

$$v = \omega R$$

$$v_l = \omega (R - l/2)$$

$$v_r = \omega (R + l/2)$$

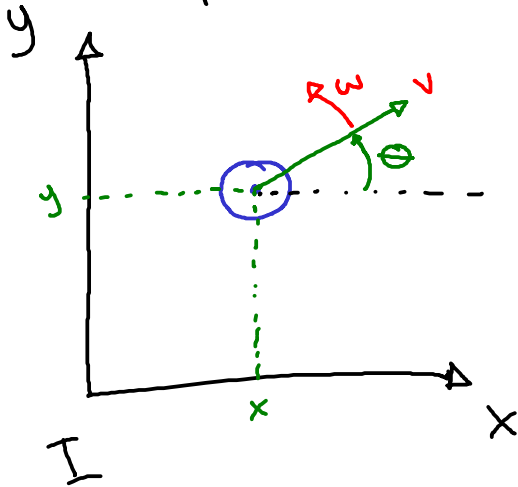
$$R = \frac{l (v_r + v_l)}{2 (v_r - v_l)}$$

$$\omega = \frac{v_r - v_l}{l}$$

$$v = \omega R$$

S. velocidad
Rotacional
Traslacional

Desplazamiento



$$q = \begin{bmatrix} x \\ y \\ \theta \end{bmatrix} \text{ configuración}$$

$$\dot{q} = f(q, v)$$

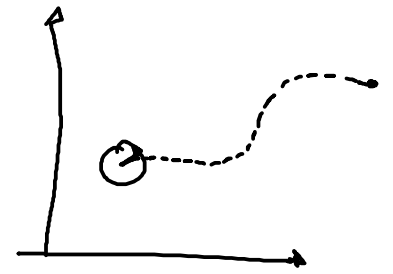
$$u = \begin{pmatrix} \omega \\ v \end{pmatrix}$$

$$\dot{q} = \begin{bmatrix} \dot{x} \\ \dot{y} \\ \dot{\theta} \end{bmatrix} = \begin{bmatrix} v \cos \theta \\ v \sin \theta \\ \omega \end{bmatrix}$$

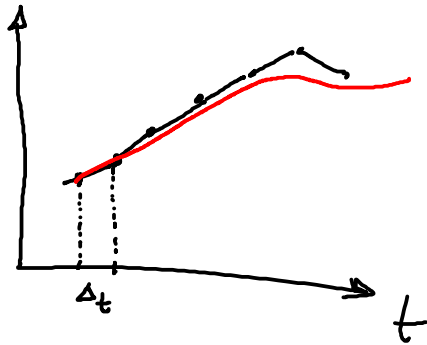
$$\omega(t)$$

$$v(t)$$

$$q = \int f(q_0, u) dt$$



Euler

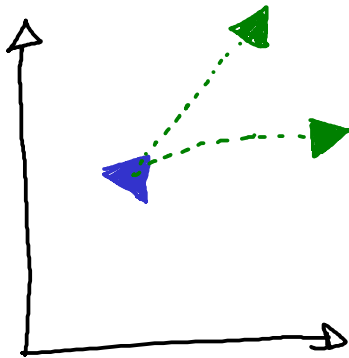


$$x = x_0 + \dot{x} \Delta t$$

$$X_{t+1} = X_t + \dot{X} \Delta t$$

$$\begin{bmatrix} x \\ y \\ \theta \end{bmatrix}_{t+1} = \begin{bmatrix} x \\ y \\ \theta \end{bmatrix}_t + \Delta t \begin{bmatrix} v(t) \cos \theta \\ v(t) \sin \theta \\ \omega(t) \end{bmatrix}$$

↑



$$q_0 = [x_0, y_0, \theta_0]$$

$$u = [v, \omega]$$

$$v = a$$

$$\omega = 0$$

$$t_{\max} = 10s$$

$$q = \int f(q, u) dt$$