

Rotational Motion - Interactive Challenge Notebook

This notebook will guide you through controlling an **omni-wheel robot** step by step. You'll see an **example**, then try to complete a similar challenge on your own!

Learning Objectives

- Understand how to move the robot using Python commands.
- Experiment with different speeds, directions, and durations.
- Observe and adjust movement patterns to improve control.

```
In [ ]: import sys
import os
import time

# Add parent directory to the Python path
sys.path.insert(0, os.path.abspath('.'))

import rclpy
from controllers.omni_robot_controller import OmniWheelControlNode # Import

# Initialize ROS2 node
rclpy.init()
node = OmniWheelControlNode()
```

Example 1: Rotating the Robot

Here's how you can make the robot **rotate counterclockwise** for 1.5 seconds.

```
In [ ]: # Example: Rotate left at 1 radian per second for 1.5 seconds
node.rotate_left(1.0, 1.5)
```

Example 2: Rotating Clockwise

Here's how you can make the robot **rotate clockwise** for 1.5 seconds.

```
In [ ]: # Example: Rotate left at 1 radian per second for 1.5 seconds
node.rotate_right(1.0, 1.5)
```

Challenge 1: Programming the robot to complete 1 rotation in 2 seconds

```
In [ ]: # Challenge
# Have the robot complete one rotation in two seconds
# Remember there are 2*pi radians in a full circle

#Write your code below
```

Challenge 2: Rotate back and forth

```
In [ ]: # Challenge
# Have the robot turn to the left 90 degrees, then pause for 2 seconds
# Then have the robot turn right 90 degrees, back to the center, then pause
# Then have the robot turn right 90 degrees again, then pause for 2 seconds.
# Then have the robot turn left 90 degrees, back to the center, then pause
# Have the robot repeat this 5 times (think loops!)
```

Shutting Down the Node

Once you're done, **shutdown the node** properly.

```
In [ ]: node.destroy_node()
rclpy.shutdown()
```