NITRObot motor calibration

How to use **NITRObot\_motor\_calibration\_simple.ino** sketch to calibrate your **NITRObot**.

What is calibration and why we need to do it?

NITRObot is a differential drive steering type of vehicle – you slow down one side (and eventually accelerate the other side) in order to make a turn. The wheels on both sides are slipping while making the turn. This is the same way a tracked tractor or a military tank is making the turns. In order to move straight the same power is applied to both sides of the robot.

We need the NITRObot to go straight when moving forward or backward and keep the same rate of turning to the left and to the right.

NITRObot uses standard (TT) DC motors. In theory, by applying the same voltage to the motors you should get exactly the same RPM (Revolutions Per Minute). There are a lot of factors which can make the wheels of the robot to actually rotate with slightly different speed. The main ones are: small differences in the friction in the gear boxes and mounting the wheels with a slight deviation from the direction of travel (causing wheel slip when moving straight).

This small differences on the left and right sides of the NITRObot can make it veer to the left or to the right while moving straight.

As a robot for beginners, NITRObot does not use wheel encoders (sensors counting pulses on each revolution of the wheel shaft). In the more advanced robots, a combination of wheel encoders, inertial measurement units (IMU) and other sensors are used to correct for these small differences and ensure that the robot is moving perfectly straight line.

In the case of NITRObot, we need to use the trial-and-error method, in order to calibrate the differential steering vehicle to go straight.

The calibration process will result in finding a speed reduction coefficient for correcting the slight differences between the speed of the left and the right side of the robot while moving straight.

The program NITRObot\_motor\_calibration\_simple.ino will help you do this calibration.

Follow the steps below:

1. Draw a straight line on the floor and place the NITRObot on the center of the line.

!!! IMPORTANT – You’ll need enough free space in front of the robot – the robot will stop moving in the number of seconds defined by You i

1. Start the robot
2. Check if there is a deviation from the straight line
3. If there is a deviation lower the initial speed value of the side which is moving faster in the following lines:



1. REPEAT, until You are satisfied with the result – straight movement of NITRObot.
2. Note down the final values for speedLeft and speedRight – You’ll need them in the “Line following” and “Maze solving” tasks.