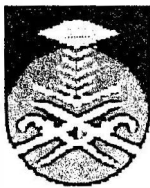


**APPLICATION OF THE GENETIC ALGORITHMS ( GAs )  
IN DETERMINING THE OPTIMAL  
TRANSFORMER TAP SETTING FOR LOSS MINIMISATION  
USING MATLAB**

This project thesis is presented in partial fulfillment for the award of the  
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## ***Abstract***

This project report presents a new approach to the use of load flow by proposing the incorporation of the Genetic Algorithms (GAs) to search the optimal transformer tap setting in order to minimise the line losses. In this way , the choice of the transformer tap setting can be determined whilst minimising losses and at the same time improved the voltage profile in the power system. The performance of this Genetic Algorithms technique was tested using standard IEEE 6-bus system and analysis of results is presented.

## **Keyword**

Power Flow Analysis , Genetic Algorithms , Transformer tap , Objective function , Fitness , Selection , Crossover , Mutation.

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# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND

In daily operation of electric Power System , a stable power supply is becoming very important. The purpose of optimising power system transformer tap setting is to minimise power system losses and at the same time maintaining an acceptable voltage profile. A more powerful tool is required to meet the demand. Nowadays , numeric optimisation 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 optimisation and learning techniques. GA is search algorithm based on mechanics of natural selection and genetics. The algorithm provide a powerful search algorithm for large and complex problems.

This project employs reactive power control by means of transformer tap changing in order to minimise the power loss while improved the voltage profile in the power system operation. The GA is used to determine the size of the tap ratio of the transformer tap changing in order to minimise the power loss.