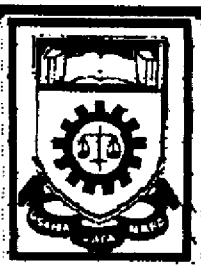
THE APPLICATION OF GENETIC ALGORITHM TO SOLVE UNIT COMMITMENT PROBLEM

Thesis presented in partial of fulfillment for the award of
Bachelor of Electrical Engineering (Hons) by
MARA INSTITUTE OF TECHNOLOGY



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NOVEMBER 1998

ACKNOWLEDGEMENT

In the name of Allah, the Beneficent and the Merciful. It is with the deepest sense of gratitude to Allah who has given the strength and ability to complete this project and the thesis as it today.

I would like to express my deepest gratitude to my project advisor, **Pn. Wan Norainin Wan Abdullah** and also to **Dr. Abdul Razak M. Jim** for their moral support and abundance of guidance and assistance for the success of this project.

Special thanks to numerous **friends and classmates** for their understanding and important contributions to the completion of this thesis.

ABSTRACT

Unit Commitment problems are well known in the power industry and have the potential to save millions of money per year in fuel and related costs. It is an area of production scheduling that relates to the determination of the on/off status of the generating units during each interval of the scheduling period.

In this thesis proposes an innovative Genetic Algorithm (GA) approach to solve the thermal unit commitment (UC) problem in power generation industry. Due to large variety of constraints to be satisfied a proper fitness function of the GA is built. MATLAB program is used to solve the unit commitment problems and to represent the fitness function of the GA.

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CHAPTER 1

1.0 INTRODUCTION

1.1 Background

The electrical power system is one of the most complex systems in the present civilization. In any power system, the main objective is to satisfy consumer's demand. In the case of an electric power system, the total load on the system will generally be higher during the daytime and early evening when industrial loads are high, lights are on and so forth and lower during the late evening and early morning when most of the population is asleep. In addition, the use of electric power has weekly cycles, the load being lower over weekend days than weekdays.

Unit commitment problems are well known in the power industry and have the potential to save millions of dollars per year in fuel and related. The unit commitment problem determines both hourly start-up and shutdown schedule and real power outputs of generating units over a time period of a day or a week. The resultant schedule should minimize total operational cost during the study period, while satisfying the forecasted load demands and various constraints of the system and the individual units. Mathematically, the unit commitment problem is defined as a non-linear, large-scale, mixed-integer