APPLICATION OF GENETIC ALGORITHM FOR OPTIMAL VOLTAGE CONTROL OF THE POWER SYSTEM
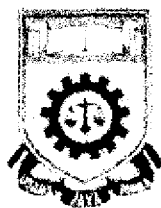
This thesis is presented in partial fulfillment for the award of the
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ABSTRACT

This project uses Genetic Algorithm (GA) for optimal voltage control of the power system and automatically will minimum a system loss. Newton-Raphson method is used for load flow calculation and determining the power losses. Although several method of voltage control equipment can be used, the study focussed on compensating capacitors as the variable parameter. The proposed method was applied to 4-busbar, 5-busbar and IEEE 14-busbar system to show its feasibility and capability. All simulation was done on the MATLAB software package version 4.2c.1.

Keywords – Load-flow(Newton_Raphson method), Voltage control(compensating Capacitors) and Genetic algorithm.

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CHAPTER 1

1.0   INTRODUCTION

1.1   BACKGROUND

In daily operation of electric power system, a stable power supply is becoming very important. The purpose of optimizing power system voltages is to minimize power system losses and at the same time maintaining an acceptable voltage profile to meet the demand. A more powerful tool is required to meet the demand. Nowadays numeric optimization techniques and expert system approaches with AI technology are applied to assist the power system operation.

Recently, Genetic Algorithm (GA) was proposed as a new paradigm for optimization and learning techniques. GA is a search algorithm based on mechanics of natural selection and genetics. The algorithms provide a powerful search algorithm for large and complex problems. The new computer algorithms have attracted AI related communities.

This project employs reactive power injection by means of compensating capacitor in order to optimize the voltage and hence reduce the power loss. The GA is used to determine the size of the compensating capacitor in order to give the optimum voltage. Other optimization methods that has been successfully applied to this problem are Non