

POLITECNICO DI MILANO


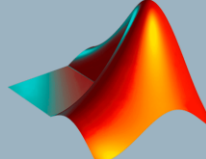
AUTONOMOUS VEHICLES

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POLITECNICO
MILANO 1863

How to use BAGS

 ROS +  MATLAB®

How to use BAGS in MATLAB/ Simulink

```
bagselect = rosbag('ex_multiple_topics.bag');
```

Create MATLAB object

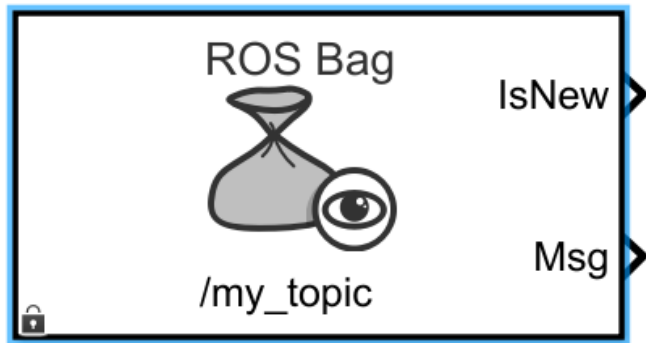
```
%Select a subset of the messages, filtered by time and topic.  
bagselect2 = select(bagselect, 'Time', ...  
[bagselect.StartTime bagselect.StartTime + 1], 'Topic', '/odom');
```

Possibility to select a subset

```
% Read messages as a structure. Specify the DataFormat name-value pair  
% when reading the messages. Inspect the first structure in the returned  
% cell array of structures.  
msgStructs = readMessages(bagselect2, 'DataFormat', 'struct');  
msgStructs{1}
```

Create a cell array of data

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Read Data

Block Parameters: Read Data

Read Data from ROS Bag (mask) (link)

Play back data from logfile.

The block outputs the most recent message from the logfile based on the current simulation time. The IsNew port outputs true if the Msg port outputs a new message relative to the previous time step.

You must load the logfile data by specifying the logfile location and timing parameters. All Read Data blocks in the model use this data. Once the logfile is loaded, select the Topic to specify which data to play back.

[Load logfile data](#)

Parameters

Topic: /my_topic Select ...

Sample time: -1

OK Cancel Help Apply

Load Logfile

Load data from a logfile for playback within a model. All Read Data blocks in the model use this data.

Specify the Logfile path as an absolute path, or click Browse to select the file. To play back data from a specific point in the log, enter a Start time offset (in seconds) from the original log start time. Also, to limit the playback to a certain length, specify the Duration (in seconds). If values are not specified for Start time offset and Duration, the entire log is played back.

