

# MANUAL CONTROL DESIGN WITH HELLO 1.0

P CONTROLLER DESIGN WITH HELLO 1.0

Connection Steps

- A. Question 1.1
- B. Block Construction Steps
- C. Run Steps

## REQUIREMENTS

- Computer
- MATLAB – Simulink
- Hello 1.0
- HelloApp MATLAB Application

## Connection Steps

- First connect HELLO 1.0 to your computer as described in Figure 0.

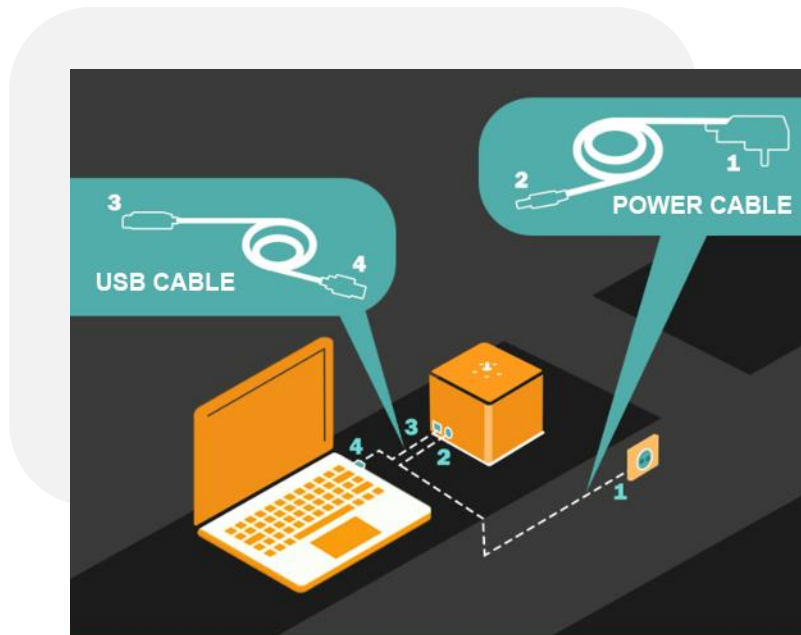


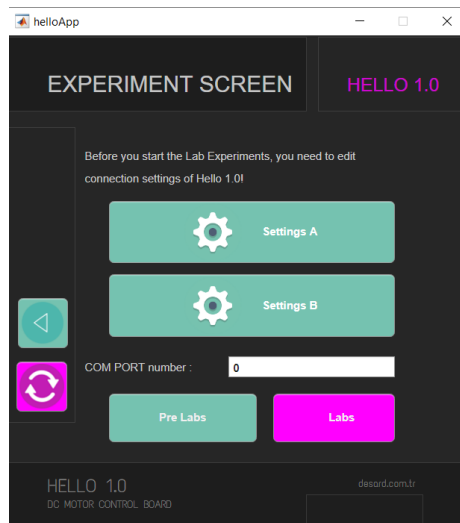
FIGURE 0

- After completing the connection, open the “HelloApp” from Matlab.

## A. Question 1.1

By creating an open looped control system over Simulink, it is aimed to control the RPM of the DC motor and the direction of turning. The relation between constant value signals to PWM and RPM will be examined on the actual system.

- Open “HelloApp” via Matlab. Proceed as directed by the application. When you reach the “Experiment Screen”, make the necessary adjustments using the “Settings A” button. You do not need to use the “Settings B” button for this experiment. Enter the COM Port number that Hello 1.0 is connected to your computer in the white field and click “Labs” button.



**FIGURE 1 : Helloapp Experiment Screen**

- Enter “LAB 2” from the Experiment Screen that opens.
- Open the “LAB 2 MODEL” model. This question will proceed through the opened model.
- You are expected to manually control the RPM and direction of turning on this model. The blocks you will use and their descriptions are given in TABLE 1.

