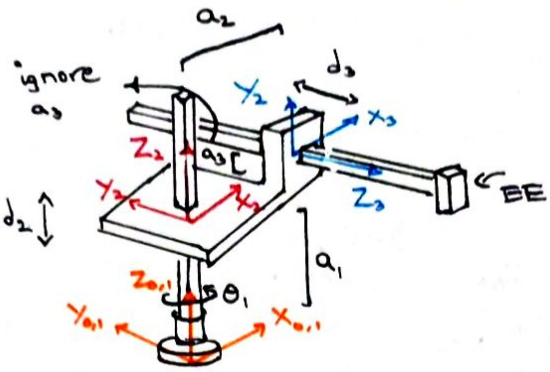
3.19)

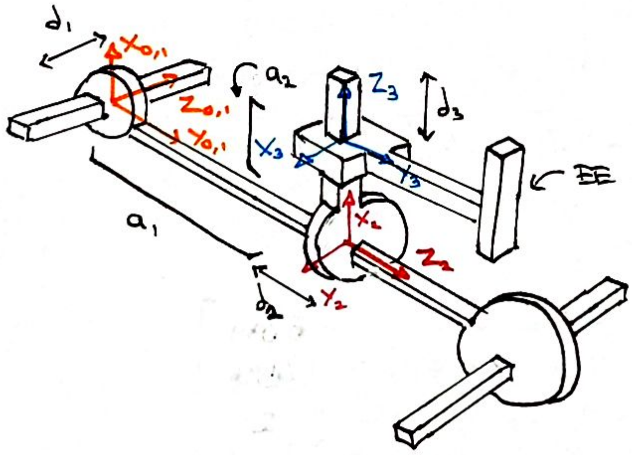


DH Table

	α_{i-1}	a_{i-1}	d_i	θ_i
1	0	0	0	θ_1
2	0	0	γ_1	0
3	90°	a_2	d_3	0
–				

$\therefore \gamma_1 = a_1 + d_2$

3.21)



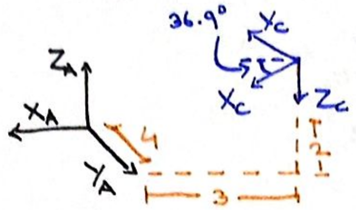
DH Table

	α_{i-1}	a_{i-1}	d_i	θ_i
1	0	0	d_1	0
2	-90°	0	γ_1	0
3	90°	a_2	d_3	90°
–				

$\therefore \gamma_1 = a_1 + d_2$

Muhammad Umer
- CMS: 345834

2.34) Find ${}^{C}_{A}T$



→ Easier to find T_c^A ;

$$d_c^A = \begin{bmatrix} -3 \\ 4 \\ 2 \end{bmatrix}$$

$$R_c^A = \begin{bmatrix} x_c \cdot x_a & y_c \cdot x_a & z_c \cdot x_a \\ x_c \cdot y_a & y_c \cdot y_a & z_c \cdot y_a \\ x_c \cdot z_a & y_c \cdot z_a & z_c \cdot z_a \end{bmatrix}$$

$$= \begin{bmatrix} 0.8 & 0.6 & 0 \\ 0.6 & -0.8 & 0 \\ 0 & 0 & -1 \end{bmatrix}$$

$$T_c^A = \begin{bmatrix} R_c^A & d_c^A \\ 0 & 1 \end{bmatrix}$$

$$\hookrightarrow \underset{\sim}{T_c^A} = \begin{bmatrix} R_c^{A^T} & -\overset{\text{transpose}}{R_c^{A^T}} d_c^A \\ 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0.8 & 0.6 & 0 & 0 \\ 0.6 & -0.8 & 0 & 5 \\ 0 & 0 & -1 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

∴ For present case, $R_c^A = R_c^{A^T}$

$$-R_c^{A^T} d_c^A = \begin{bmatrix} -0.8 & -0.6 & 0 \\ -0.6 & +0.8 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} -3 \\ 4 \\ 2 \end{bmatrix} = \begin{bmatrix} 0 \\ 5 \\ 2 \end{bmatrix}$$