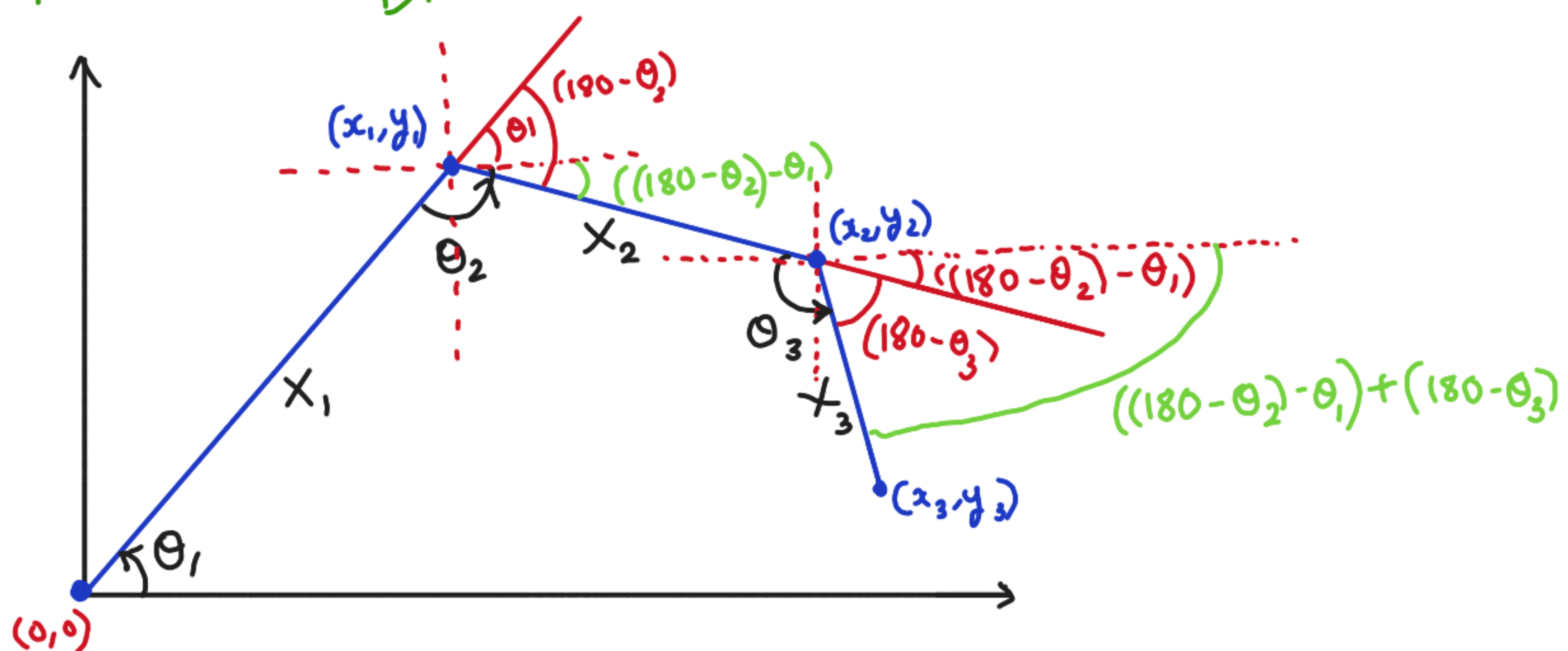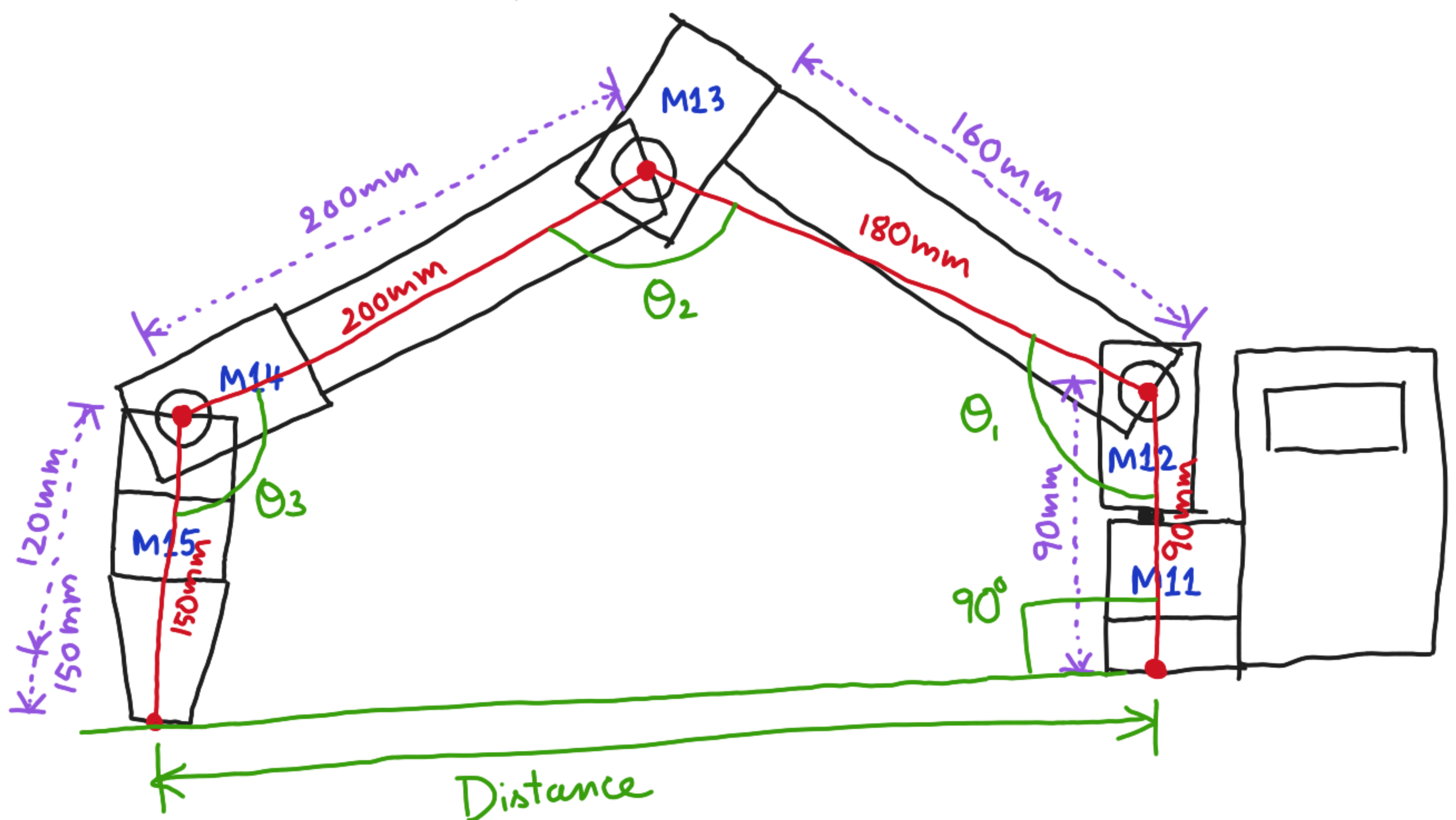# Open Manipulator X - Inverse Kinematics

$$x_1 = X_1 \cos\theta_1 \quad , \quad y_1 = X_1 \sin\theta_1$$

$$x_2 = X_1 \cos\theta_1 + X_2 \cos(180-\theta_2-\theta_1) \quad , \quad y_2 = X_1 \sin\theta_1 + X_2 \sin(180-\theta_2-\theta_1)$$

$$x_3 = X_1 \cos\theta_1 + X_2 \cos(180-\theta_2-\theta_1) + X_3 \cos(360-\theta_3-\theta_2-\theta_1)$$

$$y_3 = X_1 \sin\theta_1 + X_2 \sin(180-\theta_2-\theta_1) + X_3 \sin(360-\theta_3-\theta_2-\theta_1)$$