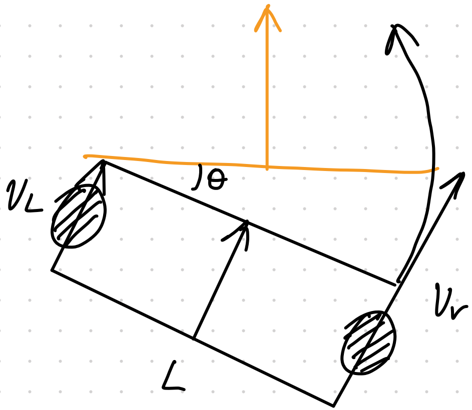


$\longrightarrow$ If θ is small enough $\longleftarrow$

$$V_r - V_L = \theta\, 2L$$

$$V_r \cancel{\Delta t} - V_L \cancel{\Delta t} = W \cancel{\Delta t} \cdot 2L$$

$$V_r - V_L = W 2L$$

$$R(W_r - W_L) = 2L W_b$$

$$\boxed{\dot{\theta} = R\,\frac{W_r - W_L}{L}}$$

$$\boxed{\begin{array}{ll} \alpha_L = \dfrac{T_L}{I_{yy\_b}} & \alpha_R = \dfrac{T_R}{I_{yy\_b}} \\ W_L = \alpha_L\, dt & W_R = \alpha_R\, dt \end{array}}$$

where I_{yy_b} is m.o.I of wheel about its spinning axis.

No slip: $V_R = W_R R \quad V_L = W_L R$

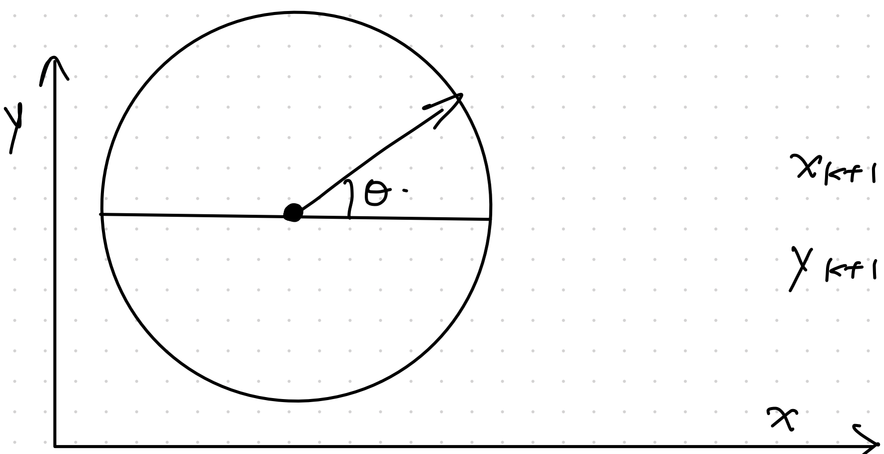
already part of dynamics.

$$\Sigma F = \left(\frac{T_L}{R}\right) + \left(\frac{T_R}{R}\right) - k_f mg$$

$$\boxed{acc = \frac{\Sigma F}{M}} \longrightarrow \text{linear acceleration.}$$

Absolute speed : $\boxed{|V| = \frac{V_R + V_L}{2}}$

positive rotation : CCW.



$$d_k = |V|_k dt + \frac{1}{2} acc\, dt^2$$

$$\left.\begin{aligned} x_{k+1} &= x_k + d_k \cos(\theta) \\ y_{k+1} &= y_k + d_k \sin(\theta) \end{aligned}\right\} \text{for all } \theta$$

Cornering constraint: no side slipe

$$F = \frac{mv^2}{r} = F_f = mgk_f$$

$$\frac{v^2}{r} = gk_f$$

$$V_{max} = \sqrt{rgk_f}$$

$$\boxed{\therefore \quad 0 \le |V| \le \sqrt{rgk_f}} \Longrightarrow$$

only constraint not in the dynamics_ode.