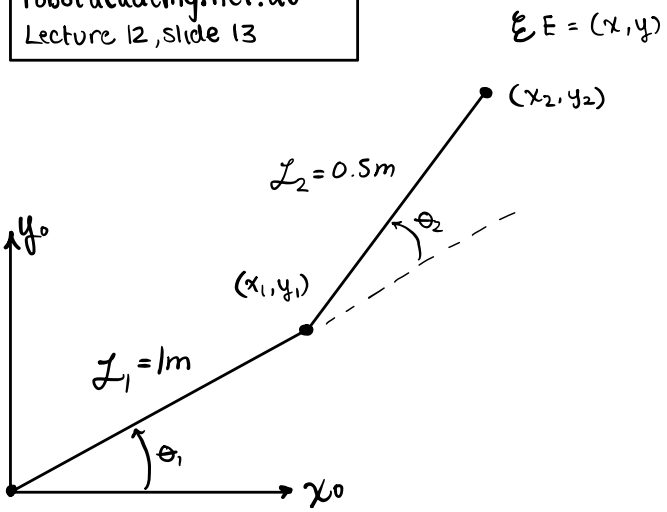
2R Planar Manipulator

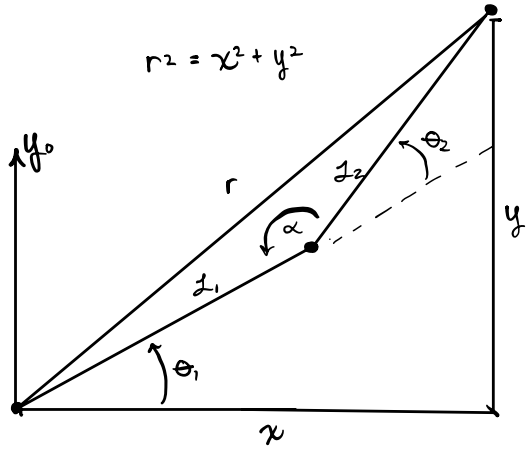
Sources:
robotacademy.net.au
Lecture 12, slide 13



✦ Forward Kinematics

$$x_1 = \mathcal{L}_1 \cos(\theta_1)$$
$$y_1 = \mathcal{L}_1 \sin(\theta_1)$$

$$x_2 = \mathcal{L}_2 \cos(\theta_1 + \theta_2) + \mathcal{L}_1 \cos(\theta_1)$$
$$y_2 = \mathcal{L}_2 \sin(\theta_1 + \theta_2) + \mathcal{L}_1 \sin(\theta_1)$$



✦ Inverse Kinematics

$$\theta_2 = \cos^{-1} \frac{x^2 + y^2 - \mathcal{L}_1^2 - \mathcal{L}_2^2}{2\mathcal{L}_1\mathcal{L}_2}$$

$$\theta_1 = \tan^{-1} \frac{y}{x} - \tan^{-1} \frac{\mathcal{L}_2 \sin\theta_2}{\mathcal{L}_1 + \mathcal{L}_2 \cos\theta_2}$$