INDUCTION MOTOR

Project synopsis submitted in partial fulfilment

for the Award of

CERTIFICATION

in

Electric Vehicle Course

by

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INTRODUCTION

Project Overview:

The main aim of this project is to develop a MATLAB script for the Induction Motor which is an electronic device that converts Electrical Energy from the battery and converts it into Mechanical Energy for the Vehicle Transmission.

Objectives:

The goal of this project is to develop a MATLAB script for the Induction Motor by understanding its performance in smooth transmission of power in EV drivetrains.

Significance:

This assignment helps to understand about the importance of an Induction Motor in the Electric Vehicle technology and also to understand its wide variety applications.
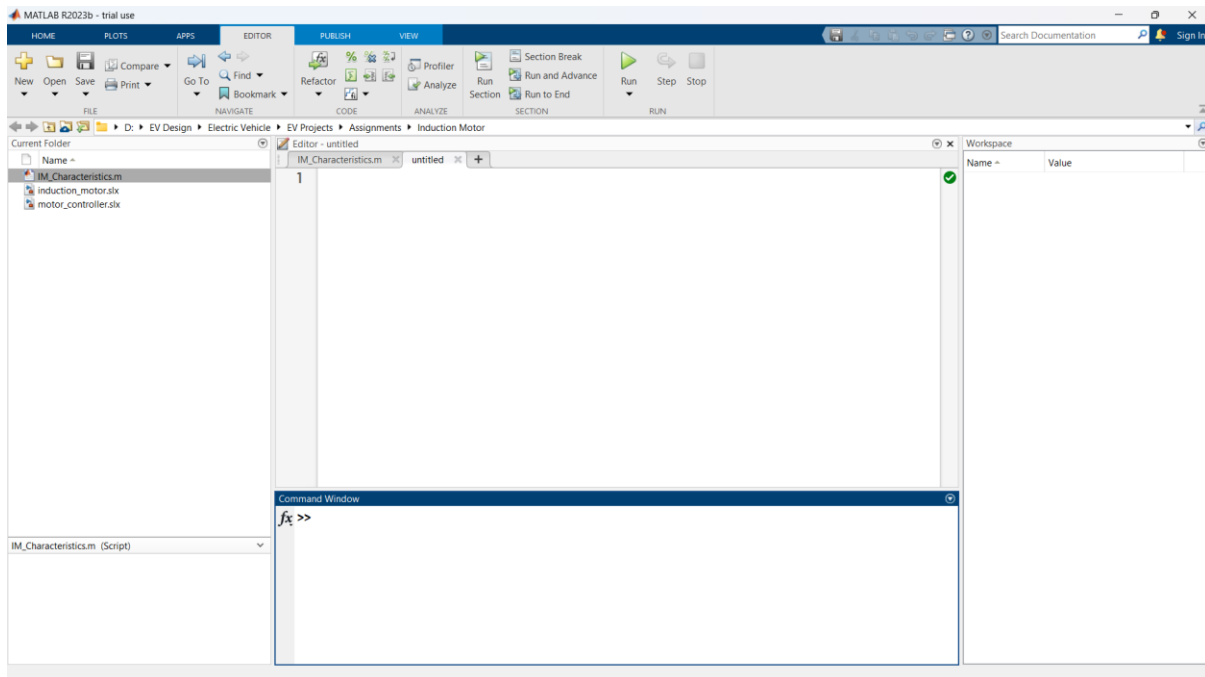
Tools and Materials

Software Tools:

The Induction Motor is designed by using MATLAB software of version R2023B. The MATLAB script is more used for designing the motor and analyzing the graphs.

METHODOLOGY

Designing Procedure:

Step 1: Open the MATLAB software and open the Editor to write the Script as shown below.

Step 2: Write the below script in the MATLAB Editor.

MATLAB Script for Induction Motor

clear all;

close all;

