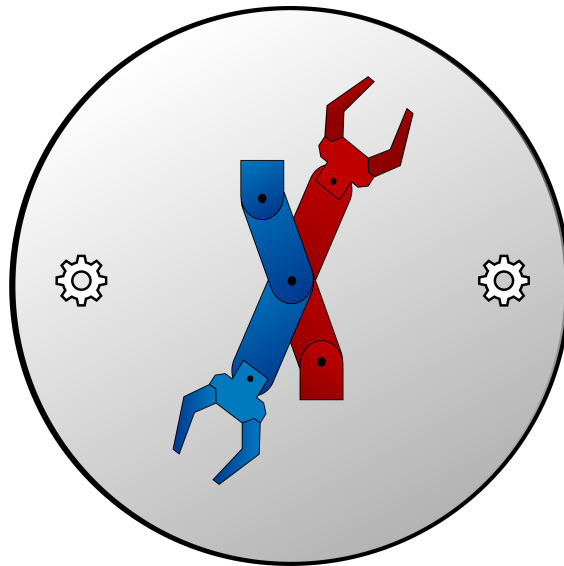


FINAL REPORT

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ME 407

Preliminary Design of Robotic Systems

Embry-Riddle Aeronautical University



Meiosis

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Table 1: DH Table for 6 DOF Manipulator

DH	d_i	θ_i	a_i	α_i
1	ℓ_1	q_1	0	$\pi/2$
2	$-d$	q_2	210	0
3	0	$q_3 + \pi/2$	75	$\pi/2$
4	$\ell_3 + \ell_4$	q_4	0	$-\pi/2$
5	0	q_5	0	$\pi/2$
6	ℓ_6	q_6	0	0

$$A = Rot_{z,\theta} Trans_{z,d} Trans_{x,a} Rot_{x,\alpha} \quad (1)$$

Given an arbitrary homogeneous matrix T_i^{i-1} (computed by matrix multiplication of A matrices $\rightarrow [A_1 A_2 \cdots A_{i-1} A_i]$), the orientation vector \bar{z}_i (with respect to φ , θ and ψ) and the relative joint position (displacement) vector \bar{o}_i (with respect to x , y , and z) can be obtained via the 3rd and 4th columns of the matrix respectively, as shown in Equation 2 (given β as an arbitrary rotation angle about the z -axis).

$$T_i^{i-1} = \begin{bmatrix} c_\beta & -s_\beta & z_i^\varphi & o_i^x \\ s_\beta & c_\beta & z_i^\theta & o_i^y \\ 0 & 0 & z_i^\psi & o_i^z \\ 0 & 0 & 0 & 1 \end{bmatrix} \quad (2)$$