ECE 425 – Pre-Lab 1

This function takes in a target angle relative to the robot, and attempts to move the robot to that angle. This can be done by moving both motors at equal speeds to an equal position (e.g. if left motor takes 30 steps, then right motor should also take 30 steps at an identical speed).

The relationship between the angle of the robot and the steps on the motor is based on the wheel size and distance between the wheels. This value can be calculated, or tested, and then implemented.

Fcn: goToAngle(int targetAngle)

Error = position - targetAngle

While(error > tolerance)

Run motor amount based on conversion

Error = position – targetAngle

End while

This function moves the robot a specific distance. The exact distance is based on the robot's wheels' diameter, and the motor's step size.

Fcn: goForward(int targetDistance)

Error = position – targetDistance

While(error > tolerance)

Run motor

Error = position – targetDistance

End while

This function moves the robot to a specific position. The robot begins at 0,0, with an angle of 0 degrees (robot faces the x-axis). This can be used to calculate the angle between the robot and the desired position, turn the robot to that angle, and then tell the robot to go forward a certain amount.

Fcn: goToGoal(int[] desiredPosition)

desiredAngle = arctan((desiredPosition[2]-currentPosition[2])/(desiredPosition[1]-currentPosition[1]))

goToAngle(desiredAngle)

distance = squareroot((desiredPosition[1]– currentPosition[1])^2+ (desiredPosition[2]–currentPosition[2])^2)

goForward(distance)

This function takes in a diameter, an arc length, and whether the robot curves left or right. Based upon the diameter of the circle, and the distance between the wheels, the wheels will run at a consistent different speed to go the desired arc size.

Fcn: circle(int diameter, int arc, boolean right) // boolean tells if circle curves to left or right

speedDifference = (Math Based on wheel diameter & distance)

Run motors at different speeds based on speedDifference

Use a For loop to determine how long to run motors to obtain a specific arc length.

This function takes in a diameter, and distance between the center of the two circles. This can then be combined with goForward and circle functions to make a figure eight (two goForwards and two circle functions.

Fcn: figureEight(int length, int diameter)

goToAngle((math to find angle for figure 8)) // depends where figure eight should start

goForward((math to find length of distance))

circle(height/2, math to find arc length, right)

goForward((math to find length of distance))

circle(height/2, math to find arc length, left)

This function uses goToGoal 4 times, with a goal of (0,1)

Fcn: square(int length)

For(i = 1 to 4)

goToGoal([0,1])

end for