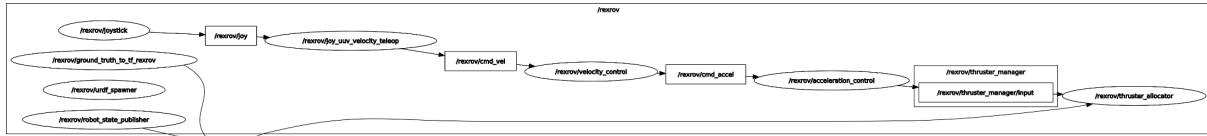


Table of Contents

Task 1	2
Rqt_graph	2
Nodes	2
/rexrov/acceleration_control	3
/rexrov/ground_truth_to_tf_rexrov	4
/rexrov/robot_state_publisher	4
/rexrov/joy_uuv_velocity_teleop	5
/rviz	5
/rosout	6
/rexrov/velocity_control	6
/rexrov/urdf_spawner	7
/rexrov/joystick	7
/rexrov/thruster_allocator	7
Task 2	8
Part B	8
Point Division	9

Task 1

Rqt_graph



In order to retrieve information about the nodes, topics, services, and messages from “[uuv_gazebo/rexrov_default.launch](#)”, I had to first launch the file by using the following command:
`roslaunch uuv_gazebo rexrov_default.launch.`

By using the command `roslaunch rqt_graph rqt_graph` we are able to have a graph visualization of /rexrov and its current active nodes and topics.

Nodes

If we would like to get specific information about every node's topic we can use `rostopic list` to list the topics and `rostopic info [topic]`, and the same can be done for services, we would only need to change topic by service. However, I mostly used `roslaunch` `list` and `roslaunch info [node]` to better understand the graph.

By using `roslaunch list` I was able to get a list of all the nodes:

1. /rexrov/acceleration_control
2. /rexrov/ground_truth_to_tf_rexrov
3. /rexrov/joy_uuv_velocity_teleop
4. /rexrov/joystick
5. /rexrov/robot_state_publisher
6. /rexrov/thruster_allocator
7. /rexrov/urdf_spawner
8. /rexrov/velocity_control
9. /rosout
10. /rviz

/rexrov/acceleration_control

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rostopic info /rexrov/acceleration_control
-----
Node [/rexrov/acceleration_control]
Publications:
 * /rexrov/thruster_manager/input [geometry_msgs/Wrench]
 * /rosout [roscpp_msgs/Log]

Subscriptions:
 * /rexrov/cmd_accel [geometry_msgs/Accel]
 * /rexrov/cmd_force [unknown type]

Services:
 * /rexrov/acceleration_control/get_loggers
 * /rexrov/acceleration_control/set_logger_level

contacting node http://aguacateubuntu:38491/ ...
Pid: 29630
Connections:
 * topic: /rosout
   * to: /rosout
   * direction: outbound (38061 - 10.82.57.126:40206) [9]
   * transport: TCPROS
 * topic: /rexrov/thruster_manager/input
   * to: /rexrov/thruster_allocator
   * direction: outbound (38061 - 10.82.57.126:40216) [16]
   * transport: TCPROS
 * topic: /rexrov/cmd_accel
   * to: /rexrov/velocity_control (http://aguacateubuntu:33137/)
   * direction: inbound
   * transport: TCPROS
```

This node has two publishers of message type `geometry_msgs` and `roscpp_msgs`. A message defines the structure of the data that is passed between nodes. The `/rexrov/thruster_manager/input` topic is a publisher to this node and it is a subscriber to the active node `/rexrov/thruster_allocator`. Along with services `/rexrov/acceleration_control/get_loggers` and `/rexrov/acceleration_control/set_logger_level` of type `roscpp/GetLoggers` and `roscpp/SetLoggerLevel`.

By using `rostopic info /rexrov/thruster_manager/input`, we are able to retrieve this information.

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rostopic info /rexrov/thruster_manager/input
Type: geometry_msgs/Wrench

Publishers:
 * /rexrov/acceleration_control (http://aguacateubuntu:45023/)

Subscribers:
 * /rexrov/thruster_allocator (http://aguacateubuntu:45395/)
```

