PRACTICA 1

CINEMATICA DE ROBOTS

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CODIGO:

```
syms theta1
syms theta2
syms theta3
syms d1
syms d2
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]
syms ans
ans =T1*T2*T3
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$$T_1^0 \quad \begin{pmatrix} \cos(\theta_1) & -\sin(\theta_1) & 0 & 0 \\ 0 & 0 & -1 & 0 \\ \sin(\theta_1) & \cos(\theta_1) & 0 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$T_2^1 \quad \begin{pmatrix} \cos(\theta_2) & -\sin(\theta_2) & 0 & L_1 \\ \sin(\theta_2) & \cos(\theta_2) & 0 & 0 \\ 0 & 0 & 1 & d_1 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$T_3^2 \quad \begin{pmatrix} \cos(\theta_3) & -\sin(\theta_3) & 0 & L_2 \\ \sin(\theta_3) & \cos(\theta_3) & 0 & 0 \\ 0 & 0 & 1 & d_2 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$T_3^0 \quad \begin{pmatrix} \sigma_1 & -\cos(\theta_3)\,\sigma_3 - \sin(\theta_3)\,\sigma_2 & 0 & L_2\,\sigma_2 + L_1\cos(\theta_1) \\ 0 & 0 & -1 & -d_1 - d_2 \\ \cos(\theta_3)\,\sigma_3 + \sin(\theta_3)\,\sigma_2 & \sigma_1 & 0 & L_2\,\sigma_3 + L_1\sin(\theta_1) \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

where

$$\sigma_1 = \cos(\theta_3)\,\sigma_2 - \sin(\theta_3)\,\sigma_3$$

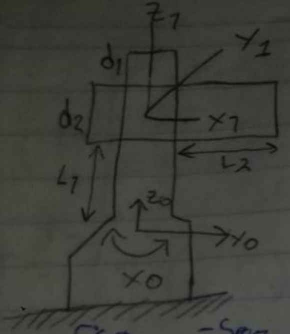
$$\sigma_2 = \cos(\theta_1)\cos(\theta_2) - \sin(\theta_1)\sin(\theta_2)$$

$$\sigma_3 = \cos(\theta_1)\sin(\theta_2) + \cos(\theta_2)\sin(\theta_1)$$

19-02-19

Practica #1

Flavio A.



i	a_{i-1}	α_{i-1}	d_i	ϕ_i
1	0	90°	0	ϕ_1
2	L_1	0	d_1	ϕ_2
3				

$$T_1^0 \begin{bmatrix} C\phi_1 & -S\phi_1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ S\phi_1 & C\phi_1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad T_2^1 = \begin{bmatrix} C\phi_2 & -S\phi_2 & 0 & L_1 \\ S\phi_2 & C\phi_2 & 0 & 0 \\ 0 & 0 & 1 & d_1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$T_3^2 = \begin{bmatrix} C\phi_3 & -S\phi_3 & 0 & L_2 \\ S\phi_3 & C\phi_3 & 0 & 0 \\ 0 & 0 & 1 & d_2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

[C(φ3)*(c(φ1)*C(φ2) - S(φ2) - S(φ3)*(c(φ1)*S(φ2) + c(φ2) + C(φ2)*S(φ1)), -c(φ3)*(C(φ1)*S(φ2) + c(φ2)* c(φ2) * S(φ1) - S(φ3)*c(φ1) - S(φ3)*c(φ1)*C(φ2) - S(φ1) *S(φ2), 0, L2*(C(φ1)*(C(φ2) - S(φ2)) - S(φ1) S(φ2) + L1*(C(φ1)]

[0, 0, -1, -d1 - d2]

[Cφ3*(Cφ1*Sφ2 + Cφ2*Sφ1 + Sφ3*(Cφ1*Cφ2 - Sφ1*Sφ2, Cφ3*Cφ1*Cφ2 - Sφ1* - Sφ3*(Cφ1)*Sφ2 + Sφ2 + Cφ2*Sφ1, 0, L2*Cφ1*Sφ2 + Cφ2*Sφ1 + L1*Sφ1]

[0, 0, 0, 1]