EENG-340 Feedback for Motion Control

April 16, 2024

Pre-Lab Plan:

Implement a PID feedback loop to control some aspect of your robot's motion.

Requirements

The goal of this project is use the robot interface you developed in Lab 4 to implement a feedback system to control the motion of your robot.

PID

A PID controller is a device, or algorithm for producing feedback that optimally adjusts the drive signal to a system in order to produce the desired output. You are welcome to use the standard PID library for Arduino, or Dr. Talaga's modification as a starting point.

Sense

In order to implement feedback you need to sense the quantity you wish to control. The robot has numerous sensors that could enable you to measure speed, position, direction, or angular velocity. Pick at least one quantity you'd like to control and use that as the input to your PID controller.

Control

Once you've identified a quantity to control, you need a way to control it! For motion on the robot the main output is the motors. There are two motors: left, and right. Each can be independently controlled using the Zumo API.

Closing the Loop

Using the sensor you choose as an input, and using the motor control as an output, implement a feedback system to control some aspect of the robot's motion. You may inspect the implementation provided by Dr. Talaga, but you must use a different sensor, or make a significant improvement if you're going to incorporate the same sensor.