/rexrov/ground_truth_to_tf_rexrov

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnodetool info /rexrov/ground_truth_to_tf_rexrov
-----
Node [/rexrov/ground_truth_to_tf_rexrov]
Publications:
* /rexrov/ground_truth_to_tf_rexrov/euler [geometry_msgs/Vector3Stamped]
* /rexrov/ground_truth_to_tf_rexrov/pose [geometry_msgs/PoseStamped]
* /rosout [roscpp_msgs/Log]
* /tf [tf2_msgs/TFMessage]

Subscriptions:
* /rexrov/pose_gt [unknown type]

Services:
* /rexrov/ground_truth_to_tf_rexrov/get_loggers
* /rexrov/ground_truth_to_tf_rexrov/set_logger_level
```

This node has four publishers of message type geometry_msgs, roscpp_msgs, and tf2_msgs. The /rexrov/ground_truth_to_tf_rexrov/euler topic is only a publisher to this node. The /rexrov/ground_truth_to_tf_rexrov/pose is only a publisher to this node. This node is subscribed to only one topic and has two services of get_loggers and set_logger_level.

/rexrov/robot_state_publisher

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnodetool info /rexrov/robot_state_publisher
-----
Node [/rexrov/robot_state_publisher]
Publications:
* /rosout [roscpp_msgs/Log]
* /tf [tf2_msgs/TFMessage]
* /tf_static [tf2_msgs/TFMessage]

Subscriptions:
* /rexrov/joint_states [unknown type]

Services:
* /rexrov/robot_state_publisher/get_loggers
* /rexrov/robot_state_publisher/set_logger_level
```

This node has three publishers of message type roscpp_msgs and tf2_msgs. The /tf topic has a publisher to this node and to /rexrov/robot_state_publisher. The /tf_static is only a publisher to this node. This node is subscribed to only one topic and has two services of get_loggers and set_logger_level.

/rexrov/joy_uuv_velocity_teleop

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnode info /rexrov/joy_uuv_v
elocity_teleop
-----
Node [/rexrov/joy_uuv_velocity_teleop]
Publications:
* /rexrov/cmd_vel [geometry_msgs/Twist]
* /rexrov/home_pressed [std_msgs/Bool]
* /rosout [rosgraph_msgs/Log]

Subscriptions:
* /rexrov/joy [sensor_msgs/Joy]

Services:
* /rexrov/joy_uuv_velocity_teleop/get_loggers
* /rexrov/joy_uuv_velocity_teleop/set_logger_level
```

This node has three publishers of message type geometry_msgs, std_msgs, and rosgraph_msgs. The /rexrov/cmd_vel topic is only a publisher to this node. The /rexrov/home_pressed is only a publisher to this node. This node is subscribed to only one topic and has two services of get_loggers and set_loggers_level.

/rviz

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnode info /rviz
-----
Node [/rviz]
Publications:
* /clicked_point [geometry_msgs/PointStamped]
* /initialpose [geometry_msgs/PoseWithCovarianceStamped]
* /move_base_simple/goal [geometry_msgs/PoseStamped]
* /rosout [rosgraph_msgs/Log]

Subscriptions:
* /rexrov/current_velocity_marker [unknown type]
* /rexrov/current_velocity_marker_array [unknown type]
* /rexrov/dvl_sonar0 [unknown type]
* /rexrov/dvl_sonar1 [unknown type]
* /rexrov/dvl_sonar2 [unknown type]
* /rexrov/dvl_sonar3 [unknown type]
* /rexrov/pose_gt [unknown type]
* /rexrov/rexrov/camera/camera_image [unknown type]
* /tf [tf2_msgs/TFMessage]
* /tf_static [tf2_msgs/TFMessage]

Services:
* /rviz/get_loggers
* /rviz/load_config
* /rviz/reload_shaders
* /rviz/save_config
* /rviz/set_logger_level
```

This node has four publishers of message type geometry_msgs and rosgraph_msgs. This node is subscribed to ten topics and has five services.

