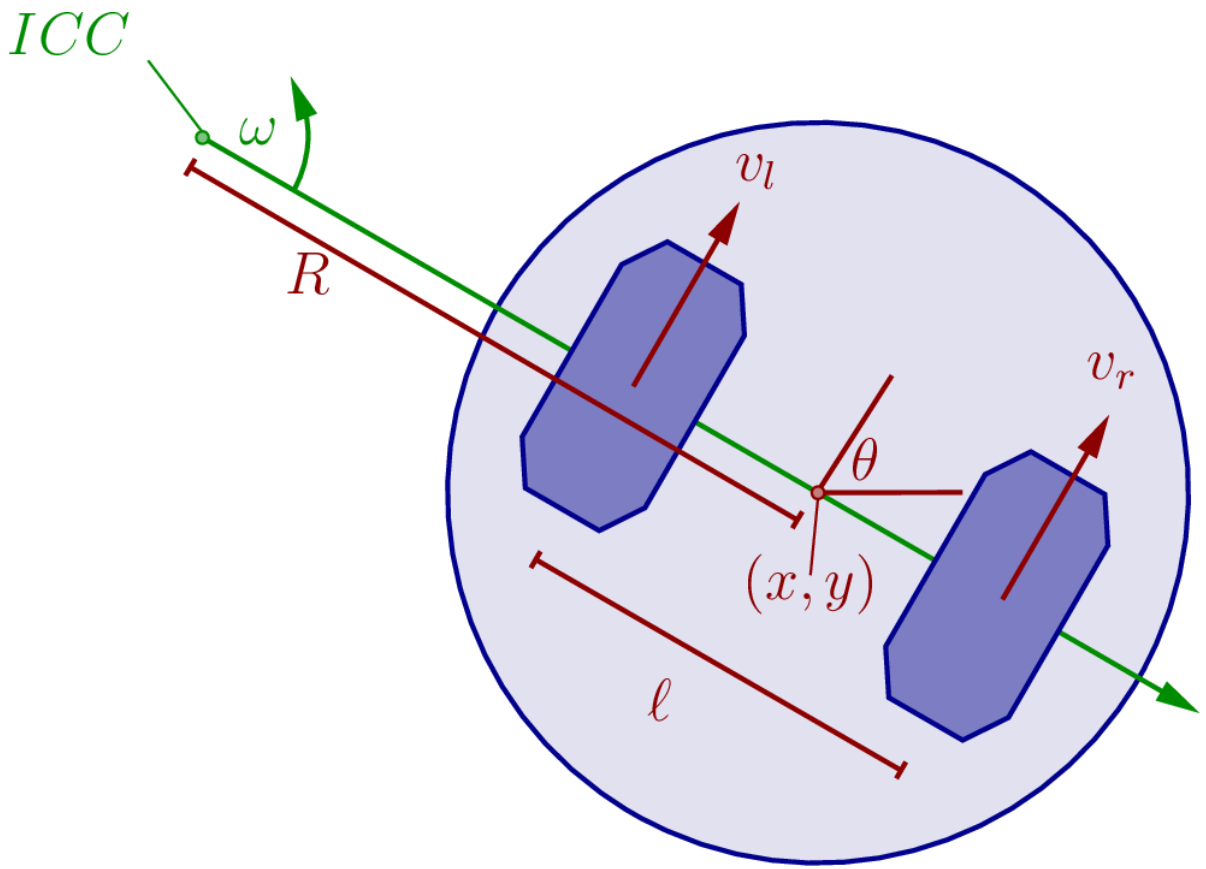
# Differential Drive Systems

## Locomotion

# Differential drive

**Definition**

A **differential drive** robot has two independent non-steered drive wheels along a common axis.



# States and actions for diff drive

**States:** Position and orientation:

$$(x, y, \theta)$$

**Actions:** Wheel velocities:

$$(v_l, v_r)$$

**Time**: Discrete. Each time step lasts $\Delta t$ seconds.

# Diff drive state transitions

How do such actions change the state?

**Main idea of differential drive motion**

The robot moves with a **constant angular velocity** around a point called the **instantaneous center of curvature**.