Project 1

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ENPM 662

INTRODUCTION TO ROBOT MODELING

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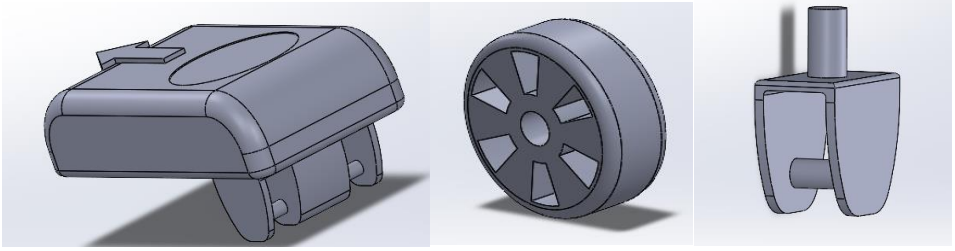
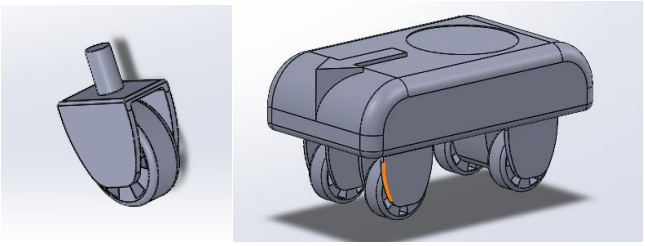
Solid work Design

For Project 1 we have designed a car with 3 DOF. For this, we have designed a chassis, 4 wheels, and 2 steering components which will be attached to the front part of the chassis.

The photos of all the design parts are shown below.



Above are the figures for the 3 assembly parts which are the chassis, wheel, and steering mechanism



Above are the design photos of the assembly of the steering and a car

We have assigned 4 continuous joints for the 4 wheels and 2 revolute joints for the steering with a limit of 90 to -90 degrees. Both wheels at the back have one rear wheel axis and the front 2 wheels and the 2 steering's have their axis for rotation.

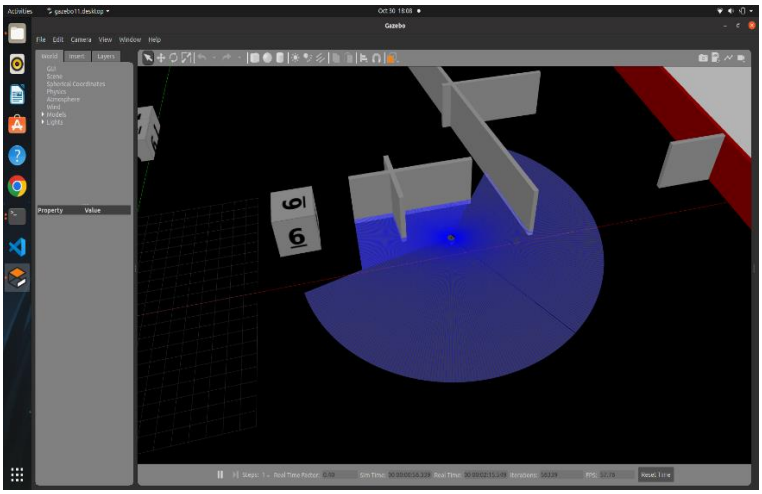
ROS

To use the model in ROS we exported the URDF file and add controllers to it. We added 4 controllers in our model, 2 Velocity joint controllers for the rear 2 wheels and 2 effort Joint controllers for the front 2 steering joints.

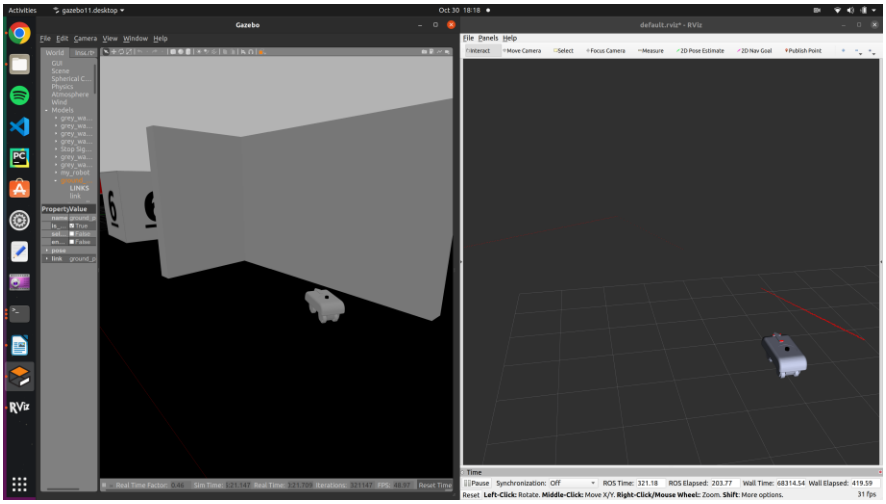
Then we made a new Xacro file consisting of the lidar and car Urdf with the joint between the base of the lidar and the car's chassis.

We created 3 python files for the robot to move in the environment. One was for the teleop to control the bot using the keyboard.

The other 2 files were of the publisher and subscriber to move the car forward in the Gazebo with increasing velocity.



Car In gazebo with lidar lasers



Car in rviz with laser scan