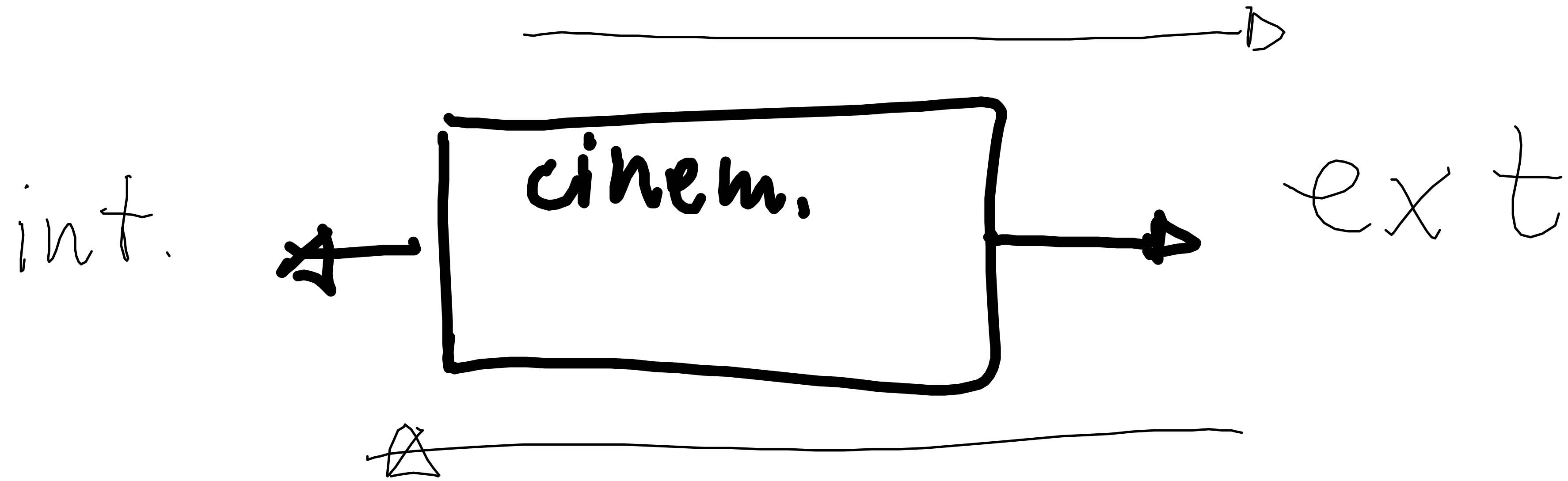
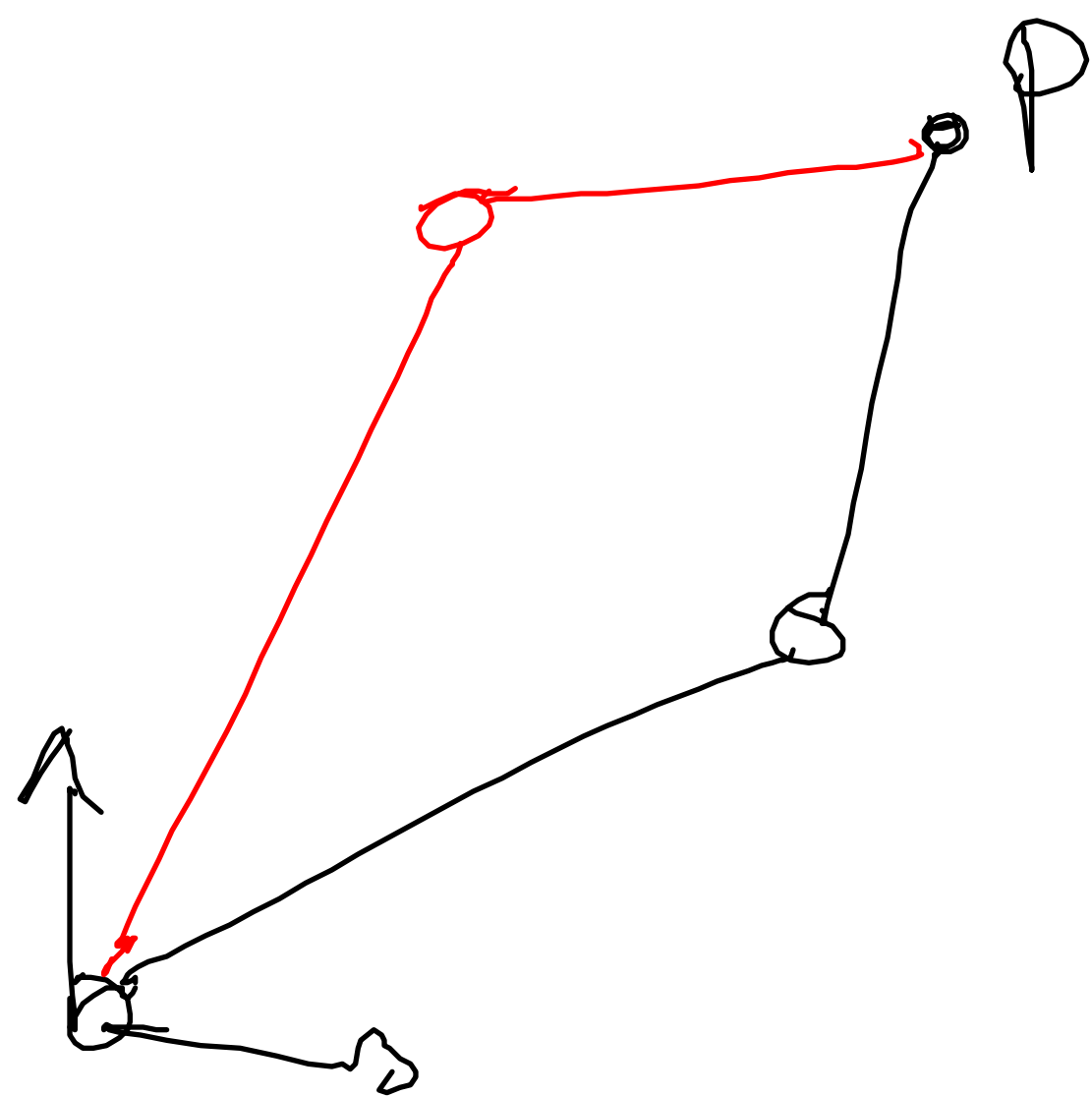
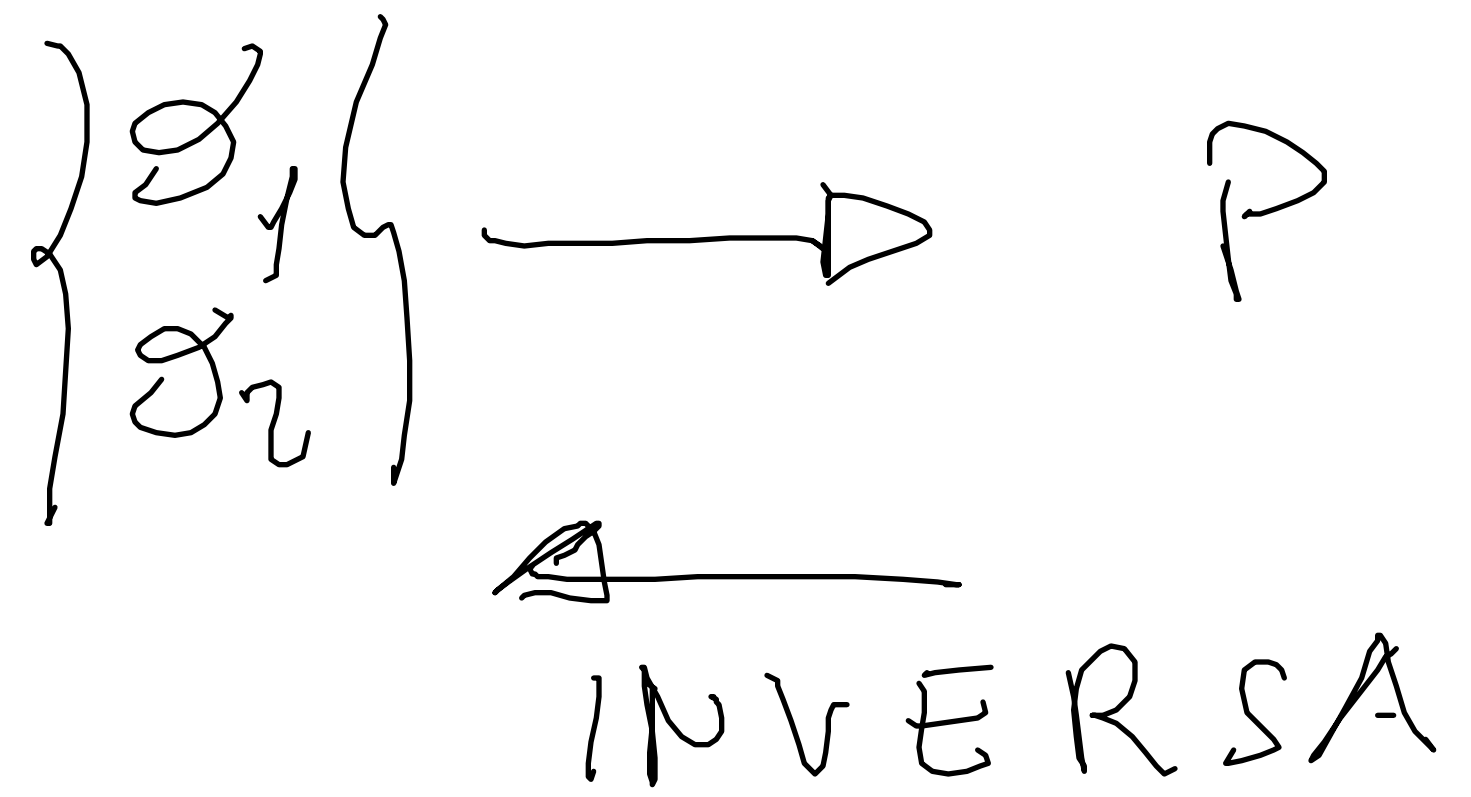
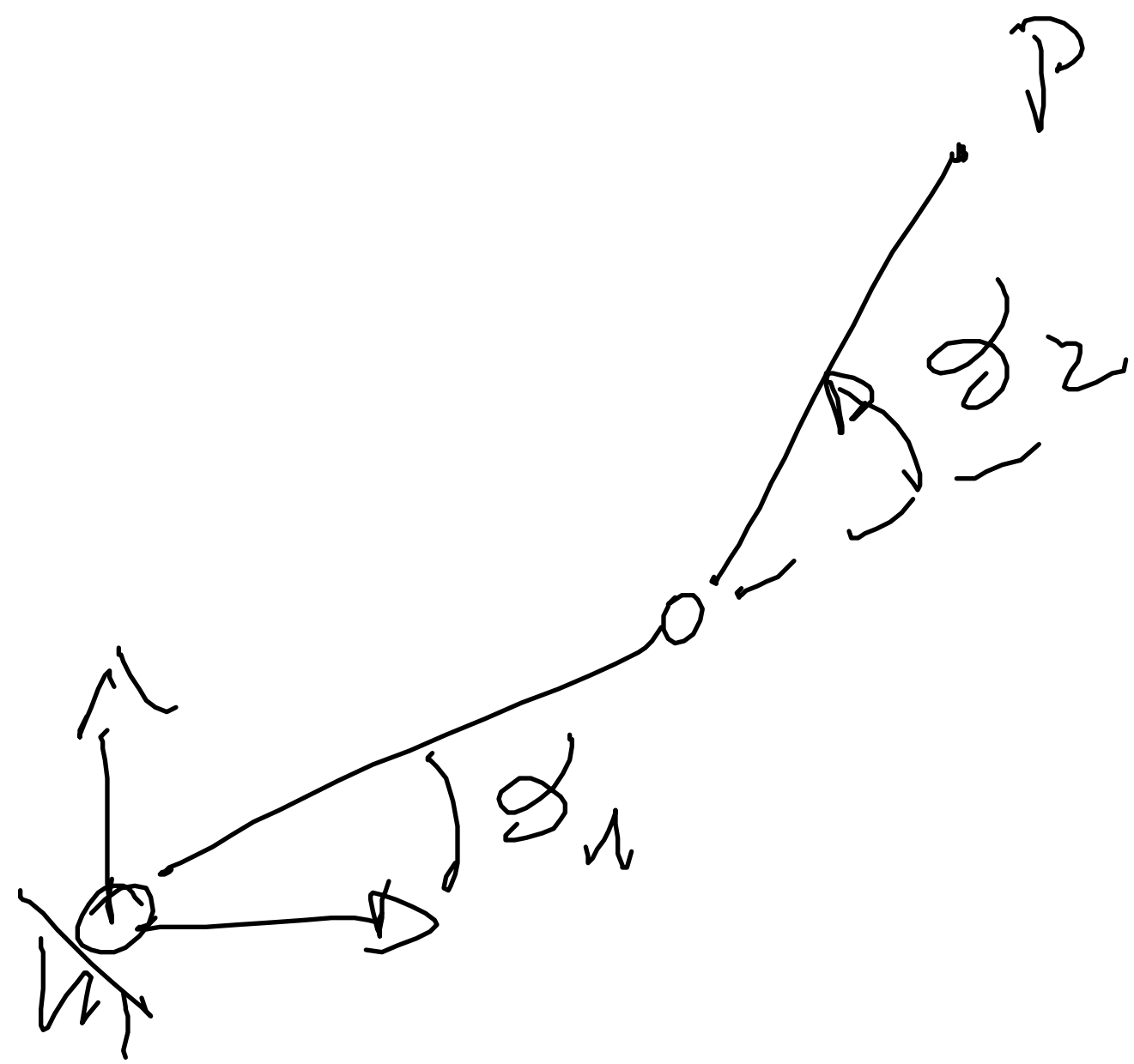
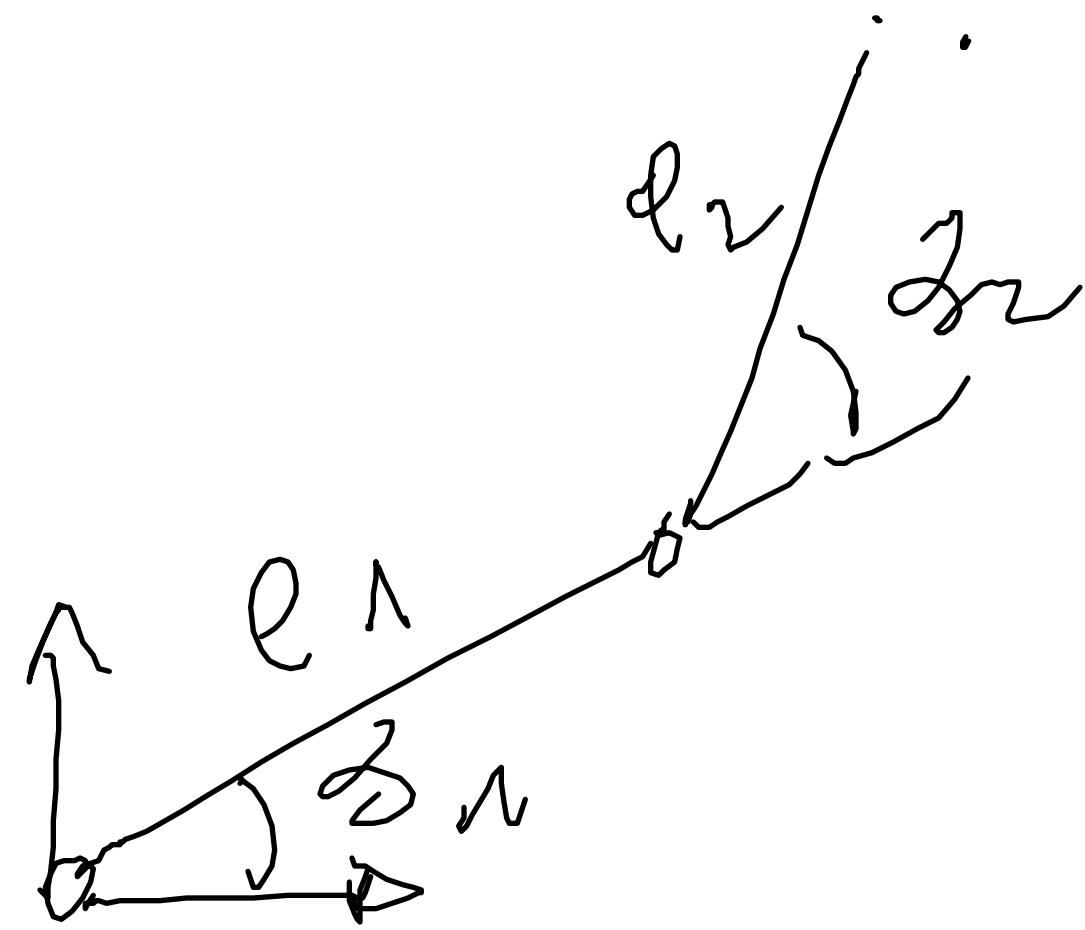


Ch. 5