LAB MODEL

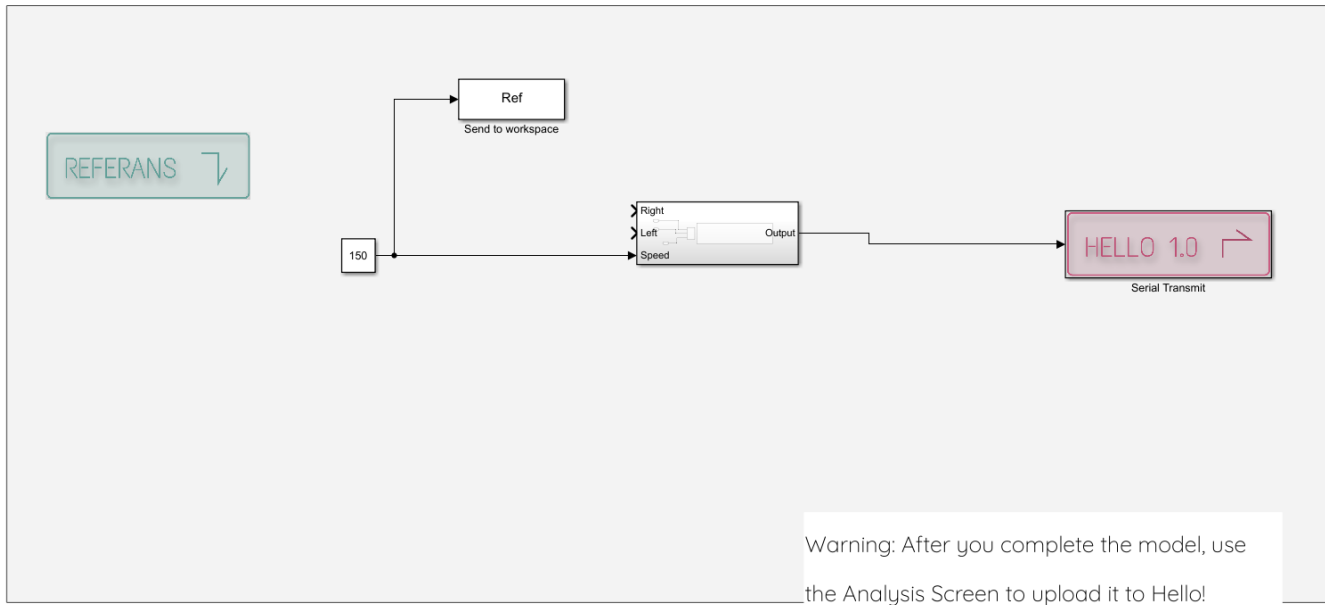


FIGURE 2 : “Experiment 2 Model” Model

- Add the blocks in “TABLE 1” to “EXPERIMENT 2 MODEL” as described in “B. Block Construction Steps” to create an open-loop system.


BLOCKS TO BE USED	BLOCK NAME	EXPLANATION
	<b>CONSTANT</b>	One of the signal generating blocks. (DOUBLE CLICK TO THE BLOCK)
		<b>Constant Value:</b> Specifies the value the block will signal.

TABLE 1 : Blocks To Be Used

## B. Block Construction Steps

- You must apply an input to the system.



- Edit the parameters of the Constant Functions as in TABLE 2 for DC motor to turn clockwise.

<b>CONSTANT VALUE TO RIGHT</b>	1
<b>CONSTANT VALUE TO LEFT</b>	0
<b>CONSTANT VALUE TO RPM</b>	150

TABLE 2 : Constant Function Parameters

- Edit the parameters of the Constant Functions as in TABLE 3 for DC motor to turn counter-clockwise.

<b>CONSTANT VALUE TO RIGHT</b>	0
<b>CONSTANT VALUE TO LEFT</b>	1
<b>CONSTANT VALUE TO RPM</b>	150

TABLE 3 : Constant Function Parameters

## C. Run Steps

- Prepare your Simulink model to make DC motor to turn clockwise.
- You are expected to test the open looped controller to understand how a DC motor module would work with basic instructions given to the system.
- After completing the model for each parameter, open the “Analysis Screen” via “HelloApp”.
- The screen shown in Figure 4 will open.

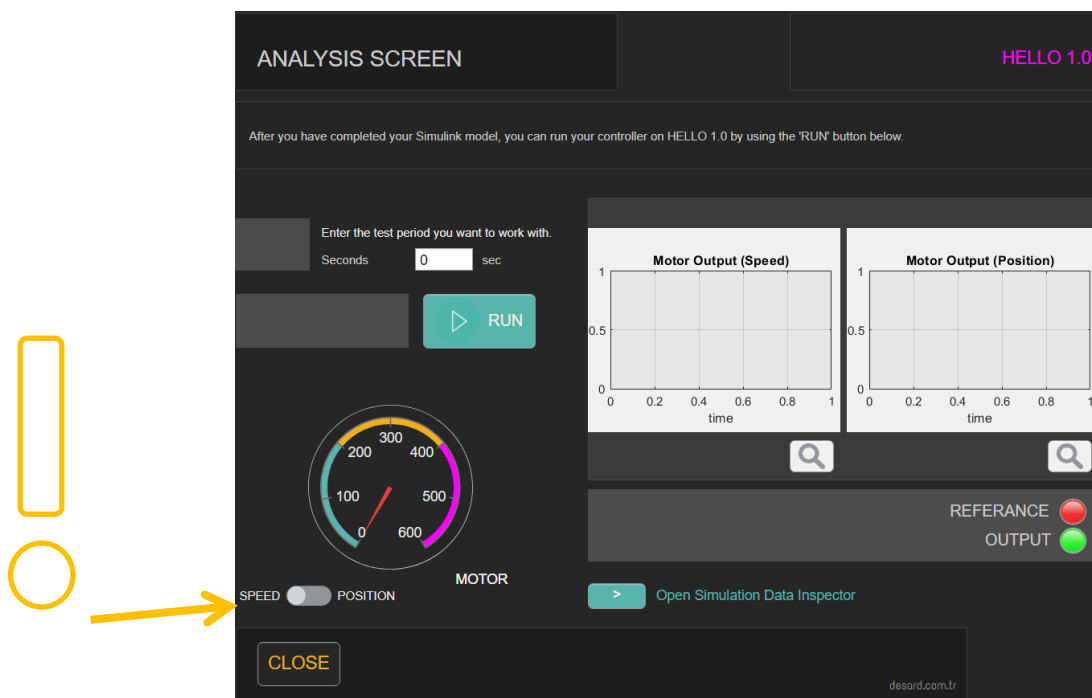


FIGURE 4 : Analysis Screen

- You can run your designed model on HELLO 1.0 by pressing ‘RUN’ button on this screen.
- You can examine the direction of DC motor visually. With the help of the ‘SYSTEM’ graphic on the Analysis Screen or the Simulation Data Inspector, you can examine how much RPM DC motor turning with.

## Desired Operating Parameters

### 1. RUN PARAMETERS

CONSTANT VALUES TO BE USED FOR PWM	255	80	150	200	
MODEL RUN TIME	10 sn				

TABLE 3 :1. RUN PARAMETERS

CONSTANT VALUES TO BE USED FOR PWM	255	80	150	200
RPM VALUE				

TABLE 4 : 1. RUN RESULTS

- Plot graphs for different pwm values with “Simulation Data Inspector” and add screenshot to your report.
- As pwm values change, comment on the relation between rpm and pwm values given to the system. Fill in TABLES 4.
- Include the model you have created, your outputs and comments in your report.