Egrescio: Obtenga el Jacobiano del robot Scara

1. Jacobiano tangencial (Jv)

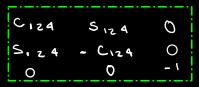
- Derivando o

$$\frac{d\vec{O}}{dt} = \begin{bmatrix} -\alpha_1 S_1 & \dot{\theta}_1 & -\alpha_2 S_{12} & (\dot{\theta}_1 + \dot{\theta}_2) \\ \alpha_1 & c_1 & \dot{\theta}_1 & +\alpha_2 C_{12} & (\dot{\theta}_1 + \dot{\theta}_2) \end{bmatrix}$$

$$-d\vec{O}$$

· Entonces Ju es:

2. Jacobrono angular:



$$S(\vec{\omega}) = \begin{bmatrix} -S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & 0 \\ S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & S(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} C(z) + (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) & (\dot{\theta}_1 + \dot{\theta}_2 + \dot{\theta}_4) \\ 0 & 0 & -1 \end{bmatrix}$$

$$= (\dot{\theta}_{1} + \dot{\theta}_{2} + \dot{\theta}_{4}) \begin{bmatrix} -s_{124} + s_{124} + c_{124} \\ c_{124} + s_{124} \\ c_{124} + s_{124} \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$S(\widehat{\omega}) = (\widehat{\theta}_1 + \widehat{\theta}_2 + \widehat{\theta}_4)$$

$$O \quad O \quad O \quad O \quad \omega_x = 0$$

$$\omega_z = \widehat{\theta}_1 + \widehat{\theta}_2 + \widehat{\theta}_4$$

$$O \quad O \quad O \quad O \quad \omega_z = \widehat{\theta}_1 + \widehat{\theta}_2 + \widehat{\theta}_4$$

$$\omega = 0$$

$$\omega_{\gamma} = 0$$

$$\omega_{\xi} = \theta_{1} + \theta_{2} + \theta_{4}$$

En forma de matrizi

$$\begin{bmatrix} \omega_{x} \\ \omega_{y} \\ \vdots \\ \omega_{x} \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ \vdots \\ 0 & 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 \\ \vdots \\ 0 & 0 & 0 \\ \vdots \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} \theta_{1} \\ \vdots \\ \theta_{2} \\ \vdots \\ \theta_{4} \end{bmatrix}$$

· Entonces el Jacobiano angular es;