AA 274A: Principles of Robotic Autonomy I
Section 6: rosbags

Our goals for this section:

1. Finish up things from previous sections
2. Learn how to use rosbags

1 Getting the navigator working

Before getting into the rosbag stuff, let's make sure your navigator is working. Follow the instructions from last week's section to make sure your robot can navigate from point to point as commanded through rviz.

2 rosbag

An important tool for debugging and programming with ROS is `rosbag`. This tool allows you to record live data coming in during operation for later playback. Here we'll use it to record performance of the pose controller under different settings to help choose controller gains.

First, edit `asl_turtlebot/scripts/controllers/P2_pose_stabilization.py` to publish the computed α, δ, and ρ values to the topics `/controller/alpha`, `/controller/delta`, and `/controller/rho` topics respectively.

HINT: you'll need to add some imports to this file. Refer to other publishers you've written in the past!

Problem 1: What message type did you choose for these messages? Include your updated code in your submission.

Next, your goal is to use record to record the α, δ, and ρ values as your navigator runs on the robot. Record multiple bags for different values of the controller gains (play with the values at the top of `navigator.py`).

Take a look at the `rosbag` tutorials and documentation for guidance:

- http://wiki.ros.org/rosbag/Commandline
- http://wiki.ros.org/rosbag/Tutorials/Recording%20and%20playing%20back%20data

Problem 2: What command did you use to record the requested topics to a particular file name?

3 Visualizing results with rqt

After recording the data, we can play it back and visualize it using a tool called `rqt_plot`.

In one terminal, start `roscore`. Then, in another terminal open `rqt_plot` and add the three topics that we logged. Finally, in another terminal, use rosbag to playback the data you recorded.

Problem 3: Take a screenshot of the resulting plot in `rqt_plot` and include it in your submission.

You may need to play with the x axis limits to get a nice looking plot.