

ACKERMANN STEERING CONTROLLER

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Overview

- Ackermann Steering is a condition when axes of all the wheels in a vehicle intersect at a single turning centre.
- This method assumes that the steering angle is calculated with respect to a common centre, in this case on a line extended from rear axle.
- Prevents vehicle skid, which increases tyre life and energy efficiency.
- Used for autonomous guided vehicles and self-driving cars.

Technology

- Programming Language: Modern C++
- Ubuntu 18.04
- Build System: cmake
- Version Control: GitHub
- Software Tools: VSCode
- Build Check: Travis
- Code Coverage: Coveralls
- Gazebo API: To interface with the robot model in Gazebo environment.
- Implementation of PID controller for heading correction.
- Pose estimation for Ackermann steering to find error in heading.

- Calculation of velocity error and Heading errors.
- Application of Ackermann Steering Kinematic model to determine wheel steering angle.
- Using PID for heading correction
- Using PID for speed control
- Usage of Gazebo APIs for simulation of robot in Gazebo environment.

Deliverables

- A robust Ackermann steering controller that will steer robot to desired setpoints.
- Demonstration of convergence of steering and velocity.

Project Fall-Back

- If the implementation of Gazebo APIs fail visual demo would not be possible, yet the convergence can be shown.