clc

V = 400/sqrt(3); %Applied Voltage

Ph = 3; %No.of Phases

P = 4; %No.of Poles

R1 = 0.2; %Stator Resistance in Ohms

R2 = 0.2; %Rotor Resistance in Ohms

X1 = 0.1; %Stator Resistance in Ohms

X2 = 0.1; %Rotor Resistance in Ohms

```matlab
f = [50:10:150]; %Frequency Range From 50Hz to 150Hz in the interval of 25Hz
i = length(f);
for x=1:i
    Ws = 4*pi*f(x)/P;
    Ns = 120*f(x)/P;
    for n = 1:200
        s = n/200;
        N(n) = Ns*(1-s);
        Zeq = (R1+R2*(1-s)/s)+(X1+X2);
        T(n) = 3*((V^2)*(R2/s))/(Ws*((R1+(R2/s)^2))+((X1+X2)^2));
    end
    plot(N,T);
    hold on;
    grid on;
    title('Torque vs Speed Characteristic of Induction Motor');
    xlabel('RPM');
    ylabel('Torque(N-M)');
    legend('50Hz', '60Hz', '70Hz', '80Hz', '90Hz', '100Hz', '110Hz', '1200Hz', '130Hz', '140Hz', '150Hz');
end
```
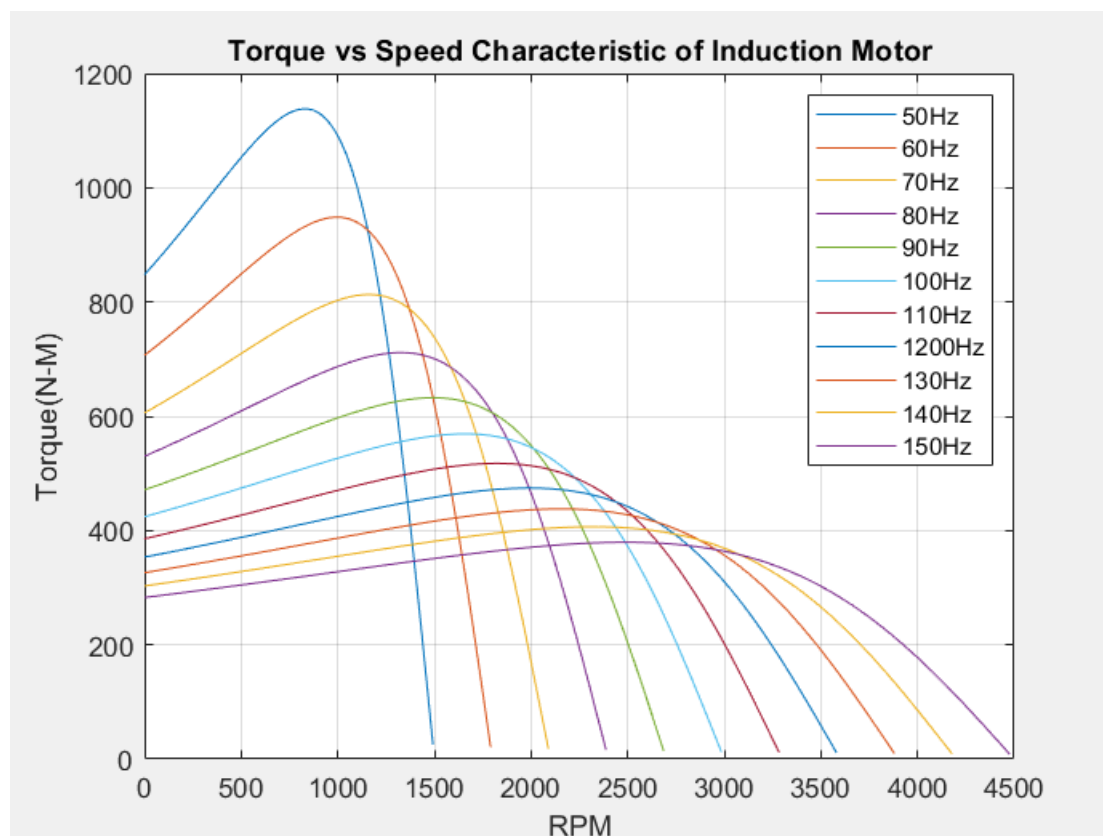
Step 3: After writing the Script then save the File before Executing.

Step 4: After saving the File Click on run button to execute the Program.

RESULT AND ANALYSIS

Final Outcome:

The MATLAB script written above for the Induction motor is executed successfully and the results are obtained as shown in the graph below.

Result Analysis:

By observing the above graph, we can say that the torque of an Induction motor is more at low speeds and if the speed increases the amount of torque decreases.

CONCLUSION

Summary:

Since the aim of the project is fulfilled by developing the MATLAB script for the Induction Motor which is used in Electric Vehicles to transfer the power by converting the Electrical energy from the battery into the Mechanical Energy.

Final Thoughts:

Through this project I have understood the significance of the Induction Motor and the its role in the Electric Vehicle.

References:

Thakkar, Dishant Harshadkumar. *Estimation of Induction Motor Circuit Parameters and Efficiency Using Matlab*. MS thesis. Texas A&M University-Kingsville, 2019.