/rosout

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnodetool info /rosout
-----
Node [/rosout]
Publications:
* /rosout_agg [rosgraph_msgs/Log]

Subscriptions:
* /rosout [rosgraph_msgs/Log]

Services:
* /rosout/get_loggers
* /rosout/set_logger_level
```

/rosout is the name of the console log reporting mechanism in ROS. It can be thought as comprising several components: The `rosout` node for subscribing, logging, and republishing the messages

/rexrov/velocity_control

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnodetool info /rexrov/velocity_control
-----
Node [/rexrov/velocity_control]
Publications:
* /rexrov/cmd_accel [geometry_msgs/Accel]
* /rexrov/velocity_control/parameter_descriptions [dynamic_reconfigure/ConfigDescription]
* /rexrov/velocity_control/parameter_updates [dynamic_reconfigure/Config]
* /rosout [rosgraph_msgs/Log]

Subscriptions:
* /rexrov/cmd_vel [geometry_msgs/Twist]
* /rexrov/pose_gt [unknown type]

Services:
* /rexrov/velocity_control/get_loggers
* /rexrov/velocity_control/set_logger_level
* /rexrov/velocity_control/set_parameters
```

This node has four publishers of message type geometry_msgs, dynamic_reconfigure, and rosgraph_msgs. The /rexrov/cmd_accel, /rexrov/velocity_control/parameter_updates, and /rexrov/velocity_control/parameter_descriptions topics are only a publisher to this node. This node is subscribed to two topics and has three services of get_loggers and set_logger_level.

/rexrov/urdf_spawner

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnode info /rexrov/urdf_spawner
-----
Node [/rexrov/urdf_spawner]
Publications:
* /rosout [rosgraph_msgs/Log]

Subscriptions: None

Services:
* /rexrov/urdf_spawner/get_loggers
* /rexrov/urdf_spawner/set_logger_level
```

This node has one publisher of message type `rosgraph_msgs`. This node is subscribed to no topics and has two services of `get_loggers` and `set_logger_level`.

/rexrov/joystick

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnode info /rexrov/joystick
-----
Node [/rexrov/joystick]
Publications:
* /diagnostics [diagnostic_msgs/DiagnosticArray]
* /rexrov/joy [sensor_msgs/Joy]
* /rosout [rosgraph_msgs/Log]

Subscriptions:
* /rexrov/joy/set_feedback [unknown type]

Services:
* /rexrov/joystick/get_loggers
* /rexrov/joystick/set_logger_level
```

This node has three publishers of message type `diagnostic_msgs`, `sensor_msgs`, and `rosgraph_msgs`. The `/diagnostics` and `/rexrov/joy` topics are only a publisher to this node. This node is subscribed to only one topic and has two services of `get_loggers` and `set_logger_level`.

