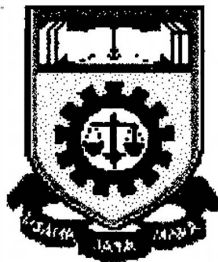


**REAL-TIME CONTROL OF ROTATIONAL SERVO SYSTEM
USING MATLAB SIMULINK AND WINCON**

**Thesis presented in partial fulfillment for the award of the
Bachelor in Engineering (Electrical) (Honours) of
INSTITUT TEKNOLOGI MARA**



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ABSTRACT

The objective of this project is to show that it is possible to use currently available commercial software, to model and simulate a Simulink Controller for a rotational servo system and running it in real-time. The software that involved in this project are Matlab Simulink, WinCon, Watcom C++ and Matlab Real-time Workshop. A model of a controller network is designed using state feedback controller and is compiled using Watcom C++ compiler. This compiler generates the real-time code using the Matlab Real-time Workshop and then linked to WinCon. WinCon is the real-time software component that runs the code generated from the Simulink Controller at specified sampling rate.

The rotational servo system of this project consists of a DC Servo Motor with built-in gearbox whose ratio is 14 : 1. The objective of the controller is to control the position and velocity of the output shaft. The controller designed is based on pole placement method. The output response of this system can be obtained in real-time using WinCon.

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CHAPTER 1

1.0 INTRODUCTION

Simulation of physical systems has been of great importance in many fields, both theoretical and application. Simulation allows scientist and engineers, for instance, to analyse the behavior of physical systems from corresponding block diagrams or mathematical models. Most of the physical systems are unstable. Applying feedback control can stabilize these unstable systems. Feedback control refers to an operation that in the presence of disturbances, tends to reduce the difference between the output and the reference input of the system. A servo system or servomechanism is a feedback control system in which the output is some mechanical position and velocity. Servo systems are extensively used in modern industry, for example, the completely automatic operation of machine tools, together with programmed instruction, may be accomplished by the use of servo system.

1.1 OBJECTIVE

The objective of this project is to design a Simulink Controller for a rotational servo system using state feedback method and running it in real-time. The controller to be implemented is to control the position and velocity of the output shaft. The output of the gearbox drives a potentiometer and an independent output shaft to which a load can be attached.