

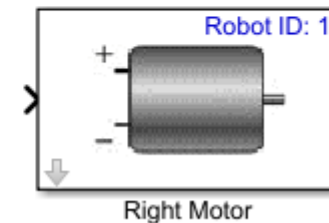
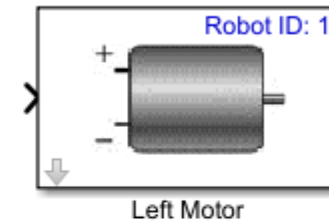
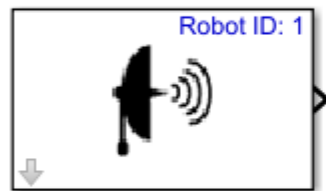
Introduction to Mobile Robotics with MATLAB and Simulink

Unit 6: Using MATLAB Functions

By MathWorks Student Competition team

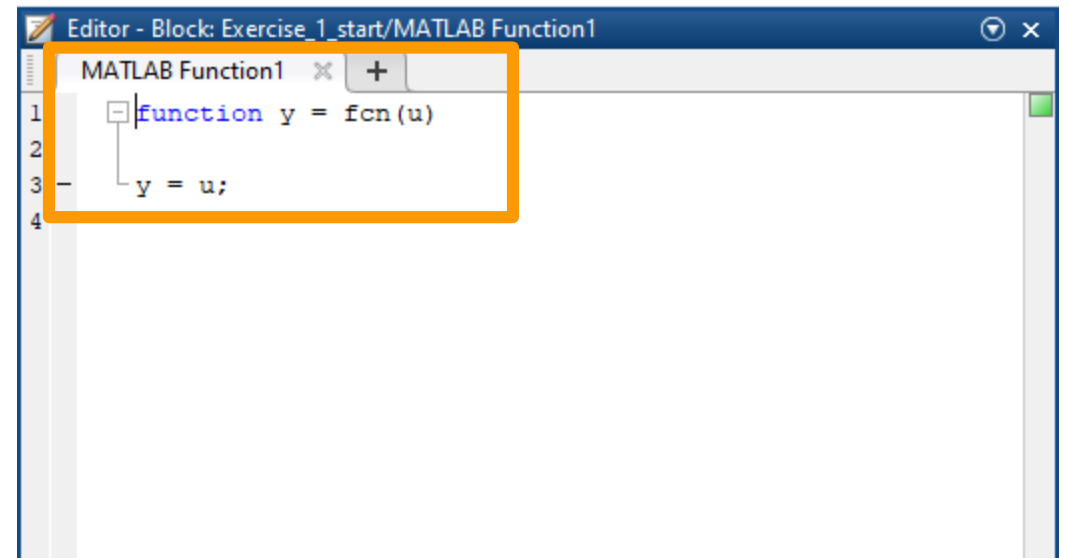
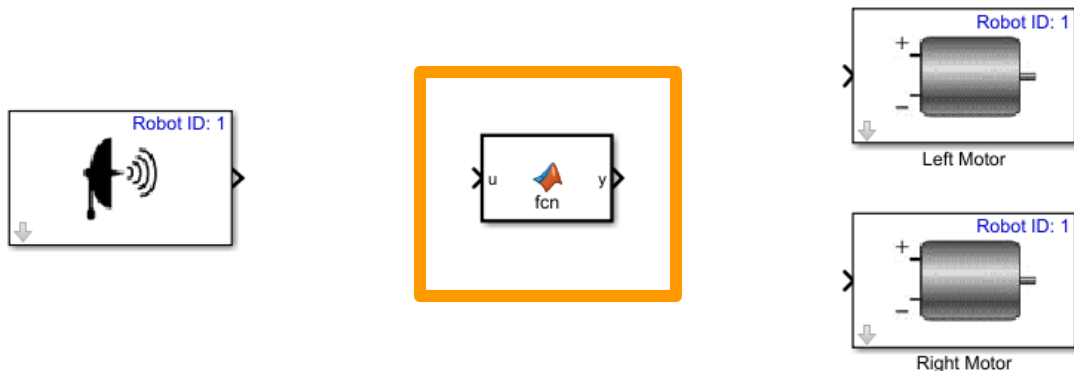
Using MATLAB Code in Simulink

