



# Regulating the lateral optic flow to navigate in a corridor

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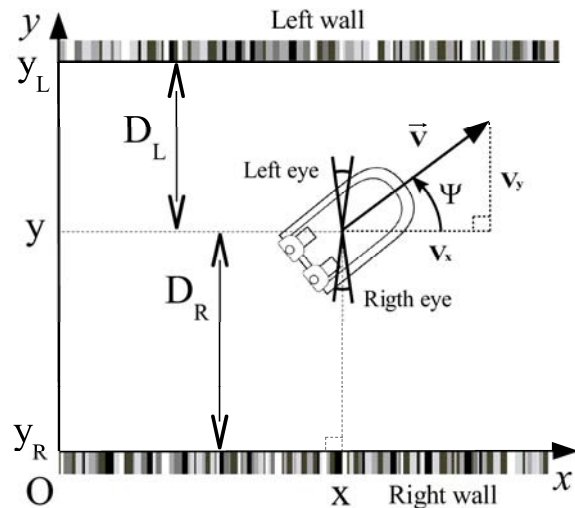
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# Regulating the lateral optic flow to navigate in a corridor

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## • Lateral optic flow to navigate safely



$\Psi$  : hovercraft yaw angle

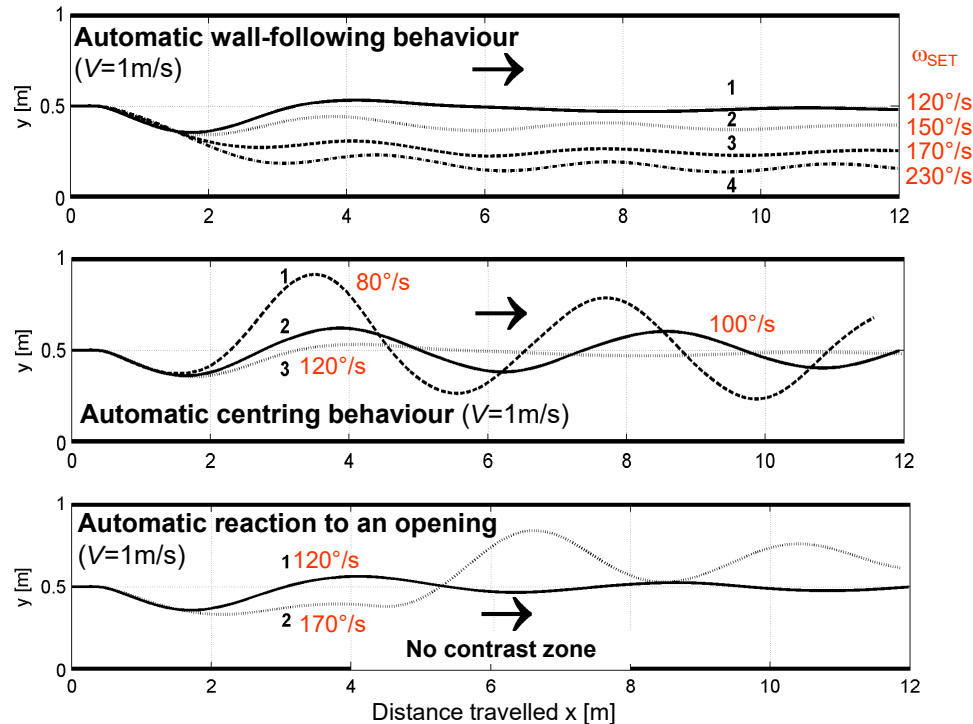
$v_x$  : ground speed along X-axis

$D_R$  : distance from right wall

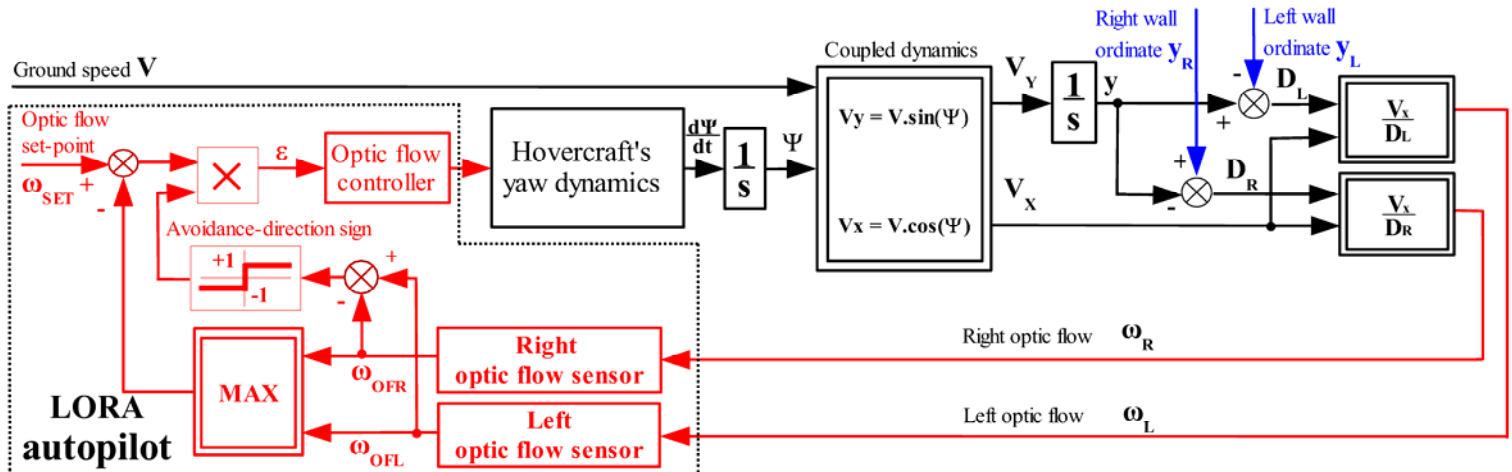
$\omega_R$  : right optic flow

$$\omega_R = \frac{v_x}{D_R}$$

## • Corridor following



## • The “optic flow regulation” loop (LORA = Lateral Optic flow Regulation Autopilot)



1. The autopilot keeps constant the ratio  $v_x / D$ .
2. It reacts to any optic flow variations by acting on the yaw.

3. Remote control ground speed
4. Active gaze stabilization by inertial information

## • Optic flow regulation does not require explicit knowledge of :

1. Ground speed (wheel tachometer not required),
2. Distance (emissive rangefinders not required),
3. Relief data (cartography not required)

⇒ **Well adapted to artificial (and natural) Micro-Air Vehicles**

## • Future improvements

- Visual control of ground speed
  - Independent control of each vehicle degree of freedom
  - Implementation on a miniature hovercraft
- [1] Serres J., Ruffier F., Franceschini N., Int. Modeling Mediterranean Multiconference, I3M'2005. Biomimetic visual navigation in a corridor: to centre or not to centre?