APPLICATION OF THE GENETIC ALGORITHM IN DETERMINING COMPENSATING CAPACITORS SIZING FOR LOSS MINIMIZATION IN POWER SYSTEM

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ABSTRACT

This report present the applications of genetic algorithm in determining compensating capacitors sizing for loss minimization in power system. The proposed technique was tested on a 6-bus system and a genetic algorithm programmer was developed using Borland C++ programming language. The developed GA is to determined the size of the compensating capacitors located at the load buses with an objective to minimize the transmission losses. From the results it shows that the proposed technique is able to determine the suitable size of the compensating capacitors in order to minimize the losses in the system.

Keywords: Compensating Capacitor, Genetic Algorithm, Load flow, Newton Raphson Method

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CHAPTER 1

INTRODUCTION

1.1 Background

Efficient use of capacitors provides significant benefits such as to correct deficiencies in the reactive power requirement in a area, which resulted in high losses in the system. Although reactive compensation can be supplied from a variety of source such as system generation, synchronous condensers, station capacitors and distribution capacitors, the most effective source comes from compensation near the load that required voltage support. The capacitor is a control device that increased system capacity by virtue of this ability to eliminate or reduce the reactive component on the system by improving the system power factor. As the power factor is improved, total current flows is reduced permitting additional load to be served by the same system. This benefit is especially important in the event that equipment may be subject to thermal overloading. Also an improved power factor will provide greater generator capability for producing active power. Others benefits are total system losses are reduced along with an improve voltage profile and also increase in system capacity.

GA was proposed as a new paradigm for optimization and learning techniques. GA is a search algorithm was provided a powerful based on mechanics of natural selection and genetics. This project will focus on reactive power injection by means of compensating capacitors in order to minimize the power loss. GA is used to determine the size of the compensating capacitors. The proposed technique was tested using 6-bus system and the results are presented along with a comparison of result obtain before implement the GA method.