VOLTAGE STABILITY MARGIN IDENTIFICATION USING EVOLUTION PROGRAMMING LEARNING ALGORITHM

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UNIVERSITI TEKNOLOGI MARA

ZAMZUHAIRI BIN DARUS
2003328095
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM
SELANGOR DARUL EHSAN

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Zamzuhairi Bin Darus
2003328095
EE220
Faculty of Electrical Engineering
Universiti Teknologi Mara
Shah Alam, Selangor

ABSTRACT

Voltage stability problems have been one of the major concerns for electric utilities as a result of a system heavy loading. This project proposed on an investigation on the voltage stability margin identification using evolution programming learning algorithm. A multi-layer feed-forward artificial neural network (ANN) with evolution programming learning algorithm for calculation of voltage stability margins (VSM). Analysis and evaluation of the voltage stability, it is necessary to accurately identify the stability margin at each load point under specific system configuration or power balance condition.

In the analysis and evaluation of voltage stability, it is necessary to accurately identify the stability margin at each load point under specified system configuration or power balance condition. Voltage stability margin (VSM) can be basically identified by the multi-solution load flow calculation method. A systematic method for selecting the ANN's input variables was developed using Matlab Programming language.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The phenomenon of voltage collapse has been observed in many countries and has been analyzed extensively in recent years. Most of the incidents are believed to be related to heavily stressed systems where large amounts real and reactive power are transported over long transmission lines while appropriate reactive power sources are not available to maintain normal voltage profiles at receiving and end buses [1]. Voltage stability is classified into large-disturbance voltage stability and small-disturbance voltage stability. The former is concerned with a system's ability to control voltages following large disturbances such as system faults, loss of generation, or circuit contingencies. The latter is concerned with a system's ability to control voltages following small perturbations such as incremental changes in system load [2].

Economic and environmental pressures require electric utilities to get the maximum benefit from the available generation and transmission resources. The present-day power systems are operated closer to their security limits. Much attention has been given to the study of voltage stability assessment tools will be required for the secure operation of interconnected power systems. The different off-line voltage stability analysis have matured over the recent years, and on-line voltage stability analysis tools are being developed to determine how close the power system is to a possible voltage stability and to suggest remedial actions when required [3]

The Artificial Neural Network (ANN) approach presented here provides the voltage stability margin after learning the inherent mapping between the power system operating condition and its voltage stability margin. The effectiveness of the proposed method is demonstrated by applying it to determine the voltage stability margin for the IEEE 14-bus power system.