STEADY STATE SECURITY ANALYSIS USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT

Steady state security analysis aims at assessing the risk a contingency would entail for an electrical network operating at a certain point. System operators' expertise and even human intuition in many ways are successful at assessing the risk a contingency would pose to a network. The objective of the project is to describe how artificial neural networks can be used to bypass the traditional load flow cycle, resulting in significantly faster computation times for online contingency analysis. The cases where operating violations are observed are considered as alert , while the cases for which the load flow algorithm exhibits a diverging algorithmically solution, are considered as emergency.

The most important task in real time security analysis is the problem of identifying the critical contingencies from a large list of credible contingencies and ranks them according to their severity. The artificial neural network (ANN)-based approach for contingency ranking. A set of feed forward neural networks are developed to estimate the voltage stability level at different load conditions for the selected contingencies. The effectiveness of the proposed method has been demonstrated through contingency ranking in IEEE 30-bus system. The performance of the developed model is compared with the unified neural network trained with the full feature set. Simulation results show that the proposed method takes less time for training and has good generalization.

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CHAPTER I

INTRODUCTION

1.1 Background

Consumption energy in power system have been increasing in line with the development of technology .The increasing energy demands on power system coupled with a low rate of additional capacity installation are causing the power systems to be operated close to their security limits. Traditionally, these limits are associated with the problems of thermal loading and transient stability. Line and transformer thermal limits have become less restrictive as the power systems have become denser. Fast fault clearing, high performance excitation systems, and other controls have raised the transfer limits in stability limited systems. However, voltage instability has become the limiting constraint for many power systems. It has been responsible for severe system disturbances including major blackouts. As a result, much attention has been given to the study of voltage stability and the development of analytical tools to be used for on-line voltage assessment. However this proposal focused to a method of assessment based on steady state security analysis of power system. The security of the system is assessed on the basis on the voltage profile at each bus with reference to changes in generation and load in the system. In the assessment, the steady states corresponded to a number of parameters that examined the loading conditions.

During power system operation, it is important that load demands be met without violations of system operational constraints. Over the years, a number of researches on security assessment have been carried out in order to resolve the problem occurs in the system. Besides, for a given operating condition, the system should be capable of resisting the loss of any component, with no operational problems. Thus, contingencies