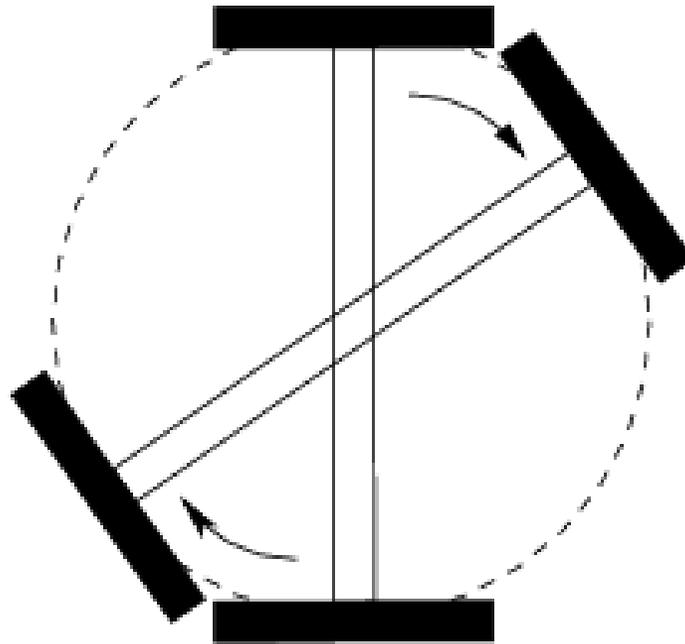# Differential Drive Systems

Special Cases

Diff drive special cases

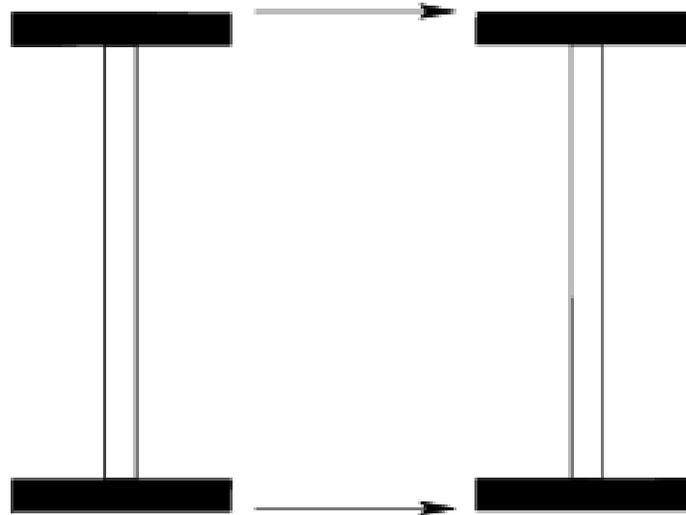There are two important special cases:

- If $v_l = -v_r$, then $R = 0$.

    The robot rotates in place.

Diff drive special cases

There are two important special cases:

- If $v_l = v_r$, then R is infinite.

  The robot moves in a straight line.

Navigating with a differential drive

A diff drive is **nonholonomic system** because it cannot move directly sideways.

Thus, navigating to a given goal state may require a series of actions.

One simple solution:

1. Rotate in place until the robot is facing its destination.
2. Move forward to the destination.
3. Rotate to the correct orientation.