AUTONOMOUS MOBILE ROBOTICS
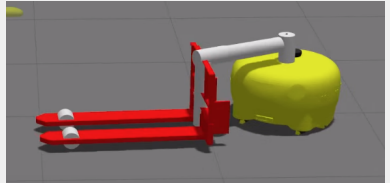
MOTION PLANNING AND CONTROL

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SEPTEMBER 7, 2022

Control of Mobile Robots

Let's try to control the differential drive robot. Consider you are given the following vehicle parameters: sampling period T_s = 0.033s, wheel radius r = 0.04 m, distance between the wheels L = 0.08 m

- Calculate analytically and by simulation the shape of the path done by the robot for the following cases? initial state of the robot you can get by calling self.set_q_init
  - $v(t)$ = 0.5 m/s, $\omega(t)$ = 0 rad/s
  - $v(t)$ = 1 m/s, $\omega(t)$ = 2 rad/s
  - $v(t)$ = 0 m/s, $\omega(t)$ = 2 rad/s
  - wheels angular velocities are $\omega(t)_L = 20 rad/s$ and $\omega(t)_R = 18 rad/s$
- Check that calculated and simulated path the same. Why or why not?
- Plot odometry of the vehicle and how can we reduce the error between desired and actual odometry of the vehicle?
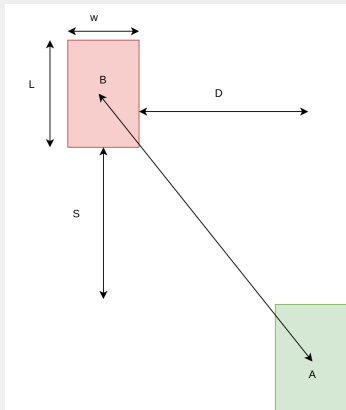
Consider the following figure
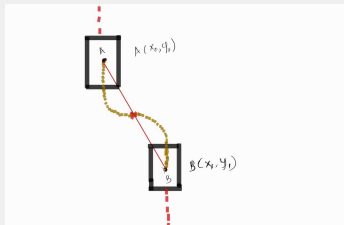
- Assume you know the vehicle parameters of the vehicle. Can you calculate the path that vehicle has to navigate from position A to position B? Make necessary assumptions

Consider the following figure

- Can you calculate the path that vehicle has to navigate from position A to position B? Make necessary assumptions