

SHUNT DC MOTOR SPEED CONTROL METHODS USING MATLAB

**Project report presented in the partial fulfillment for the award of the
Bachelor of Electrical Engineering (Hons)
UNIVERSITI TEKNOLOGI MARA**



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ACKNOWLEDGEMENT

All praises be to mighty Allah SWT the most Gracious and most Merciful for the strength and blessing throughout the entire research until the completion of this thesis.

I would like to extend my sincere gratitude to my research supervisor, Assoc Prof Pauziah Mohd Arsad, for the assistance and guidance towards the progress of this project. Throughout the year, Assoc Prof Pauziah has been patiently monitoring my progress and guided me in the right direction and offering encouragement. Obviously the progress I had now will be uncertain without the assistance. My special appreciation and thanks to my fellow classmates for the invaluable assistances towards this project. Most of all, I am very grateful to my family for their unfailing encouragement and financial support they have given me over the years.

Last but not least, I wish to express my earnest gratitude to Assoc Prof Muhammad Yahya for his constant encouragement during the duration of the project.

ABSTRACT

This thesis focused on three different methods of speed control of Shunt DC motor. The speed of Shunt DC motor was analysed by mean of MATLAB Simulink. The three methods used in this project are field resistance control, armature resistance control and armature voltage control. The torque speed characteristics of Shunt DC motor was analysed with different methods of control mentioned. MATLAB GUI was incorporated in the project to display results obtained. MATLAB GUI is user friendly and a very helpful tool to demonstrate the speed change of Shunt DC motor. The Shunt DC motor simulations were successfully developed and the MATLAB GUI program had been successfully designed.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The theory of electrical circuits represents one of most important parts of any electrical engineering education. The main aim of this thesis project is to obtain the knowledge about simulation of Shunt DC motor speed control method using MATLAB SIMULINK and interface with graphic user interface (GUI). This requires a powerful software mathematical tool. MATLAB is a software package for high performance numerical computation and visualization. The combination of analysis capabilities, flexibility, reliability, and powerful graphics makes MATLAB the premier software package for all electrical engineers. MATLAB has been enhanced by the very powerful SIMULINK program. SIMULINK is a graphical mouse-driven program for the simulation of dynamic systems. It enables the user to simulate linear, as well as nonlinear, systems easily and efficiently.

Computer modelling and simulation tools have been extensively used to support and enhance electric machinery courses. MATLAB with its toolboxes such as Simulink [1] and SimPowerSystems [2] is one of the most popular software packages used by educators to enhance teaching characteristics of electric machines. The objective of this paper is to present simulation models of Shunt DC motor speed control methods. These models include Simulink models of three most common speed control methods, which are the field resistance, armature voltage, and armature resistance control methods.

The three most common speed control methods are field resistance control, armature voltage control, and armature resistance control. In this section, simulation models of these three control method for DC motor drives for dynamic analysis are presented.