VOLTAGE STABILITY BASED CONTINGENCY RANKING FOR POWER SYSTEM ANALYSIS

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ABSTRACT

This project report presents a method for identification of system instability and contingency ranking analysis. Voltage collapse may occur in a power system due to lost in voltage stability in the system. Therefore voltage stability analysis is important in order to identify critical buses in a power system i.e which are closed to their voltage stability limit.

The objective of contingency ranking is to shortlist a specified number of critical contingencies from a large list of credible contingencies and rank them according to their severity. This project paper describes the Newton Raphson load flow method and voltage stability index for voltage stability indication with respect to a load bus .The voltage stability index then used to rank the contingencies of the system.

Keyword: Voltage stability, Contingency ranking.

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CHAPTER 1

INTRODUCTION

1.1   Introduction

The increase in power demand has caused power transmission systems to be heavily loaded and hence the problems associated with voltage instability has become a great concern to planning and operation engineer. Voltage stability is an important factor to be considered in power system operation and planning since voltage instability would lead to system collapse. Furthermore a stable contributes to reliability and reduction in system loss [1]. As a result many technique as been developed to identify critical power system, buses and lines.

In the project report, a voltage stability index with respect to a load bus is formulated from the voltage equation derived from a two bus network and it is computed using Thevenin equivalent circuit of the power system referred to a load bus. This index indicates how far the load buses from their voltage stability limit and hence identifies the critical buses. . A load bus is considered critical if it is in the condition at which its voltage stability measure is very closed to its limit. This indicates that the particular load bus is going to lose its voltage stability and hence voltage collapse is expected to occur at this load bus. Then the voltage stability index is ranked according to their severity. The contingency ranking function has the objective of short-listing an operator specified number of critical contingencies from a large list of credible contingencies. Once the critical bus in a power system is identified from it contingency ranking , appropriate action can be taken to avoid any incidence of voltage collapse in the power system.