/rexrov/thruster_allocator

```
vsancnaj@aguacateubuntu:~/catkin_ws/src/uuv_simulator$ rosnode info /rexrov/thruster_allocator
-----
Node [/rexrov/thruster_allocator]
Publications:
* /rexrov/thrusters/0/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rexrov/thrusters/1/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rexrov/thrusters/2/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rexrov/thrusters/3/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rexrov/thrusters/4/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rexrov/thrusters/5/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rexrov/thrusters/6/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rexrov/thrusters/7/input [uuv_gazebo_ros_plugins_msgs/FloatStamped]
* /rosout [rosgraph_msgs/Log]

Subscriptions:
* /rexrov/thruster_manager/input [geometry_msgs/Wrench]
* /rexrov/thruster_manager/input_stamped [unknown type]
* /tf [tf2_msgs/TFMessage]
* /tf_static [tf2_msgs/TFMessage]

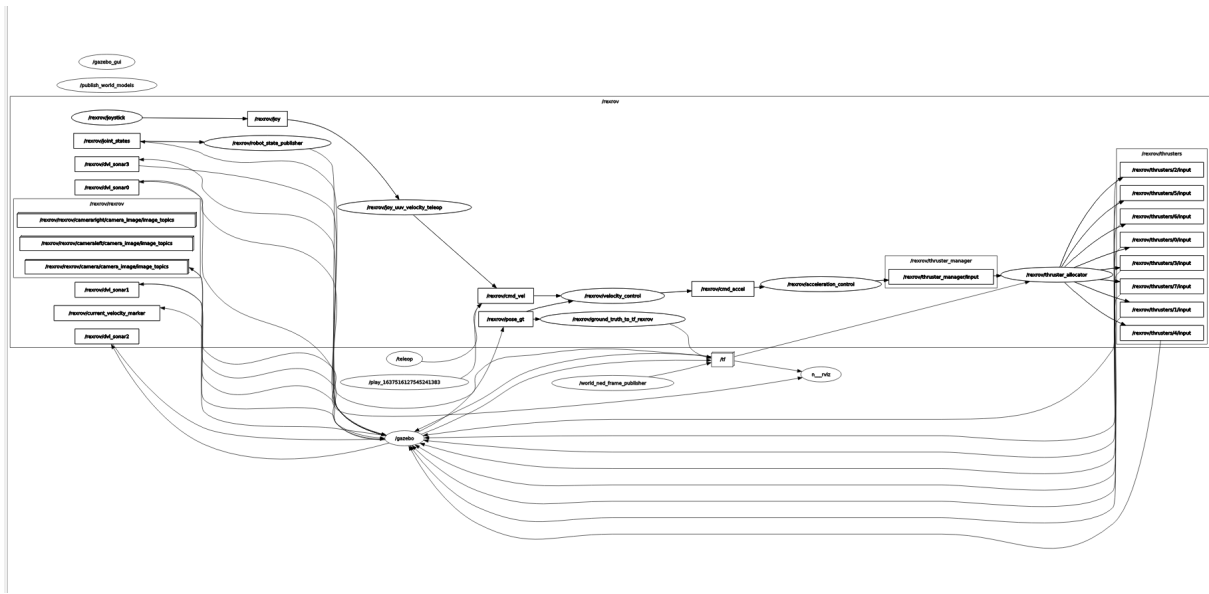
Services:
* /rexrov/thruster_allocator/get_loggers
* /rexrov/thruster_allocator/set_logger_level
* /rexrov/thruster_allocator/tf2_frames
* /rexrov/thruster_manager/get_config
* /rexrov/thruster_manager/get_thruster_curve
* /rexrov/thruster_manager/get_thrusters_info
* /rexrov/thruster_manager/set_config
```

This node has nine publishers of message type `uuv_gazebo_ros_plugins_msgs`. It is subscribed to four topics and has seven services.

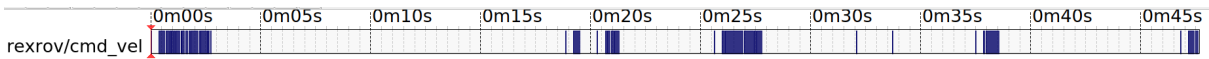
Task 2

Part B

Rqt_graph



Trajectory Plot



Point Division

We divided the work by questions and for some parts of those questions

1. Valentina 25 pts
2. Yassine & Valentina
 - a. Yassine 10 pts & Valentina 5 pts
 - b. Valentina 5 pts
3. Yassine 20 pts
4. Yasar 35 pts

Name	Percentages
Valentina	35 %
Yassine	30 %
Yasar	35 %