



$$P_f \begin{pmatrix} x_1 \cdot \cos \theta_1 - y_1 \cdot \sin \theta_1 \\ x_1 \cdot \sin \theta_1 + y_1 \cdot \cos \theta_1 \end{pmatrix}$$

$$P_f \begin{pmatrix} x_2 \cdot \cos (\theta_1 + \theta_2) - y_2 \cdot \sin (\theta_1 + \theta_2) \\ x_2 \cdot \sin (\theta_1 + \theta_2) + y_2 \cdot \cos (\theta_1 + \theta_2) \end{pmatrix}$$

$$P_f \begin{pmatrix} x_3 \cdot \cos (\theta_1 + \theta_2 + \theta_3) - y_3 \cdot \sin (\theta_1 + \theta_2 + \theta_3) \\ x_3 \cdot \sin (\theta_1 + \theta_2 + \theta_3) + y_3 \cdot \cos (\theta_1 + \theta_2 + \theta_3) \end{pmatrix}$$

$$P_x = x_1 \cdot \cos \theta_1 - y_1 \cdot \sin \theta_1 + x_2 \cdot \cos (\theta_1 + \theta_2) - y_2 \cdot \sin (\theta_1 + \theta_2) + x_3 \cdot \cos (\theta_1 + \theta_2 + \theta_3) - y_3 \cdot \sin (\theta_1 + \theta_2 + \theta_3) + s$$

$$P_y = x_1 \cdot \sin \theta_1 + y_1 \cdot \cos \theta_1 + x_2 \cdot \sin (\theta_1 + \theta_2) + y_2 \cdot \cos (\theta_1 + \theta_2) + x_3 \cdot \sin (\theta_1 + \theta_2 + \theta_3) + y_3 \cdot \cos (\theta_1 + \theta_2 + \theta_3) + h$$

$$\text{if } x_1 = x_2 = x_3 = 0. \quad s = h = 0.$$

$$P_x = -y_1 \cdot \sin \theta_1 - y_2 \cdot \sin (\theta_1 + \theta_2) - y_3 \cdot \sin (\theta_1 + \theta_2 + \theta_3)$$