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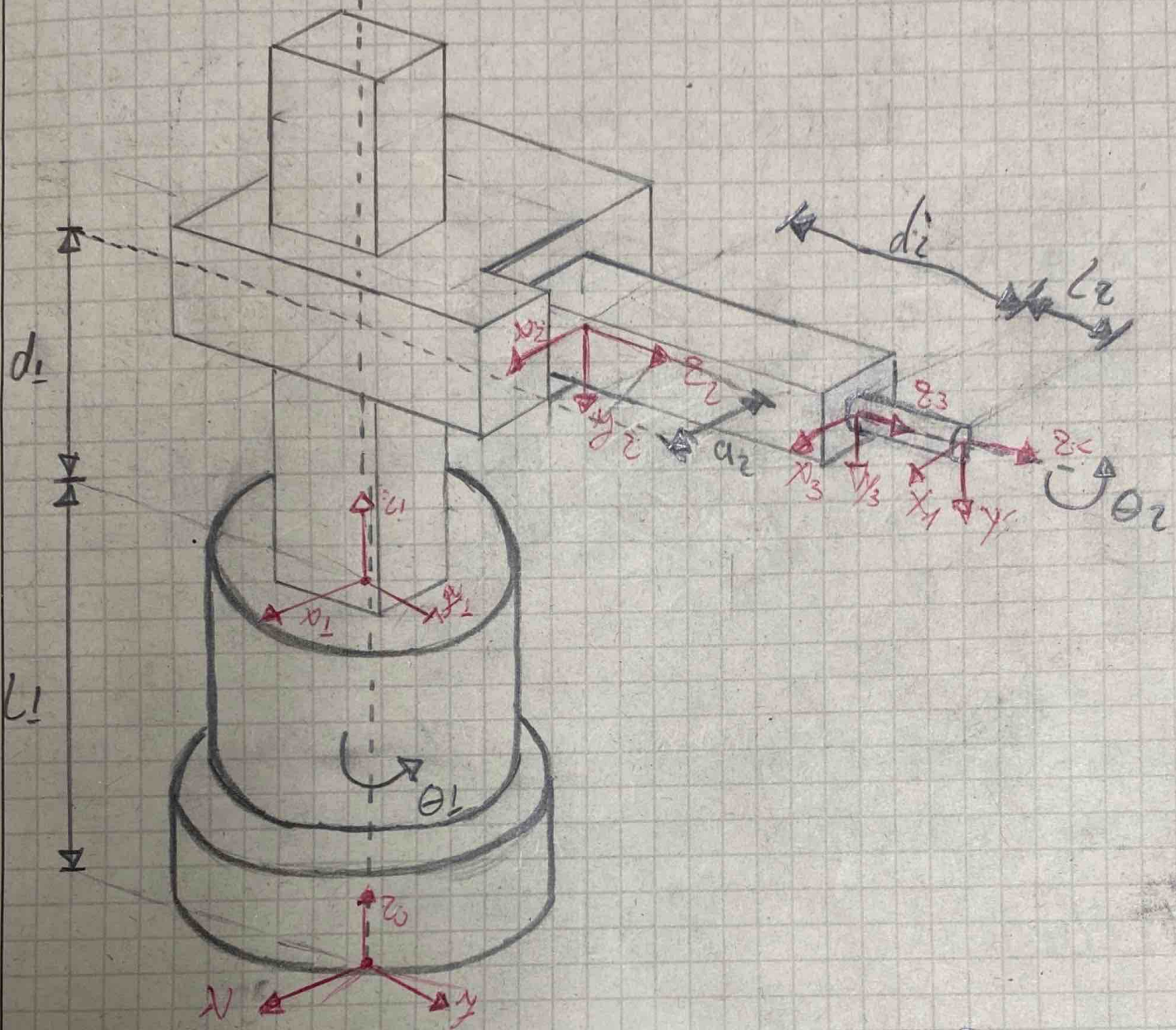
Robotica

Parcial 2

Daniel Rivera Yepes - 2190249



D-H

θ_i	d_i	a_i	α_i
θ_1	L_1	0	0
0	d_1	$-a_2$	-90
0	d_2	0	0
θ_2	L_2	0	0

$$ {}^{0}_{1}A = \begin{bmatrix} C\theta_1 & -S\theta_1 & 0 & 0 \\ S\theta_1 & C\theta_1 & 0 & 0 \\ 0 & 0 & 1 & L_1 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

$$ {}^{1}_{2}A = \begin{bmatrix} 1 & 0 & 0 & -a_2 \\ 0 & 0 & 1 & 0 \\ 0 & -1 & 0 & d_1 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

