {}^{C_0}\xi_{C_i}$

b) ${}^{W}\xi_{B_i} = {}^{W}\xi_{C_i}\,{}^{C}\xi_{B} = {}^{W}\xi_{C_i} \cdot \left({}^{B}\xi_{C}\right)^{-1}$

c) ...