GENETIC ALGORITHM BASED FOR UNIT COMMITMENT IN POWER SYSTEMS

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ABSTRACT

This project report presents a genetic algorithm approach for determining the priority order in the commitment of thermal units in power generation. The purpose of the problem is to properly schedule on/off states at the same times determining the generation of each unit that is to be committed of all power station units in a system to meet the load demand, so that the overall generation cost is a minimum, while satisfying various constraints. This project report examines the feasibility of using genetic algorithm and shows the simulation result to make a comparison of cost generated between the unit thermals.

Keyword

Unit Commitment Problem (UCP), Genetic Algorithm, Optimization Techniques

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CHAPTER 1

INTRODUCTION

1.1 Background

There are many factors involved in the successful operation for a power system. The system is expected to have as power instantaneously and continuously available to meet customer's demand. The electrical power system is one of the most complex systems in the present civilization. In a power system, the main objective is to satisfy customer's demand. In the case of an electrical 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. The entire operating requirement must be achieved simultaneous, and it is also expected that the production and distribution of power would be accomplished at minimum cost.

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 objective of unit commitment (UC) of power systems is to schedule the generation units in order to serve the load demands at the minimum operating cost while meeting all systems constraints. In a power system, there may be different types of thermal power units based on fuel used (such as coal, natural gas, oil), with different production cost, generating capacities and characteristics. Usually such a system operates under continuous variation of consumer load demand. This demand for electricity exhibits such large variations between weekdays and weekends, and between peak and off-peak hour that it is not economical to keep all the generating units continuously on-line. Thus determining which units should kept