VOLTAGE STABILITY PREDICTION IN POWER SYSTEM NETWORK USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT

Voltage stability has been identified as a crucial issue in power system study which causes several problems such as blackout. This phenomenon has made this subject a very relevant issue in power system planning and operation. This project presents an Artificial Neural Network (ANN) approach for determine voltage stability prediction in power system network. The objective of this project is to develop ANN model for the voltage stability prediction in power system. Other objective is to develop ANN training algorithm and ANN testing algorithm of the network in determine voltage stability. The proposed technique was tested on the IEEE 30 bus reliability test system (RTS) power system and the result shows that a good prediction for voltage stability condition of the system was obtained.

Keywords: Voltage Stability, Artificial Neural Network (ANN), ANN Training Code, ANN Testing Code, Reliability Test System (RTS).

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 BACKGROUD OF STUDY

The enhancement growth in power system grid show increasing of demand that must be bare by power system plant. The effect of this situation is power system will become complex in the near future. When power system face complex and heavily load, voltage instability become one of major problem. The problem has made a great concern for the electric utilities company to focus much attention on investigating this situation. The effect of reactive power load demand on transformer and heavy machine compared to the effect of real power demand will cause power systems to be in stress mode and responsible to many voltage collapse incident around the world [1].

Nowadays the voltage instability that happened in power system networks because of the decline of voltage due to the increasing demand in reactive power. From this many technique and tools have been developed to study this problem. The utilities have included voltage stability analysis as priority in planning and operation in their routine [2, 3].

The study involves the development of Artificial Neural Network (ANN) model for voltage stability prediction of load buses in power system network using IEEE 30 bus reliability test system. To achieve this, an ANN algorithm was developed which implement repetitive load flow using Newton-Raphson method against various value of