Quiz: Wheels and Distance

Introduction to Mobile Robotics > Wheels and Distance Investigation

Condition	Wheel Diameter (cm)	Wheel Circumference (cm)	Number of wheel rotations in program	Theoretical (predicted) distance traveled in program (cm)	Actual distance traveled (cm) in each trial	Average actual distance traveled (cm)
New Wheel 1	6.27		3.00		1) 63.2 2) 54.9 3) 56.6	
New Wheel 2		14.1	3.00		1) 37.0 2) 38.1 3) 43.7	

1. Complete the data table above by filling in the blanks.

2. Find the % error of the measured data in the table above for both wheels. Say whether or not the data from each of the new wheels supports Dr. Turner's hypothesis and why.

Remember that Dr. Turner's hypothesis said that:
Distance Traveled = Wheel Rotations x Wheel Circumference

And that you can calculate %error using the equation:

$$\frac{|\text{ theoretical measurement - actual measurement }|}{\text{theoretical measurement}} \times 100\%$$

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3. How many degrees must a robot with "New Wheel 1" (see data table above) be programmed to travel in order to go:

    a. 15cm?

    b. 30cm?

4. Benny replaces the wheels on his robot with wheels that are half as large (in diameter) as the wheels on his old one, but leaves the program the same. What percent of the old distance will his new robot run?

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