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CSIT 531
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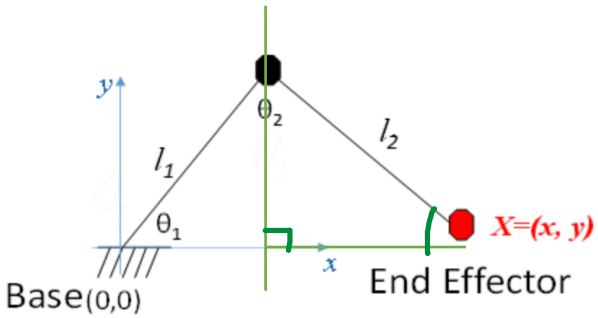
11/02/2020

Question:

Given the following two-link robot with specific joint angles, please compute the position *(x, y)* of its end effector. (Please present the calculation processes/steps)



(x, y) = f(θ_1, θ_2)

$X = l_1 \cos \theta_1 + l_2 \sin\alpha$

$X = l_1 \cos \theta_1 + l_2 \sin (\theta_1 + \theta_2 - 90)$

$X = l_1 \cos\theta_1 + l_2 \sin [-[90 - (\theta_1 + \theta_2)]]$

$X = l_1 \cos\theta_1 + l_2(-\sin [(90) - (\theta_1 + \theta_2)])$

$X = l_1 \cos\theta_1 - l_2 \cos (\theta_1 + \theta_2)$

$Y = l_1 \sin \theta_1 - l_2 \cos\alpha$

$Y = l_1 \sin \theta_1 - l_2 \cos [-90 + \theta_1 + \theta_2]$

$Y = l_1 \sin \theta_1 - l_2 \cos [-[90 - (\theta_1 + \theta_2)]]$

$Y = l_1 \sin \theta_1 - l_2 \cos [90 - (\theta_1 + \theta_2)]$

$Y = l_1 \sin \theta_1 - l_2 \sin (\theta_1 + \theta_2)$