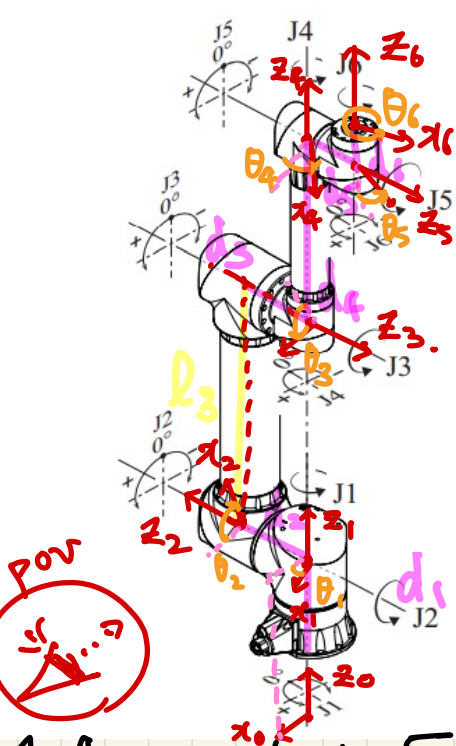


왼쪽 그림의 자세 (원점자세)

축	각도
J1	0°
J2	0°
J3	0°
J4	0°
J5	0°
J6	0°

$l_3 = 390\,mm$

1. Assign Link Frames

2. Obtain Denavit Hartenberg Kinematic Parameters

	a_i	α_i	θ_i	d_i
1	0	0	θ_1	d_1 145mm
2	0	$\frac{\pi}{2}$	θ_2	d_2 135mm
3	l_3 390mm	$-\pi$	θ_3	d_3 135mm
4	0	$\frac{\pi}{2}$	θ_4	d_4 270mm
5	0	$-\frac{\pi}{2}$	θ_5	d_5 100mm
6	0	$+\frac{\pi}{2}$	θ_6	d_6 65mm

3. Formulate Euler transformation matrix for each.

$$ {}^{i-1}\mathbf{T}_i = \begin{bmatrix} \cos\theta_i & -\sin\theta_i \cos\alpha_i & \sin\theta_i \sin\alpha_i & a_i \cos\theta_i \\ \sin\theta_i & \cos\theta_i \cos\alpha_i & -\cos\theta_i \sin\alpha_i & a_i \sin\theta_i \\ 0 & \sin\alpha_i & \cos\alpha_i & d_i \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

	a_i	α_i	θ_i	d_i
1	0	0	θ_1	d_1
2	0	$\frac{\pi}{2}$	θ_2	d_2
3	l_3	$-\pi$	θ_3	d_3
4	0	$\frac{\pi}{2}$	θ_4	d_4
5	0	$-\frac{\pi}{2}$	θ_5	d_5
6	0	$+\frac{\pi}{2}$	θ_6	d_6

$$ {}^0\Pi_1 = \begin{bmatrix} C_1 & -S_1 & 0 & 0 \\ S_1 & C_1 & 0 & 0 \\ 0 & 0 & 1 & d_1 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

$$ {}^1\Pi_2 = \begin{bmatrix} C_2 & 0 & S_2 & 0 \\ S_2 & 0 & -C_2 & 0 \\ 0 & 1 & 0 & d_2 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

$$ {}^2\Pi_3 = \begin{bmatrix} C_3 & S_3 & 0 & l_3 C_3 \\ S_3 & -C_3 & 0 & l_3 S_3 \\ 0 & 0 & -1 & d_3 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

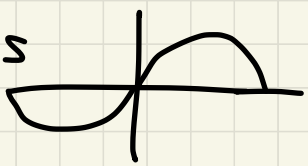
$$ {}^3\Pi_4 = \begin{bmatrix} C_4 & 0 & S_4 & 0 \\ S_4 & 0 & -C_4 & 0 \\ 0 & 1 & 0 & d_4 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

$$ {}^4\Pi_5 = \begin{bmatrix} C_5 & 0 & -S_5 & 0 \\ S_5 & 0 & +C_5 & 0 \\ 0 & -1 & 0 & d_5 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

$$ {}^5\Pi_6 = \begin{bmatrix} C_6 & 0 & S_6 & 0 \\ S_6 & 0 & -C_6 & 0 \\ 0 & 1 & 0 & d_6 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

C

S



$\therefore$ ${}^0\Pi_6 = {}^0\Pi_1 \cdot \Pi_2 \cdots {}^5\Pi_6$

calculated with python.