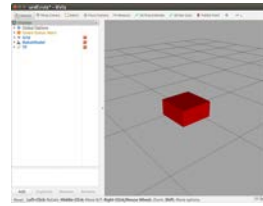


## Chapter 2 URDF Results 09/27/18

1. Make a box <!-- Base Link --> Page 46-47

```
$ roslaunch ros_robotics ddrobot_rviz.launch model:=dd_robot.urdf
```

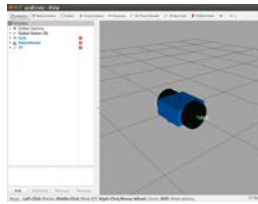


2. Add Wheels <!-- Right Wheel --> <!-- Left Wheel -->

dd\_robot2

3. Add Caster <!-- Caster --> dd\_robot3

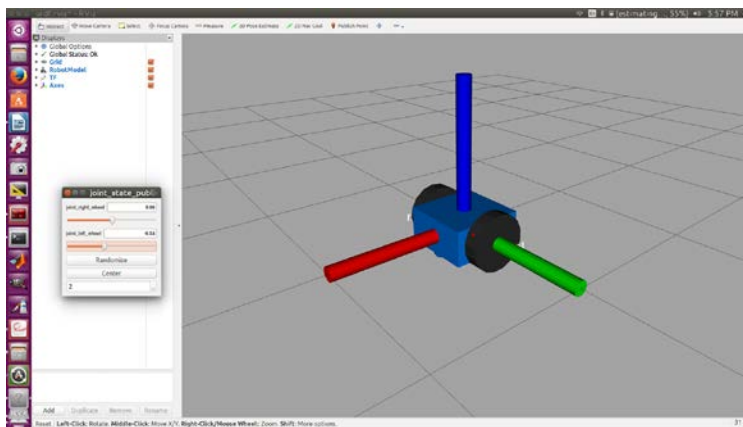
4. Add Color Blue Body, Black Wheels



5. Add Collisions dd\_robot5

6. Add Mass and Inertia dd\_robot6 and make joint\_state\_publisher visible

```
$ roslaunch ros_robotics ddrobot_rviz.launch model:=dd_robot6.urdf gui:=True  
(Do not include <cr> if copied from the book; I added Axes to the picture.)
```



Chapter 2 References 9/2018

[robot state publisher](http://wiki.ros.org/robot_state_publisher)

[http://wiki.ros.org/robot\\_state\\_publisher](http://wiki.ros.org/robot_state_publisher)

[joint state publisher](http://wiki.ros.org/joint_state_publisher)

[http://wiki.ros.org/joint\\_state\\_publisher](http://wiki.ros.org/joint_state_publisher)

## List of moments of inertia

[https://en.m.wikipedia.org/wiki/List\\_of\\_moments\\_of\\_inertia](https://en.m.wikipedia.org/wiki/List_of_moments_of_inertia)

### Let's see what we have for topics and messages

```
harman@D104-45931:~$ rostopic list
/clicked_point
/initialpose
/joint_states
/move_base_simple/goal
/rosout
/rosout_agg
/tf
/tf_static
```

