MINIMUM LOAD SHEDDING FOR IMPROVING TOTAL LOSS DURING LINE OUTAGE CONTINGENCY USING EVOLUTIONARY PROGRAMMING TECHNIQUE

This thesis is presented in partial fulfillment for the award of the Bachelor of Electrical Engineering (Hons)

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ABSTRACT

This project presents a methodology for solving minimum load shedding problem during line contingency by using Evolutionary Programming (EP) technique in order to minimize the losses and maximize the minimum voltage in the power system. This case study has been developed through the Evolutionary Programming (EP) technique using MATLAB software. This study tested two fitness functions. They are the maximization of minimum voltage and the total losses minimization in a power system. Comparison in the results obtained was made in order to determine the best fitness function to be used in solving the minimum load shedding problem. The proposed technique was tested on the IEEE 30-bus reliability test system.

Keywords:

Minimum load shedding, total loss, line contingency, Evolutionary Programming (EP).

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CHAPTER 1

INTRODUCTION

1.0 BACKGROUND

Deregulation has forced electric utilities to exploit existing transfer capability of the power network. Power system will operate closer to their load limits and this will lead to the problems with the voltage instability. In these recent days, voltage stability becomes a major concern in power system planning and operation [18].

Voltage collapse may occur immediately when the system cannot satisfy the demands of active and reactive power after some severe contingencies. The voltage collapse also can occur if the available control has been exhausted or no fast control action activated. An emergency load shedding will be required to prevent voltage collapse. Voltage is not a good indicator for voltage stability because voltage collapse may occur at a high voltage grade in a heavy reactive compensation system [19].

Emergency load shedding control need the restoring of power flow solvability and searching for the minimum load-shedding direction according to the sensitivity vector. The sensitivity of arbitrary parameters on the load margin is widely used.