Motor Controller Design

Project synopsis submitted in partial fulfilment

for the Award of

CERTIFICATION

in

Electric Vehicle Course

by

Pavan Srinivas Marri, September 1st batch

DATE: 31st August, 2024

TABLE OF CONTENTS

INTRODUCTION

Project Overview:

The main aim of this project is to design a Motor controller which is an electronic device that controls the function of motor to ensure the safe and secure operation of the Motor in an Electric Vehicle.

Objectives:

The goal of this project is to develop a Mathematical model of a simple motor controller by focusing on precise control over motor speed.

Significance:

This assignment helps to understand about the importance of a Motor Controller in the Electric Vehicle technology and its role in keeping the motor to operate safely and smoothly.

Tools and Materials

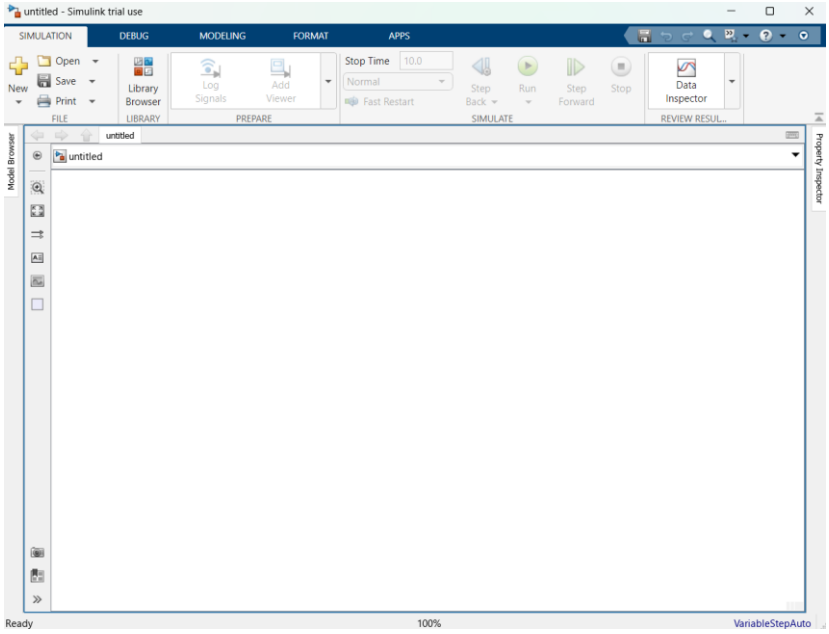
Software Tools:

The Motor Controller is designed by using MATLAB software of version R2023B. The Simulink environment is more used for designing the motor controller and analyzing the graphs.

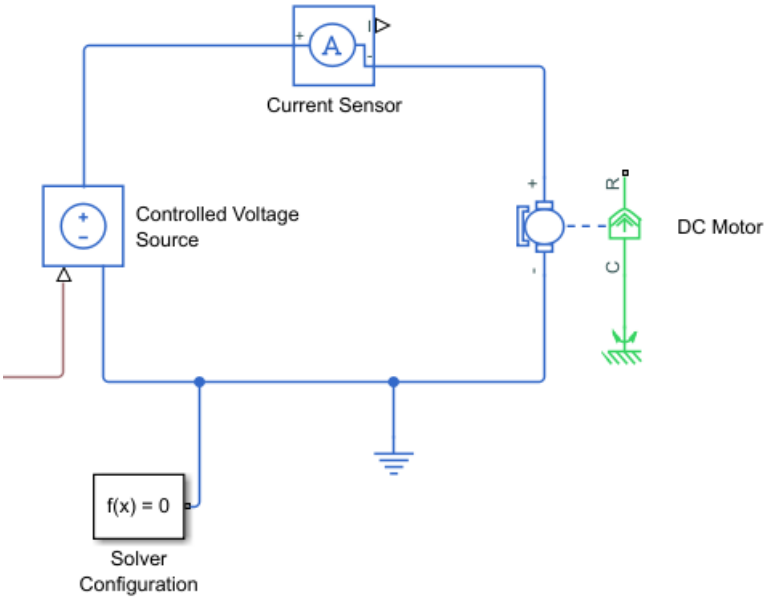
METHODOLOGY

Designing Procedure:

