

1. Page 14:

Pure Pursuit Control for WMR

- Concept:
 - Modify the angular velocity to let the center achieve a point on path

$$\alpha = \arctan\left(\frac{y - y_g}{x - x_g}\right) - \theta$$

$$\omega = \frac{2 \sin(\alpha)}{L_d} \quad \leftarrow \quad \frac{2v \sin(\alpha)}{L_d}$$

$L_d = (kv + L_{fc})$, where k, L_{fc} are parameters.

1. Set a distance **Ld**.
2. Find the nearest point on the path.
3. Search the following point until the distance of the point larger than or equal to **Ld**.

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2. Page 14:

Pure Pursuit Control for WMR

- Concept:
 - Modify the angular velocity to let the center achieve a point on path

$$\alpha = \arctan\left(\frac{y - y_g}{x - x_g}\right) - \theta \quad \leftarrow \quad \left(\frac{y_g - y}{x_g - x}\right) - \theta$$

$$\omega = \frac{2 \sin(\alpha)}{L_d}$$

$L_d = (kv + L_{fc})$, where k, L_{fc} are parameters.

1. Set a distance **Ld**.
2. Find the nearest point on the path.
3. Search the following point until the distance of the point larger than or equal to **Ld**.

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Stanley Control

- Concept:
 - Exponential stability for front wheel feedback
- Some Implementation Details

$$\theta_e = \theta_p - \theta$$

$$\dot{e} = v_f \sin(\delta - \theta_e)$$

$$\delta = \arctan\left(-\frac{ke}{v_f}\right) + \theta_e$$

$$e = \begin{bmatrix} x - x_g \\ y - y_g \end{bmatrix} \cdot \begin{bmatrix} \cos(\theta_p) \\ \sin(\theta_p) \end{bmatrix} \Rightarrow \begin{matrix} \theta_p + 90 \\ \theta_p + 90 \end{matrix}$$

