No.

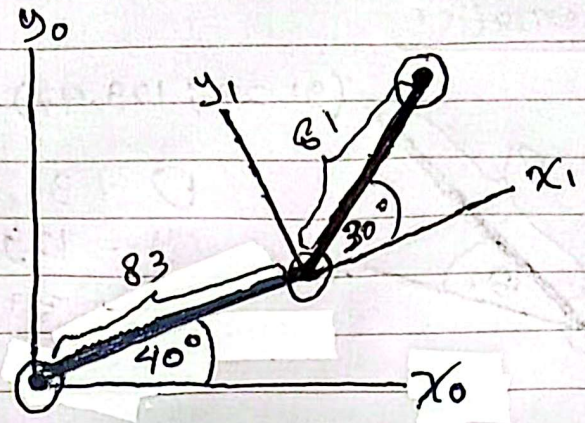
Date

Christian Rivaldo L.

Study Case

NIM = 533483

NIF = 22581



$$H_1 = \begin{bmatrix} \cos(40+30) & -\sin(40+30) & 83\cdot\cos 40^\circ + 81\cdot\cos(40^\circ+30^\circ) \\ \sin(40+30) & \cos(40+30) & 83\cdot\sin 40^\circ + 81\cdot\sin(40^\circ+30^\circ) \\ 0 & 0 & 1 \end{bmatrix}$$

$$H_1 = \begin{bmatrix} \cos 70^\circ & -\sin 70^\circ & 83\cdot\cos 40^\circ + 81\cdot\cos 70^\circ \\ \sin 70^\circ & \cos 70^\circ & 83\cdot\sin 40^\circ + 81\cdot\sin 70^\circ \\ 0 & 0 & 1 \end{bmatrix}$$

$$H_1 = \begin{bmatrix} 0,34 & -0,94 & 91,28 \\ 0,94 & 0,34 & 129,47 \\ 0 & 0 & 1 \end{bmatrix}$$

Posisi end-effector: $x = 91,28$

$y = 129,47$ (Forward Kinematics)

No.

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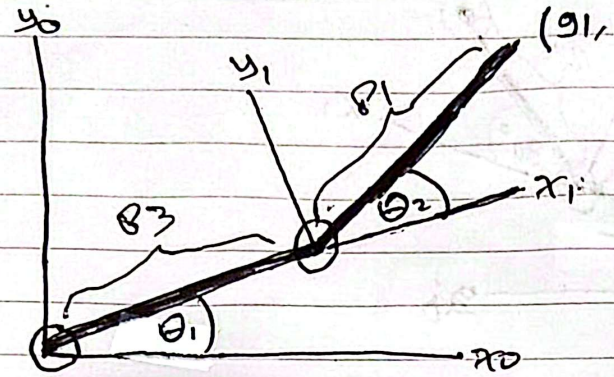
Fold

Inverse Kinematics



(91,28 ; 129,47) thd x_o, y_o

$x = 91,28$

$y = 129,47$

$l_1 = 83$

$l_2 = 81$

$$\theta_2 = \cos^{-1}\left(\frac{x^2+y^2-l_1^2-l_2^2}{2 \cdot l_1 \cdot l_2}\right) = \cos^{-1}\left(\frac{(91,28)^2+(129,47)^2-83^2-81^2}{2\,(83)\cdot(81)}\right)$$

$$\theta_2 = \cos^{-1}\left(\frac{11.644,5193}{13.446}\right)$$

$$\boxed{\theta_2 = 30^\circ}$$

$$\theta_1 = \tan^{-1}\left(\frac{y}{x}\right) - \tan^{-1}\left(\frac{l_2 \cdot \sin(\theta_2)}{l_1 + l_2 \cdot \cos(\theta_2)}\right)$$

$$\theta_1 = \tan^{-1}\left(\frac{129,47}{91,28}\right) - \tan^{-1}\left(\frac{81 \cdot \sin(30^\circ)}{83 + 81 \cdot \cos(30^\circ)}\right)$$

$$\theta_1 \approx 54,8 - 14,8$$

$$\boxed{\theta_1 \approx 40^\circ}$$