# 2-segment Robot







$$P = \begin{cases} l_1 c \dot{q}_1 + l_2 c (\dot{q}_1 + \dot{q}_2) \\ l_1 s \dot{q}_1 + l_2 s (\dot{q}_1 + \dot{q}_2) \end{cases}$$

$$q = \begin{cases} q_1 \\ q_2 \end{cases}$$

$$P = k(q) \quad \left. \begin{matrix} x = x(q_1(t), q_2(t)) \\ y = y(q_1(t), q_2(t)) \end{matrix} \right\}$$

$$\begin{Bmatrix} \dot{z} \\ z \end{Bmatrix} = \begin{bmatrix} \frac{\partial x}{\partial q_1} & \frac{\partial x}{\partial q_2} \\ \frac{\partial y}{\partial q_1} & \frac{\partial y}{\partial q_2} \end{bmatrix} \begin{Bmatrix} \dot{q}_1 \\ q_1 \end{Bmatrix}$$

$$\begin{bmatrix} \frac{\partial x}{\partial q_1} \\ \frac{\partial x}{\partial q_2} \\ \frac{\partial y}{\partial q_1} \\ \frac{\partial y}{\partial q_2} \end{bmatrix} \begin{Bmatrix} \dot{q}_1 \\ \dot{q}_2 \end{Bmatrix} \left| \begin{matrix} -l_1 s \dot{q}_1 - l_2 s (\dot{q}_1 + \dot{q}_2) & -l_2 s (\dot{q}_1 + \dot{q}_2) \\ l_1 c \dot{q}_1 + l_2 c (\dot{q}_1 + \dot{q}_2) & l_1 c (\dot{q}_1 + \dot{q}_2) \end{matrix} \right.$$

J