

IO-SFL:

$$\begin{aligned}x_b &= x + b \cos(\theta) & \dot{x}_b &= v \cos(\theta) - \omega b \sin(\theta) \\y_b &= y + b \sin(\theta) & \dot{y}_b &= v \sin(\theta) - \omega b \cos(\theta)\end{aligned} \quad \dot{\theta} = \omega$$

$$\begin{bmatrix} v \\ \omega \end{bmatrix} = \begin{bmatrix} \cos(\theta) & \sin(\theta) \\ -\frac{1}{b} \sin(\theta) & \frac{1}{b} \cos(\theta) \end{bmatrix} \begin{bmatrix} \dot{x}_b \\ \dot{y}_b \end{bmatrix}$$

$$\begin{aligned}\dot{x}_b &= \dot{x}_{des} + k_1 e_x & e_x &= x_{des} - x_b \\ \dot{y}_b &= \dot{y}_{des} + k_2 e_y & e_y &= y_{des} - y_b\end{aligned}$$