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ROS package tf2_ros: a basic introduction

Mukunda Bharatheesha

tf2_ros package

- tf2_ros is a ROS package that implements the functional aspects of TF
  - actively maintain spatial and temporal relationships between reference frames.

- **transform** pose from a given reference frame to a target reference frame
  - "time travel" functionality - look up spatio-temporal relationships between frames in the past.

Was there a tf1 ROS package?

- Yes, it was (and is) called just tf.
  - still works and used in many applications.
  - command line tools.
  - all in one (vs clear separation of functionalities in tf2 via packages).

- **tf2_ros** is recommended and all tf functionalities have been migrated to tf2
  - transform buffer to cache transforms over a certain duration.

tf2_ros: information representation

- How are the spatio-temporal relationships quantified?
  - 3D transformation: translation, rotation (quaternion) and time stamp (geometry_msgs/TransformStamped).
  - ROS topic: /tf (tf2_msgs/TFMessage).

- TF Command line tools
  - Start the course simulation in a new terminal
    - lower graphics demand with gui:=false argument.
  - Start another terminal, source the workspace setup files.

tf/tf2_ros: command line tools

Print transformation between source and target frames on the terminal

```
$ rosrun tf tf_echo <source_frame> <target_frame>
```

View the "TF tree"

```
$ rosrun tf view_frames
```

```
$ rosrun tf2_tools view_frames.py
```

Publish a static transform between a parent and a (new) child frame

```
$ rosrun tf2_ros static_transform_publisher <trans>
<rot> "parent" "child"
```

command line tool: tf_echo (static)

donnie@tudelft: ~/ros/hrwros_ws

/home/donnie/ros/hrwros_code_ws/src/hrwros_code/hrwros_gazebo/launch/hrwros_environment.launch h

```
donnie@tudelft:~/ros/hrwros_ws$ rosrun tf tf_echo world robot2_pedestal_link
At time 0.000
- Translation: [-7.800, -1.500, 0.000]
- Rotation: in Quaternion [0.000, 0.000, 0.000, 1.000]
            in RPY (radian) [0.000, -0.000, 0.000]
            in RPY (degree) [0.000, -0.000, 0.000]
At time 0.000
- Translation: [-7.800, -1.500, 0.000]
- Rotation: in Quaternion [0.000, 0.000, 0.000, 1.000]
            in RPY (radian) [0.000, -0.000, 0.000]
            in RPY (degree) [0.000, -0.000, 0.000]
At time 0.000
- Translation: [-7.800, -1.500, 0.000]
- Rotation: in Quaternion [0.000, 0.000, 0.000, 1.000]
            in RPY (radian) [0.000, -0.000, 0.000]
            in RPY (degree) [0.000, -0.000, 0.000]
```

joint <origin>

command line tool: tf_echo (dynamic)