APPLICATION OF ARTIFICIAL NEURAL NETWORK (ANN) FOR REACTIVE POWER DISPATCH

Project report is presented in partial fulfilment for the award of the Bachelor of Electrical Engineering (Hons.)

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ACKNOWLEDGEMENT

Alhamdulillah, all praise to Allah S.W.T, The Most Gracious and Most Merciful who has given me the strength, ability and patience to complete this project and the thesis. I would like to convey my deepest gratitude and appreciation to my project supervisor, Dr.Titik Khawa bt Abdul Rahman for her invaluable suggestion, guidance and advice for the completion of this project.

I would also like to thank to Encik Ismail Musirim who has given encouragement to make this project a success.

Last but not least, my special thanks to all my friends, Saodah, Rahimah,and Juriah, for the valuable help and motivation given in completing this project. Most of all to my beloved family, especially my mother and my brother who are dearest person in my life and greatest source of inspiration, thank you for the endless love and encouragement they have given and for being so understanding.

ABSTRACT

Recently research has shown that ANN is promising solution to many applications especially for non-linear problem in power system, which is difficult for conventional technique. The potential of application of ANN as an alternative approach for solving certain difficult power system problem where conventional methods have not achieved desired speed couldn't be understated.

This report presents the study of reactive power dispatch problem, for the power system to operate in a reliable and economic way. In this study, artificial neural network (ANN) with multi layer feed forward and error back propagation is used. The feed forward network programmed was developed using the MATLAB version 6.1. The proposed technique is tested on IEEE 14 bus system.

The result shows that the proposed ANN technique is highly accurate and capable to predict at faster rate.

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CHAPTER 1

INTRODUCTION

1.1 Background

The reactive power dispatch problem is important for the modern power system to operate in a reliable and economic way because it is the voltage control in the power system. The purpose of the reactive power dispatch is to improve the voltage profile and minimize the real power loss in the system.

One of the major problems faced by power system operators is the reactive power dispatch imposed on electric power utilities for continues and reliable supply of energy. Major power loads require a significant amount of reactive power that has to be supplied while maintaining load bus voltages within their permissible operating limits. Any changes in the system configuration or system demand may result in higher or lower voltage profiles where, the high voltage at light load condition and low voltage at heavy load condition.

In order to maintain desired levels of voltages and reactive flows under various operating conditions and system configuration, power system operators may utilize a number of controls such as switching var sources, changing generators voltages, and adjusting transformer tap settings [1]. By an optimal adjustment of these controls, the optimal distribution of reactive power would minimize transmission losses. The reactive power dispatch assumes that real power has been dispatched and would remain fixed throughout the optimization procedure.

Recent research has shown that artificial neural network (ANNs) is a promising solution to many applications that are difficult for conventional computers [2]. The first artificial neuron was produced in 1943 by the neurophysiologist Warren McCulloch and the logician Walter Pits.