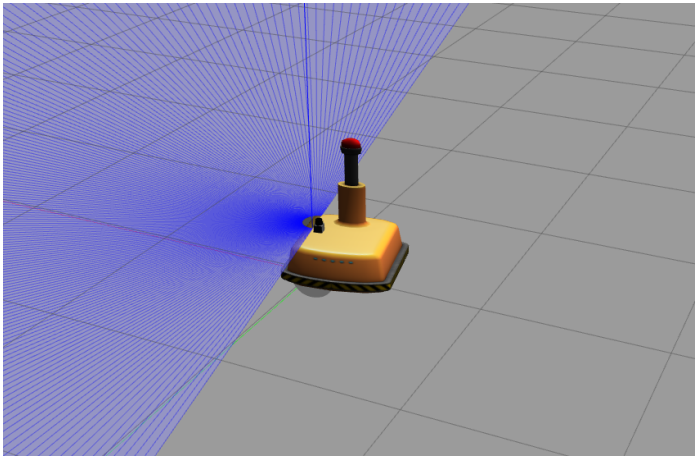
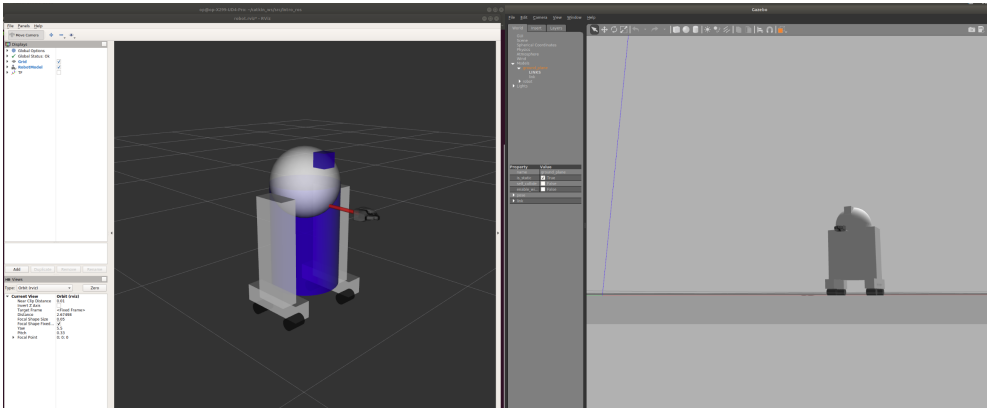
Introduction to ROS2: Basics, Motion, and Vision

INNOPOLIS UNIVERSITY

Hagen Robot



R2 D2



Step 01

create a new package

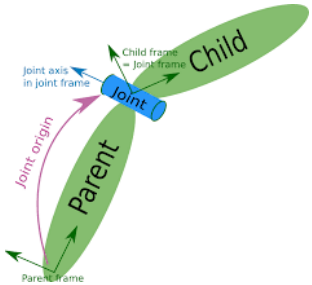
cd <path to workspace>/catkin_ws/src
ros2 pkg create −−build-type ament_python hagen_robot_diff_drive

create robot model config file

mkdir -p models/hagen_robot_model
cd models/hagen_robot_model
touch model.config

Step 02

1. How to define movable joints in sdf?
2. Continuous joint: can take on any angle from negative infinity to positive infinity on a specified axis, e.g., z-axis by specifying 0 0 1
3. Revolute joints: rotate in the same way that the continuous joints do, but these type of joints have strict limits
4. Prismatic joints: moves along an axis, not around it



Step 03

1. Robot's location is at 0 0 .04 (x,y,z) and no orientation change with respect to the **Gazebo coordinate system**
2. Robot's chassis (**chassis**) should be constructed as a box whose dimensions are 0.4 x 0.2 x 0.1 (Length x Width x Height) in m
3. Add a mesh for the robot chassis
4. Add caster wheel to the robot's chassis and its pose (-0.19 0 0 0 0 0)
5. Add left and right wheels (**left_wheel** and **right_wheel**) with respect to **chassis** and those poses are 0.12 0.19 0.1 0 1.5707 1.5707 and 0.12 -0.19 0.1 0 1.5707 1.5707, respectively. The pose is defined as x y z roll pitch yaw
6. Add a laser scanner **laser_link** with pose 0.15 0 0.30 0 0 0 with respect to **chassis**
7. Add revolute joints from **left_wheel** and **right_wheel** to **chassis**,
8. Add fixed joint between **laser_link** and **chassis**
9. Add a plugin for diff_drive robot controller

Step 04

create a node for launch the robot using a sdf file

```
cd <path to workspace>/catkin_ws/src/hagen_robot_diff_drive/hagen_robot_diff_drive
touch spawn_robot.py
```

update the setup.py adding an entry point to the node that was developed

```
entry_points= {
'console_scripts': [
'spawn_robot = hagen_robot_diff_drive.spawn_robot:main'
], },
```

Step 05

create a launch script for spawn the robot

```
spawn_entity = Node(package='hagen_robot_diff_drive', executable='spawn_robot',
arguments=['HagenRobot', 'hagen_robot', '0.0', '0.0', '0.0'],
output='screen')
```