



**UNIVERSIDAD POLITÉCNICA**  
DE LA ZONA METROPOLITANA DE GUADALAJARA

Materia: Cinemática de robots  
Profesor: Morán Garabito Carlos Enrique

## **PRACTICA #1**



**T/M 8`B**  
**UPZMG**

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Tarea / Problema / Práctica

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Diagram of a 2-DOF robot arm with joints 1 and 2, links 1 and 2, and end effector P. The diagram shows the coordinate frames and joint types (Revolute and Prismatic).

Denavit-Hartenberg parameters table:

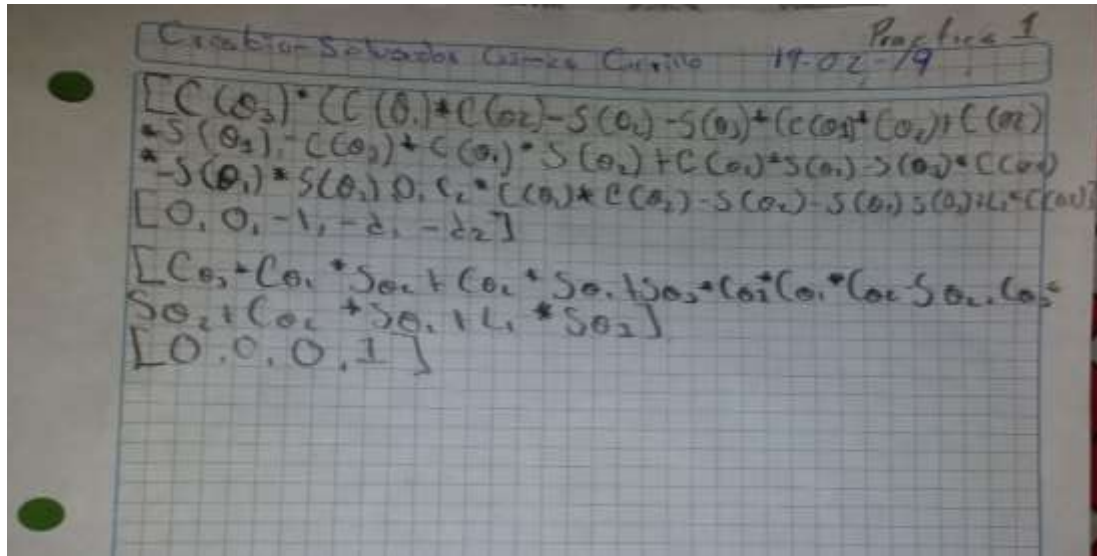
	$a_{i-1}$	$\alpha_{i-1}$	$d_i$	$\theta_i$
1	0	0	0	$\theta_1$
2	$L_1$	0	$d_2$	$\theta_2$
3	$L_2$	0	0	$\theta_3$

Transformation matrices:

$$T_1 = \begin{bmatrix} C_{\theta_1} & S_{\theta_1} & 0 & 0 \\ 0 & 0 & 1 & 0 \\ S_{\theta_1} & C_{\theta_1} & 0 & d_1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_2 = \begin{bmatrix} C_{\theta_1} & S_{\theta_1} & 0 & L_1 \\ S_{\theta_1} & C_{\theta_1} & 0 & 0 \\ 0 & 0 & 1 & d_2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_3 = \begin{bmatrix} C_{\theta_1} & S_{\theta_1} & 0 & L_2 \\ S_{\theta_1} & C_{\theta_1} & 0 & 0 \\ 0 & 0 & 1 & d_2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$



## Código de Matlab:

```
T1=[cos(theta1),-sin(theta1),0,0;0,0,-1,0;sin(theta1),cos(theta1),0,0;0,0,0,1]
syms L1
T2=[cos(theta2),-sin(theta2),0,L1;sin(theta2),cos(theta2),0,0;0,0,1,d1;0,0,0,1]
syms L2
T3=[cos(theta3),-sin(theta3),0,L2;sin(theta3),cos(theta3),0,0;0,0,1,d2;0,0,0,1]
```

i	Ai-1	α-1	Di	Oi
1	0	90°	0	O1
2	L1	0	D1	O2
3	L2	0	D2	O3