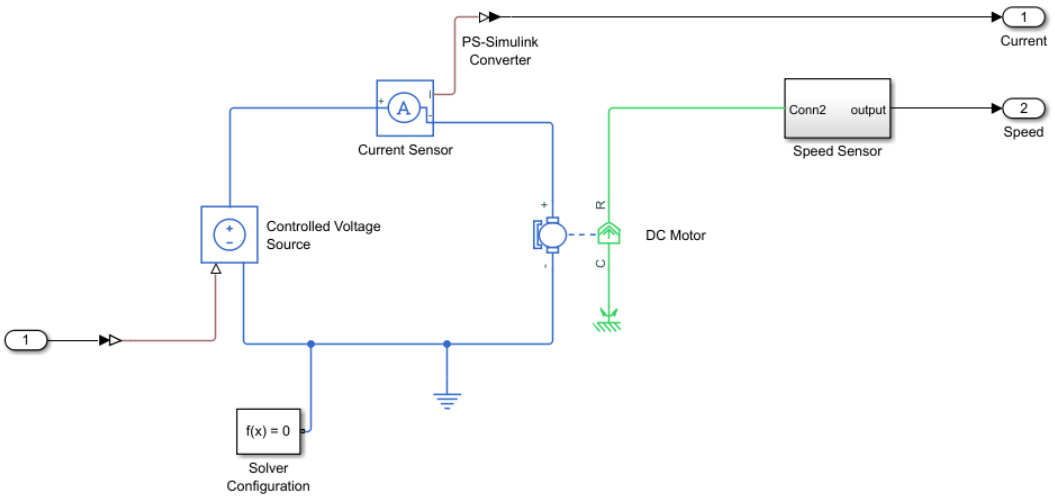
Step 1: Open the Simulink environment in the MATLAB software.



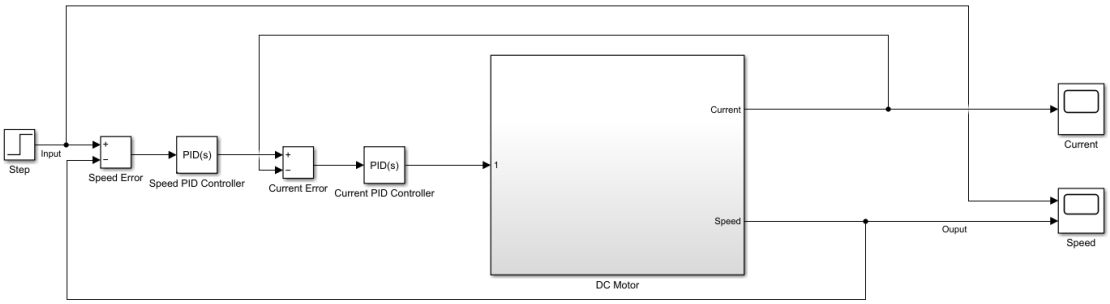
Step 2: Make the connections for the DC Motor, Current Sensor, Controlled Voltage Source along with Solver configuration and Electrical Reference as shown below.



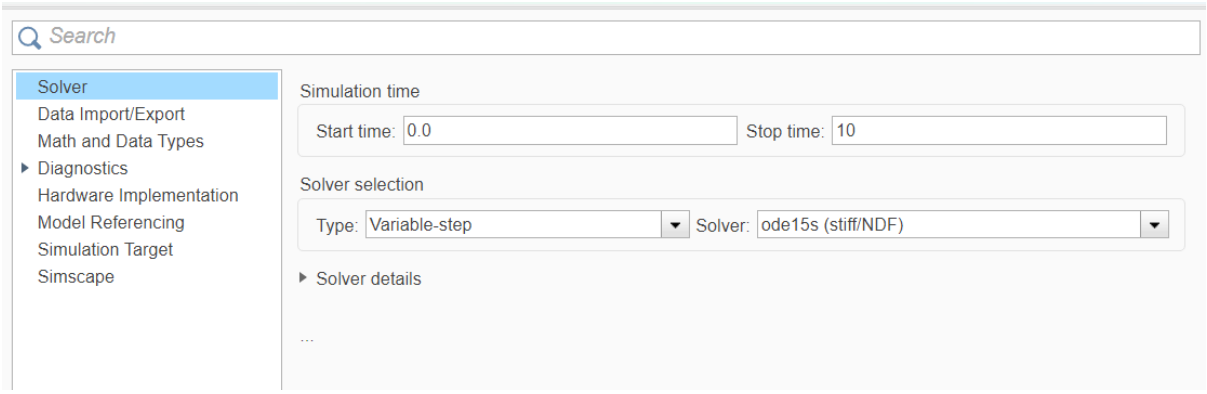
Step 3: Then connect the Ideal Rotational Motion Sensor to the DC Motor as shown in the figure.



