# REACTIVE POWER DISPATCH FOR COST AND LOSS MINIMIZATION IN POWER SYSTEM DURING LINE OUTAGE CONTINGENCY BY USING MAIEP

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# ABSTRACT

Electrical power system are designed and operated to meet the continuous variation of power demand. The optimal reactive power dispatch is to optimize the steady state performance of a power system in terms of one or more objective functions while fulfilling both equality and inequality constrains. This paper present a new optimization technique termed as Multi Agent Immune Evolutionary Programming (MAIEP) utilizing Reactive Power Dispatch (RPD) to minimize total generation cost and losses in power system. MAIEP concept is origin from few combinations of optimization technique of Multiagent System (MAS), Artificial Immune System (AIS) and Evolutionary Programming (EP) optimization technique. In a large power system network, there are many possibilities of the contingency occurrence. Contingencies could be line outage, the occurrence of contingency in a nominal voltage and leads to voltage collapse. Line outage could be extreme case when the outage line involving any units of the power supply in the system. The programming codes are written in MATLAB. The propose technique was tested using IEEE-26-Bus Reliability Test System. The result obtained from before contingency and during contingency are comparing with MAIEP optimization technique and pre optimization technique.

# CONTENTS

# CHAPTER 1

# INTRODUCTION

## 1.1 INTRODUCTION

Reactive power management has been of great interest to researchers as well as system operators, especially after the restructuring of the power industry. This interest is mainly due to the significant effect that reactive power has on system security given its close relationship with the bus voltages throughout the power network. The optimal operation of a power system is required to proceed the optimal planning of facilities or devices for the system.

Generally, these facilities consist of generating plants, reactive power compensation and transmission network. There are two sub-objective of ORPD which are to maintain the voltage profile of the network in an acceptable range and the other objective is to minimize the total power loss of the network. Lastly is to minimize the transformer tap setting changes and generator VAR source switching. Suitably adjusting the following facilities such as tap changing under load transformers, generating units' reactive power capability variation, switching of inductors, switching of unloaded or unused lines and flexible AC transmission system (FACTS) devices can control reactive power flow. It is therefore clear that reactive power and voltage control is a constrained, nonlinear problem of considerable complexity. Useful studies was done for solving the reactive power dispatch problem have been carried out based on classical techniques which includes nonlinear programming(NLP), successive linear programming, mixed integer programming, Newton and quadratic techniques. Most of these approaches can be broadly