SEPARATELY EXCITED DC MOTOR CONTROL METHOD USING MATLAB SOFTWARE (SIMULINK) AND INTERFACE WITH GRAPHICAL USER INTERFACE (GUI)

A thesis submitted in partial fulfillment of the requirement for the awards of the

Bachelor Engineering (Hons.) in Electrical

HASBIBULLAH BIN OMAR
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITY TEKNOLOGI MARA
MALAYSIA
MAY 2010

ACKNOWLEDGEMENT

Alhamdulillah, the first word that I would like to praise the Almighty Allah S.W.T for blessing me with strength and capability to provide the Final Year Project thesis successfully.

I would like to express my gratitude to PM Pauziah Arshad as a supervisor for my Final Year Project who was guided and encouraged me during completing my final year project.

My deepest grace and thank goes to my beloved parents who gave me endless supports and patience toward the completion of the project. Their supports and advices have boosted up my spirit to do the best in my final year project.

Lastly, my greatest gratitude to Faculty of Electrical Engineering and to all my friends who contributed in giving me a toughness spirit and support to me in completing my final year project directly or indirectly. The kindness, corporation and support from all of the above mentioned people would always be remembered.

ABSTRACT

This project is to investigate the characteristic of DC motor speed by using MATLAB Software. The speed of the DC motor can be controlled using Armature Voltage Control (V_a), Field Resistance Control (R_f) and Armature Resistance Control (R_a). The Separately Excited DC motor will be simulated by using MATLAB Simulink. The three control methods as stated above will be used in order to investigate the motor speed characteristic. In addition, the MATLAB Graphical User Interface (GUI) was also used in this project to display the output from the simulation.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION TO DC MOTOR

DC motors have long been widely used in many industrial applications. A DC motor can be considered a Single Input Single Output (SISO) system having torque speed characteristics compatible with most mechanical loads.[1]

In many applications DC motors are used to drive mechanical loads. Some applications require that the speed remains constant as the mechanical load applied to the motor changes. On the other hand, some applications require that the speed be controlled over a wide range.

There is a variety of techniques available ranging from classical to optimal and robust methods. Variable structure control has been used recently in speed control application such as robots where robustness is an important property in such application.[1]

The DC commutator machines are built in a wide range of sizes, from small control devices until up to enormous motors of 10,000hp or more used in rolling mill applications. The dc machines today are principally applied as industrial drive motors, particularly when high degrees of flexibility in controlling speed and torque are demanded. Such motors are used in steel and aluminum rolling mills, traction motors, overhead cranes, forklift trucks, electric trains and golf carts. Commutator machines are also used in portable tools supplied from batteries, in automobiles, as starter