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$$ {}^{2}_{3}A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & d_2 \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad {}^{3}_{4}A = \begin{bmatrix} C\theta_2 & -S\theta_2 & 0 & 0 \\ S\theta_2 & C\theta_2 & 0 & 0 \\ 0 & 0 & 1 & l_2 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

$${}^{0}_{4}T = {}^{0}_{1}A\ {}^{1}_{2}A\ {}^{2}_{3}A\ {}^{3}_{4}A \rightarrow \text{Matriz Homogenea}$$

$$ {}^{0}_{4}T = \begin{bmatrix} C\theta_1 C\theta_2 & -\text{Sin}\theta_2 C\theta_1 & -S\theta_1 & -a_2 C\theta_1 - d_2 S\theta_1 - l_2 S\theta_1 \\ S\theta_1 C\theta_2 & -S\theta_1 S\theta_2 & C\theta_1 & -a_2 S\theta_1 + d_2 C\theta_1 + l_2 C\theta_1 \\ -S\theta_2 & -C\theta_2 & 0 & d_1 + l_1 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

Matriz Jacobiana

$$x = -a_2 C\theta_1 - d_2 S\theta_1 - l_2 S\theta_1$$

$$y = -a_2 S\theta_1 + d_2 C\theta_1 + l_2 C\theta_1$$

$$z = d_1 + l_1$$

$$ J = \begin{bmatrix} \frac{\partial x}{\partial \theta_1} & \frac{\partial x}{\partial d_1} & \frac{\partial x}{\partial d_2} & \frac{\partial x}{\partial \theta_2} \\ \frac{\partial y}{\partial \theta_1} & \frac{\partial y}{\partial d_1} & \frac{\partial y}{\partial d_2} & \frac{\partial y}{\partial \theta_2} \\ \frac{\partial z}{\partial \theta_1} & \frac{\partial z}{\partial d_1} & \frac{\partial z}{\partial d_2} & \frac{\partial z}{\partial \theta_2} \end{bmatrix} = \begin{bmatrix} a_2 S\theta_1 - d_2 C\theta_1 - l_2 C\theta_1 & 0 & -S\theta_1 & 0 \\ -a_2 C\theta_1 - d_2 S\theta_1 - l_2 S\theta_1 & 0 & C\theta_1 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix} $$

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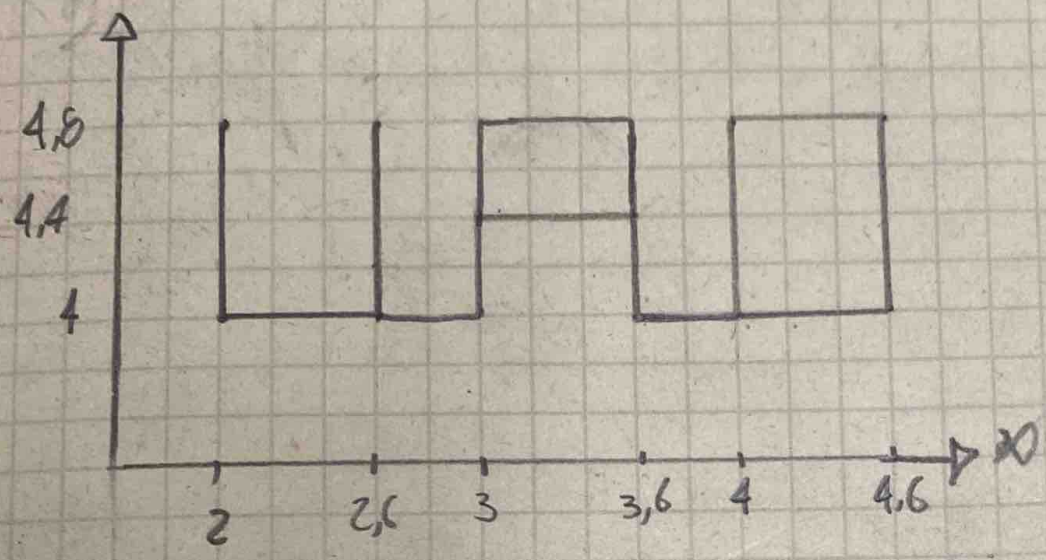

$P_1 = [2, 0, 4{,}8]$

$P_2 = [2, 0, 4]$

$P_3 = [2{,}6, 0, 4]$

$P_4 = [2{,}6, 0, 4{,}6]$

$P_5 = [2{,}6, 0, 4]$

$P_6 = [3, 0, 4]$

$P_7 = [3, 0, 4{,}8]$

$P_8 = [3{,}6, 0, 4{,}8]$

$P_9 = [3{,}6, 0, 4{,}4]$

$P_{10} = [3, 0, 4.4]$

$P_{11} = [3.6, 0, 4.4]$

$P_{12} = [3{,}6, 0, 4]$

$P_{13} = [4, 0, 4]$

$P_{14} = [4, 0, 4{,}8]$

$P_{15} = [4{,}6, 0, 4{,}8]$

$P_{16} = [4{,}6, 0, 4]$

$P_{17} = [4, 0, 4]$