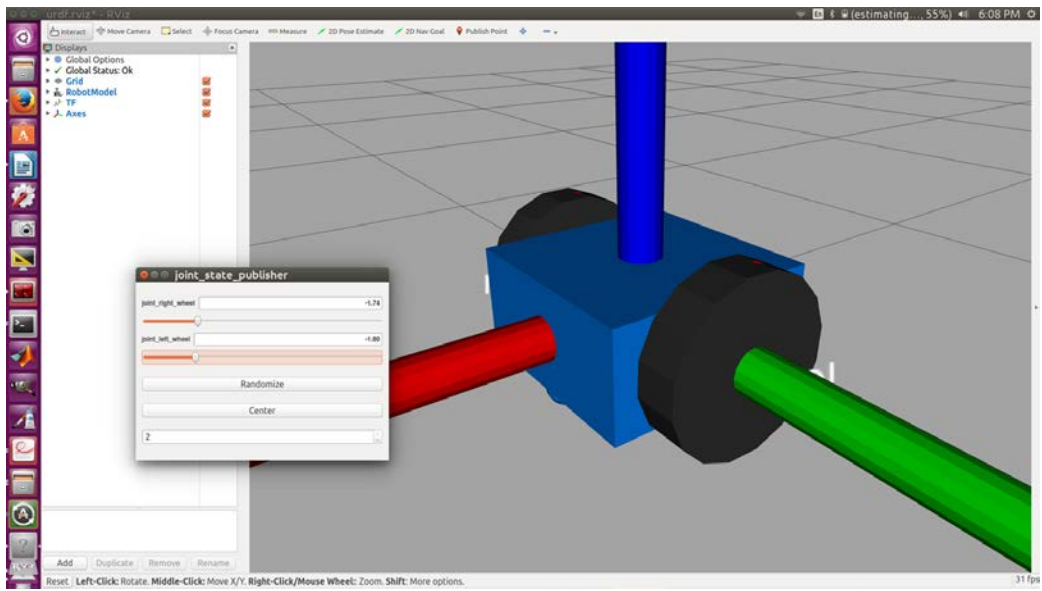
```
harman@D104-45931:~$ rostopic type /joint_states
```

```
sensor_msgs/JointState
harman@D104-45931:~$ rosmmsg show sensor_msgs/JointState
std_msgs/Header header
  uint32 seq
  time stamp
  string frame_id
string[] name
float64[] position
float64[] velocity
float64[] effort
```

What is being sent by the joint\_state\_publisher? (Move the red dots to vertical – about 90 deg)

```
$ rostopic echo /joint_states
```

```
header:
  seq: 6667
  stamp:
    secs: 1538089596
    nsecs: 672245979
  frame_id: ""
name: ['joint_right_wheel', 'joint_left_wheel']
position: [-1.7423272856808991, -1.7995042719762335]
velocity: []
effort: []
```



## Launch File

```
harman@D104-45931:~$ roscd ros_robotics
harman@D104-45931:~/catkin_ws/src/ros_robotics$ ls
CMakeLists.txt launch package.xml scripts urdf urdf.rviz worlds
harman@D104-45931:~/catkin_ws/src/ros_robotics$ cd launch/
harman@D104-45931:~/catkin_ws/src/ros_robotics/launch$ ls
ddrobot_gazebo.launch ddrobot_rviz.launch turtlesim_teleop.launch
harman@D104-45931:~/catkin_ws/src/ros_robotics/launch$ gedit ddrobot_rviz.launch
```

```
<launch>
<!-- values passed by command line input -->
<arg name="model" />
<arg name="gui" default="False" />

<!-- set these parameters on Parameter Server -->
<param name="robot_description" textfile="$(find ros_robotics)/urdf/$(arg model)" />
<param name="use_gui" value="$(arg gui)" />

<!-- Start 3 nodes: joint_state_publisher, robot_state_publisher and rviz -->
<node name="joint_state_publisher" pkg="joint_state_publisher" type="joint_state_publisher" />

<node name="robot_state_publisher" pkg="robot_state_publisher" type="state_publisher" />

<node name="rviz" pkg="rviz" type="rviz" args="-d $(find ros_robotics)/urdf.rviz" required="true" />
<!-- (required = "true") if rviz dies, entire roslaunch will be killed -->
</launch>
```