Step 4: Make the above connection as a subsystem and connect the Step and PID controllers to the Motor subsystem as an Input. After connect the scope as shown in the figure.



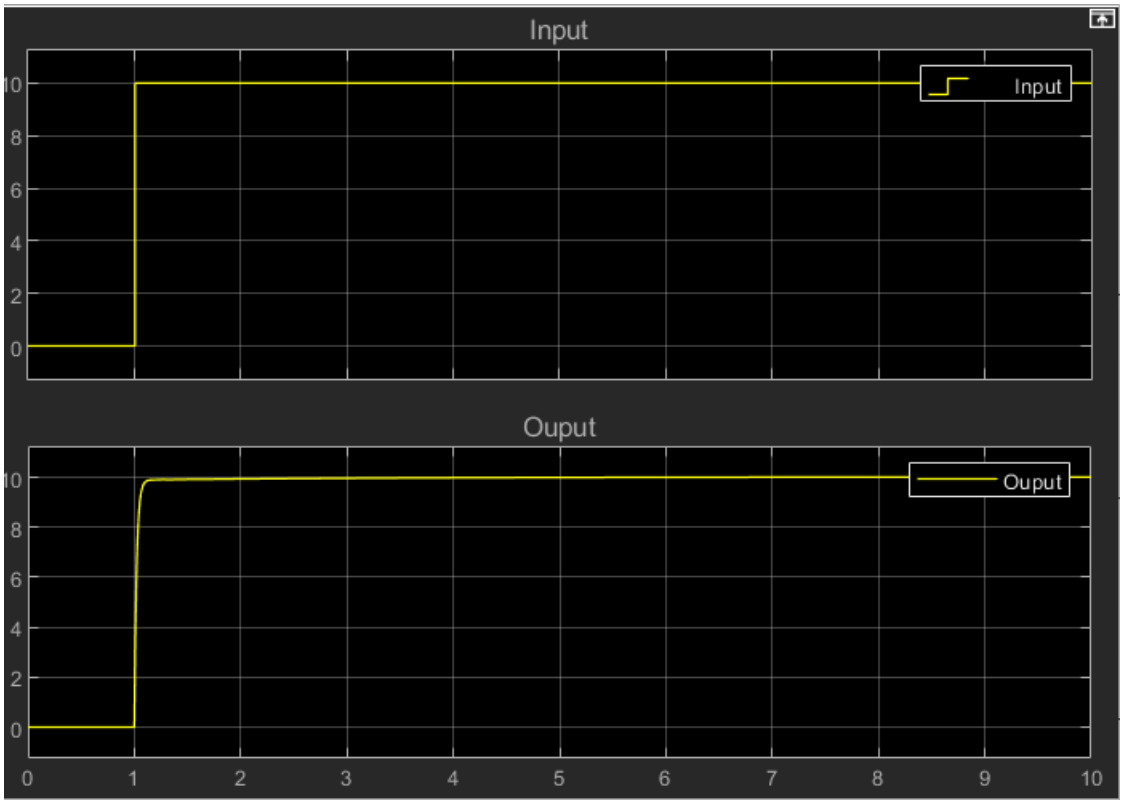
Step 5: After making the connections as shown above change the Solver Configuration to ode15s and then Run the model to observe the Results.



RESULT AND ANALYSIS

Final Outcome:

The Motor controller for the DC Motor is successfully modelled by following the above steps in the Simulink environment using PID Controller. The obtained Speed characteristics are given below.



Result Analysis:

By observing the above speed characteristics of the motor, we can say that the PID controller has a precise control over the speed of the motor.

CONCLUSION

Summary:

Since the aim of the project is fulfilled by developing the Controller for the DC Motor using PID controller block. The controller can easily track the motor characteristics to ensure the smooth and steady operation of the DC Motor in an Electric Vehicle.

Final Thoughts:

Through this project I have understood the significance of the Motor controller in the Electric vehicle technology and its role to keep the safe operation of the motor.

References:

Molnár, Ján, et al. "Design of motor speed controller of electronic commutation." *2017 International Conference on Modern Electrical and Energy Systems (MEES)*. IEEE, 2017.