

Assignment 7 – Differential steering

Problem 1

If you haven't already, build a robot using two different motors to power the wheels, one motor powering a wheel or wheels on the left-hand side, and the other motor powering a wheel or wheels on the right-hand side.

Problem 2

Without using the `DifferentialPilot` class, experiment with differential steering. Write a program to make the robot follow a circular path. Don't worry if the actual path isn't exactly circular or the robot doesn't quite make it back to its start position.

According to the formulas we derived in class and the angular velocities at which your program has the two wheels spin, what is the theoretical radius that your robot should trace? Is this close to what you observe in real life? Write your answers in your program as comments.

Problem 3

Use the `DifferentialPilot` class to write a program which has the robot follow a path which traces out the sides of a square. To practice decomposition, your program should have a method `traceSquare()` which takes a single double as its argument representing the side length of the square which is to be traced.

Challenge problem

Experiment with the `DifferentialPilot arc()` method for different input values. How closely do the different values correspond to the real-life turning ratio for your robot? How does your robot fare with particularly large or small values for the turning ratio? If you don't remember the argument(s) to `arc()`, look it up in the LeJOS documentation.