## Final URDF

```
harman@D104-45931:~/catkin_ws/src/ros_robotics/launch$ cd ..
harman@D104-45931:~/catkin_ws/src/ros_robotics$ ls
CMakeLists.txt launch package.xml scripts urdf urdf.rviz worlds
harman@D104-45931:~/catkin_ws/src/ros_robotics$ cd urdf
harman@D104-45931:~/catkin_ws/src/ros_robotics/urdf$ ls
dd_robot2.urdf dd_robot4.urdf dd_robot6.urdf dd_robot.urdf
dd_robot3.urdf dd_robot5.urdf dd_robot.gazebo
```

```
<?xml version='1.0'?>
<robot name="dd_robot">

<!-- Base Link -->
<link name="base_link">
<visual>
<origin xyz="0 0 0" rpy="0 0 0" />
<geometry>
<box size="0.5 0.5 0.25"/>
</geometry>
<material name="blue">
<color rgba="0 0.5 1 1"/>
</material>
</visual>
<!-- Base collision, mass and inertia -->
<collision>
<origin xyz="0 0 0" rpy="0 0 0" />
<geometry>
<box size="0.5 0.5 0.25"/>
</geometry>
</collision>
```

```

<inertial>
  <mass value="5"/>
  <inertia ixx="0.13" ixy="0.0" ixz="0.0" iyy="0.21" iyz="0.0" izz="0.13"/>
</inertial>

<!-- Caster -->
<visual name="caster">
  <origin xyz="0.2 0 -0.125" rpy="0 0 0" />
  <geometry>
    <sphere radius="0.05" />
  </geometry>
</visual>
<!-- Caster collision, mass and inertia -->
<collision>
  <origin xyz="0.2 0 -0.125" rpy="0 0 0" />
  <geometry>
    <sphere radius="0.05" />
  </geometry>
</collision>
<inertial>
  <mass value="0.5"/>
  <inertia ixx="0.0001" ixy="0.0" ixz="0.0" iyy="0.0001" iyz="0.0" izz="0.0001"/>
</inertial>

</link>

<!-- Right Wheel -->
<link name="right_wheel">
  <visual>
    <origin xyz="0 0 0" rpy="1.570795 0 0" />
    <geometry>
      <cylinder length="0.1" radius="0.2" />
    </geometry>
    <material name="darkgray">
      <color rgba=".2 .2 .2 1"/>
    </material>
  </visual>
  <!-- Right Wheel collision, mass and inertia -->
  <collision>
    <origin xyz="0 0 0" rpy="1.570795 0 0" />
    <geometry>
      <cylinder length="0.1" radius="0.2" />
    </geometry>
  </collision>
  <inertial>
    <mass value="0.5"/>
    <inertia ixx="0.01" ixy="0.0" ixz="0.0" iyy="0.005" iyz="0.0" izz="0.005"/>
  </inertial>

</link>

<!-- Right Wheel joint -->
<joint name="joint_right_wheel" type="continuous">
  <parent link="base_link"/>
  <child link="right_wheel"/>
  <origin xyz="0 -0.30 0" rpy="0 0 0" />
  <axis xyz="0 1 0" />
</joint>

```

```

<!-- Left Wheel -->
<link name="left_wheel">
  <visual>
    <origin xyz="0 0 0" rpy="1.570795 0 0" />
    <geometry>
      <cylinder length="0.1" radius="0.2" />
    </geometry>
    <material name="darkgray">
      <color rgba=".2 .2 .2 1"/>
    </material>
  </visual>
  <!-- Left Wheel collision, mass and inertia -->
  <collision>
    <origin xyz="0 0 0" rpy="1.570795 0 0" />
    <geometry>
      <cylinder length="0.1" radius="0.2" />
    </geometry>
  </collision>
  <inertial>
    <mass value="0.5"/>
    <inertia ixx="0.01" ixy="0.0" ixz="0.0" iyy="0.005" iyz="0.0" izz="0.005"/>
  </inertial>
</link>

<!-- Left Wheel joint -->
<joint name="joint_left_wheel" type="continuous">
  <parent link="base_link"/>
  <child link="left_wheel"/>
  <origin xyz="0 0.30 0" rpy="0 0 0" />
  <axis xyz="0 1 0" />
</joint>

</robot>

```

## LIKE TO SEE BAXTER'S URDF?

[https://github.com/RethinkRobotics/baxter\\_common/blob/master/baxter\\_description/urdf/baxter.urdf](https://github.com/RethinkRobotics/baxter_common/blob/master/baxter_description/urdf/baxter.urdf)

1559 lines (1552 sloc) 51.1 KB