

Fundamentals of Robotics HW 2

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Abstract

This report is part of Fundamentals of Robotics course for 3d year students at Innopolis University. In this report I am creating a ROS package and a simple URDF file which is being visualized using RViz. Moreover, I wrote a C++ code which acts as a publisher to the JointState topic and updates the position for each joint separately.

1 URDF

The design consists of one base shaped like a box and four links as shown in Figure 1.

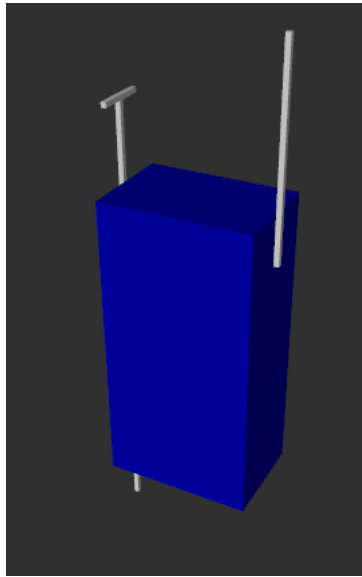


Figure 1: URDF solid view

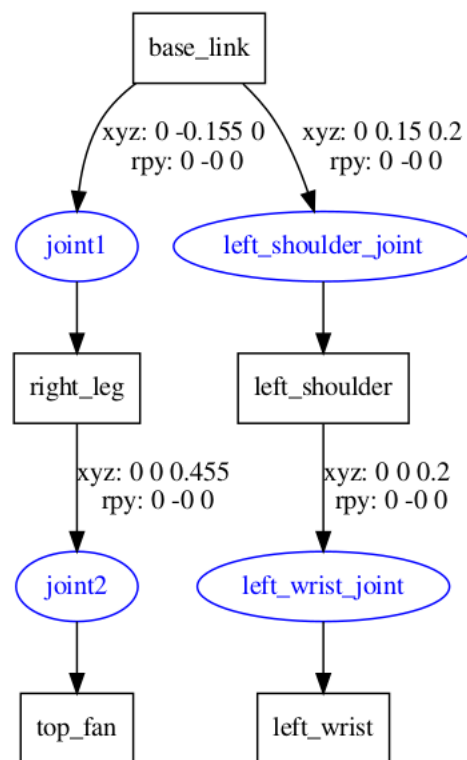


Figure 2: URDF Tree

As Figure 3 shows the right leg link is attached to the base link by joint1 which is of type continuous, so it enables the right leg link to rotate non stop around its center. For top fan, we see that it is located horizontally at the top end of right leg link and it is attached to it using a continues joint as well. For the left shoulder joint and left wrist joint combined with the links between them they create a RR manipulator in zx plane.

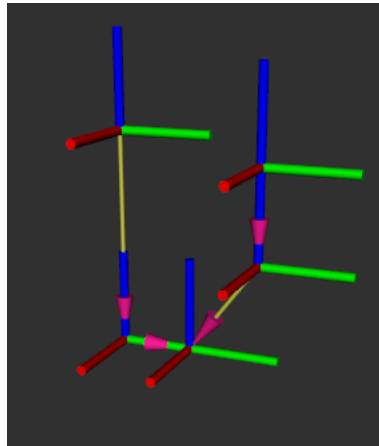


Figure 3: TF Transform Tree

2 C++ Publisher

In order to move the robot in RViz a node should publish the states of each joint to the JointState topic. Each message to the JointState topic will contain:

1. Header header
2. string[] name
3. float64[] position
4. float64[] velocity
5. float64[] effort

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

Figure 4: JointState sensor messages

C++ code will publish the states of the joints using JointState sensor messages.

3 Launch file

The last step is to complete the launch file where it will be responsible for launching the robot in RViz, the robot state publisher and the publisher node.

4 GitHub

All files can be found here