- **What if I want to write code instead of connecting blocks?**
- The “MATLAB Function” block allows for a MATLAB function to be connected to other Simulink blocks
- Open the “**MATLAB_Fcn_start.slx**”



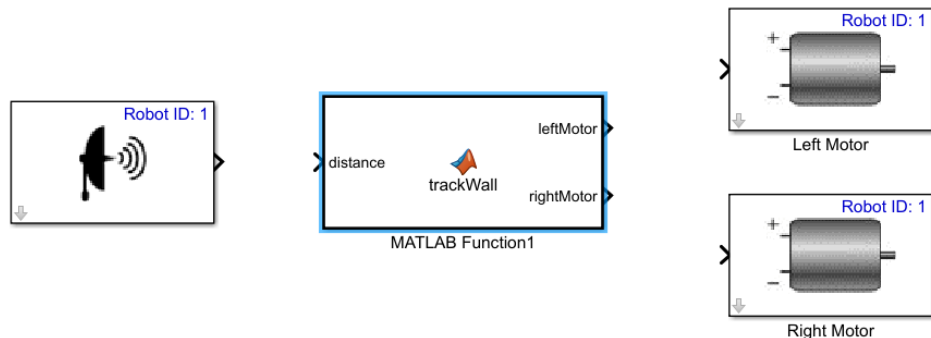
Editing MATLAB Function Blocks

1. Double click on the MATLAB Function block to open the MATLAB editor
 2. Edit the function name, inputs and outputs to match those desired on the Simulink block
- Changes to the function name and the input/output variables in the editor will propagate to the Simulink block



Tracking the Wall Using a MATLAB Function

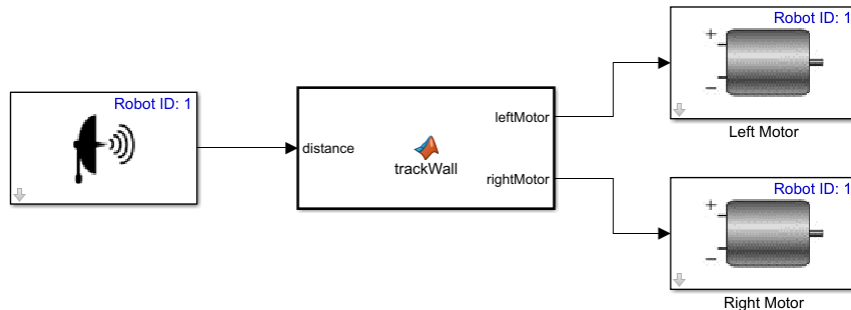
- Solve the task of tracking the field walls with a MATLAB Function instead of using switch blocks
1. Rename the MATLAB function “trackWall”
 2. Edit the function to have one input and two outputs that will correspond to 1 sensor and 2 two motors in our model
 3. Save the model



The screenshot shows the MATLAB Function1 editor window. The title bar reads 'Editor - Block: Exercise_1_temp/MATLAB Function1*'. The function signature is defined as `function [leftMotor, rightMotor] = trackWall(distance)`. The line numbers 1 through 4 are visible on the left side of the editor.

Implementing the Logic

1. Connect sensor and motor blocks to the MATLAB function block
2. Add logic to switch between moving forward and turning
3. Assign motors with the correct speed values depending on the condition
4. Run the model
5. Verify the robot tracks the wall properly



The image shows a MATLAB Function Editor window titled 'Editor - Block: Exercise_1_temp/MATLAB Function1*'. The function is named 'trackWall' and takes 'distance' as an input. The function body is as follows:

```
1 function [leftMotor,rightMotor] = trackWall(distance)
2
3
4 if distance > 1
5     leftMotor=0;
6     rightMotor=0;
7 else
8     leftMotor=0;
9     rightMotor=0;
10 end
```

The code is highlighted with an orange border.

End of Unit 6: Using MATLAB Functions

- Congrats !
- Here are some learning outcomes from this unit:
 - How to use the Simulink MATLAB Function block
 - How make a robot track a wall using MATLAB code