Logfile Options

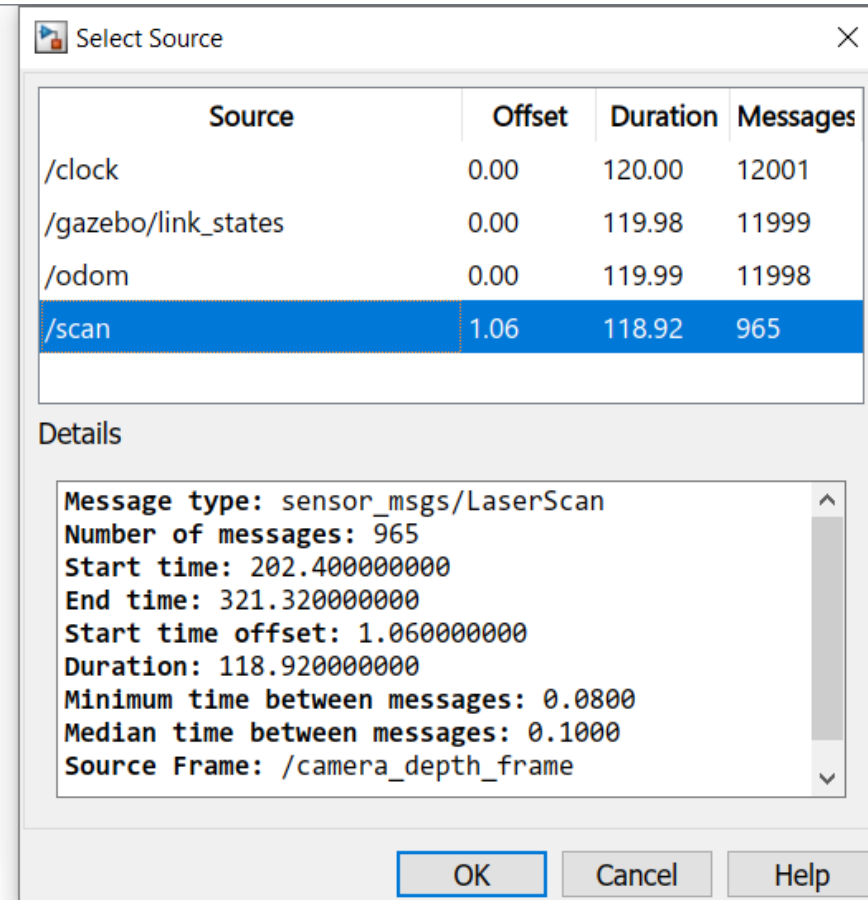
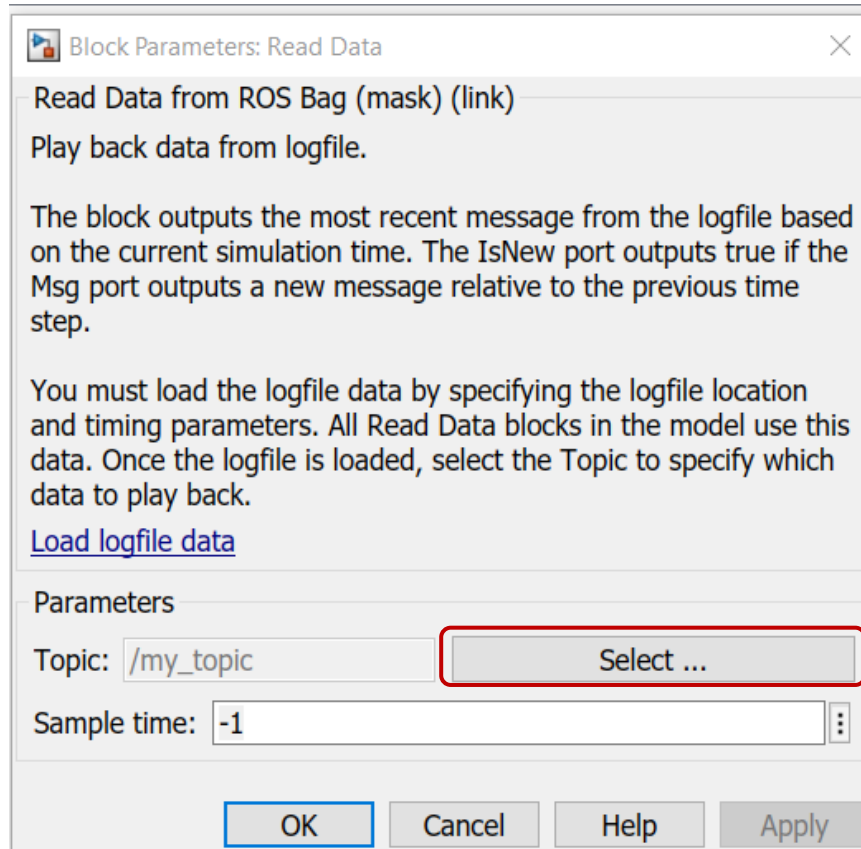
Logfile path: der\ex_multiple_topics.bag Browse

Start time offset:

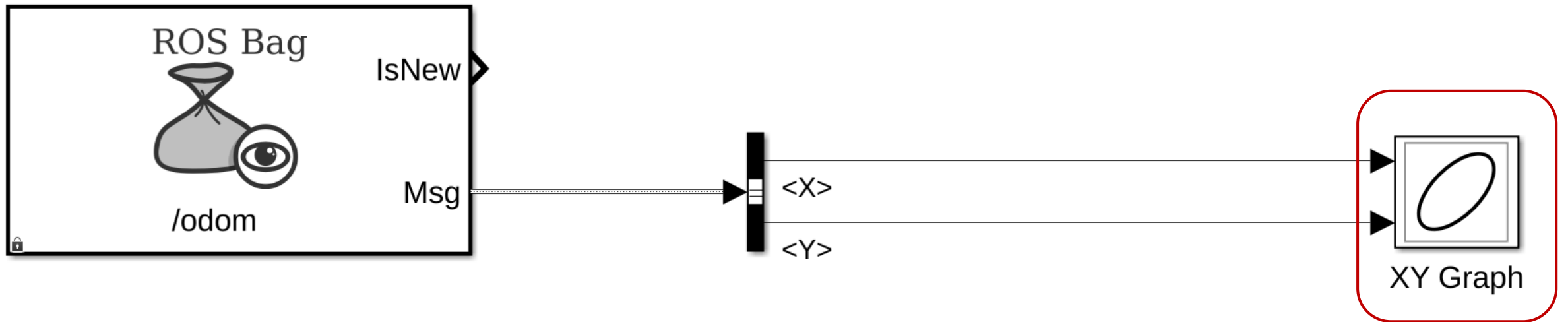
Duration:

