REACTIVE POWER COMPENSATION FOR LOSS MINIMIZATION IN TNB DISTRIBUTION SYSTEM

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ABSTRACT

This report presents the application of Artificial Immune System in determining compensating capacitor sizing for loss minimization in the power system. The proposed technique was tested on TNB distribution system and the Artificial Immune System program was developing using Borland C++ programming language. The developed Artificial Immune System is used to determine the size of the compensating capacitor located at the most end load bus with an objective to minimize the distribution losses. From the result it shows that the proposed technique is able to determine the suitable size of the compensating capacitor while satisfying the voltage constrain in order to minimize the losses in the system [1].

Keyword: Compensation Capacitor, Artificial Immune System, Dist-Flow, Voltage Improvement.

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CHAPTER 1

INTRODUCTION

1.1 Background study

Efficient used of capacitor provides significant benefits such as to correct deficiencies in the reactive power requirement in an area, which result in high losses in the system. Although reactive compensation can be supplied from a variety of source such as system generation, synchronous condenser, and compensating capacitors, the most effective source comes from compensation near the load that required voltage support [2]. Capacitor is has the ability to eliminate or reduce the reactive requirement of the system by improving 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 where equipment may be subject to thermal overloading. An improve power factor will also increase generator capability for producing active power. Other benefits are total system losses are reduced along with an improve voltage profile and also increase in system capacity [1].

Artificial Immune System was proposed as a new paradigm for optimization and learning techniques. Artificial Immune System for this project will be used to determine the optimal power injection by means of compensating capacitors in order to minimize the power loss. The proposed technique was tested using TNB system and the results are presented along with a comparison of result obtained before installing the Compensating Capacitor.