SYNCHRONOUS MACHINE OPERATING CHARACTERISTIC AND PARAMETER VARIATIONS

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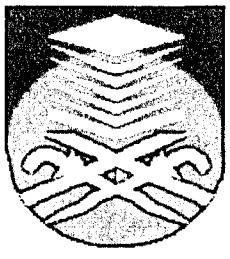

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ABSTRACT

This package presents computer models of electric machines based on the space vector formulation leading to the assessment of the dynamic performance of open- and closed-loop ac and dc drive systems.

The Simulink/Matlab implementation is adopted because of its inherent integration of vectorized system representations in block diagram form, of numerical analysis methods, of graphical portrayal of time evolutions of signals combined with the simple realization of the functionality of controllers and power electronic excitations. The development of Simulink models of drive assemblies is a relatively simple task consisting of combining input-output block representation of the various components making up the system; these blocks can readily be reused (utilizing standard copy-and-paste techniques) to modify the system components or the configuration of the system.

This approach provides a powerful design tool because of the ease of observing the effects of parameters modifications and of differing system configurations and control strategies.

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CHAPTER 1

INTRODUCTION

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 of circuit analysis and synthesis and to experience the actual behavior of a Synchronous machine. This requires a powerful software mathematical tool. MATLAB is 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.

A theory is a general statement of principle abstracted from observation. And a model is a representation of a theory that can be used for control and prediction. For a model to be useful, it must be realistic and yet simple enough to understand and manipulate. These requirements are not easily fulfilled as realistic models are seldom simple and simple models are seldom realistic.

The scope of a model is defined by what is considered relevant. Features or behavior that is relevant must be included in the model and those that are not can be ignored. Modelling refers to the process of analysis and synthesis to arrive at a mathematical description that contains the relevant dynamic characteristics of the particular model [9].