OK Cancel Help

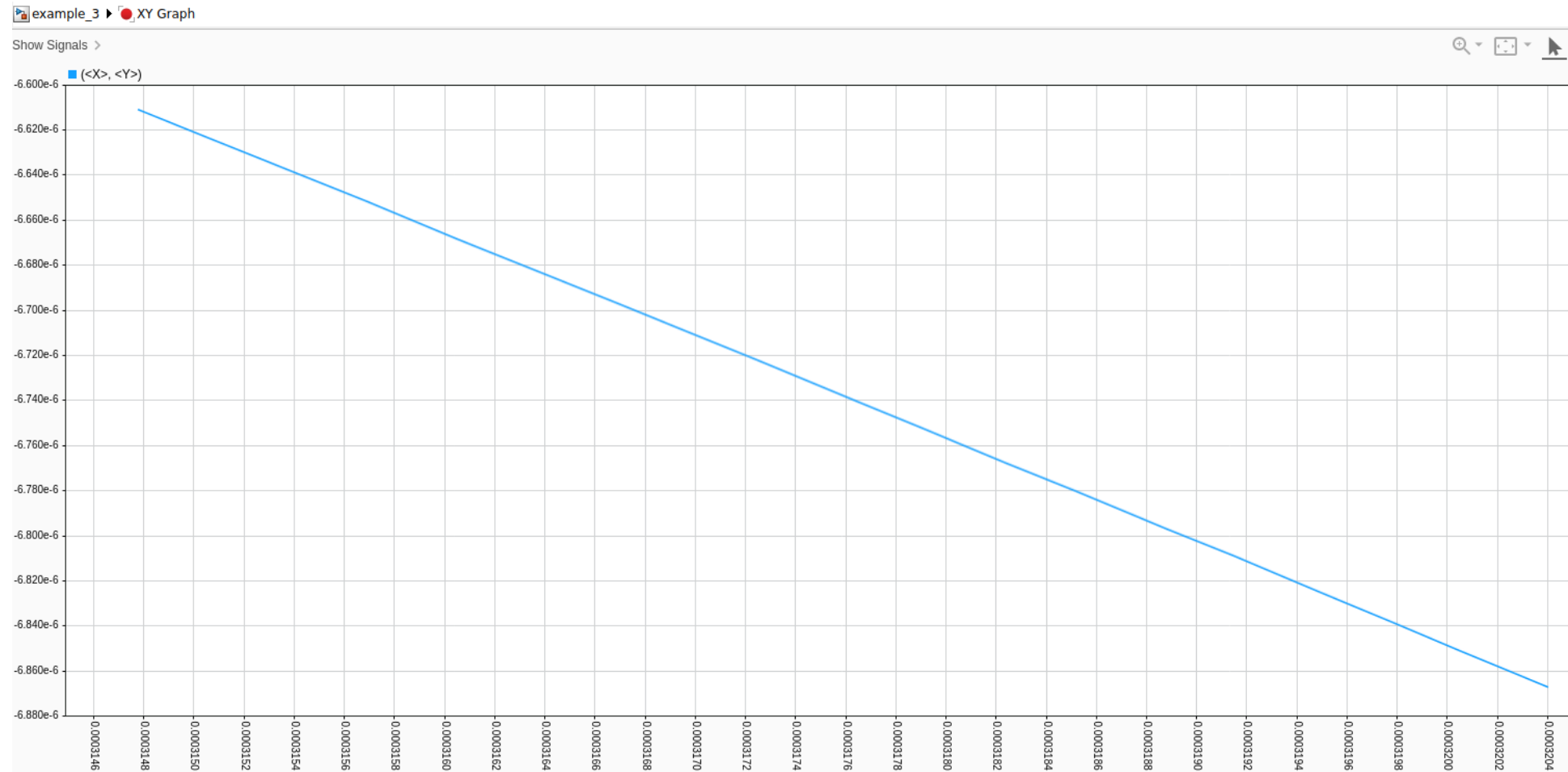
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Assignment I -A

What we expect from you

Starting from a Bag file provided (*ex_A1.bag*),
evaluate at each time:

- minimum distance respect to obstacles
- An estimate of `/cmd_vel` sequence provided to the robot

List of suggested steps

HINT: this part of the assignment can be done using just MATLAB (windows)

- Subscribe to bag messages
- Evaluate minimum distance (and save it)
- Evaluate /cmd_vel in consecutive time steps (odom?) and save it
- Write a publisher with that sequence (and save a bag)
- Use matlab to plot results for the report



Assignment I -B

What we expect from you

Starting from a your `cmd_vel` estimated:

- Evaluate how accurate it is

List of suggested steps

HINT: this part of the assignment requires the use of Gazebo + ROS

- Run *estimated commands* (a bag prev saved? Simulink or directly ROS?)
- Save robot behavior with your *estimated commands*
- Compare the original and reproduced robot behavior and provide a proof for the report

That's it for today...

See you next time!

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