AN OPTIMAL LOAD SHEDDING APPROACH FOR TRANSMISSION NETWORKS USING PARTICLE SWARM OPTIMIZATION (PSO) TECHNIQUE

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

MOHD FARID BIN MOHD RAWI
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
NOVEMBER 2009

ACKNOWLEDGEMENT

In the name of ALLAH Most Gracious Most Merciful

It is with the deepest gratitude that ALLAH gives me strength and ability to complete this project.

First and foremost, I would like to acknowledge my most sincere gratitude to my project supervisor Associate Professor Dr. Ismail Bin Musirin for his support, continuous guidance, valuable comments and suggestions towards the completion of this final project.

I would like to express my gratitude to my friends Azlan, Junainah, Safri, Azlina and all whom I known especially all the PLK students at the Faculty of Electrical Engineering, Universiti Teknologi MARA for their advice and support.

I gratefully acknowledge my mother, father and family for their understanding, support and constant encouragement.

Last but not least, credit goes to everybody who involved either directly or indirectly for their concern on each and every single assistance once I asked. All persons who had given me treasured points of view and lots of self motivational support.

"May Allah bless and reward them for their generosity".

ABSTRACT

This thesis presents an optimal load shedding approach for transmission networks using Particle Swarm Optimization (PSO). The study involves the development of PSO algorithm and engine to address load shedding in loss minimization. Electrical power transmission network typically connects power plants to multiple substations near a populated area. Electrical power transmission system interconnects generators and loads and generally provides multiple paths among them. Load shedding is one of the challenging problems in deregulated power systems. By employing the PSO, it is estimated to maintain the system, to minimize the sum of curtailed load and also to minimize the system losses. The proposed method is tested on transmission network IEEE 30-bus system for more practical applications.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Project Overview

Nowadays, electricity is the most important matters to a customer. With the growth of technology around the world, electrical power systems need to supply their utilities. Response from that situation, the demand for electricity exceeds the power supply capability of the network. When the system is in emergency state, it required to shed partial loads to supply the important loads for system stability which concerns on the voltage, current, power and frequency constraints.

Failure to supply the load can cause monetary problem to customer also the equipments. To increase the service quality to their costumers, electricity companies established certain planning and operating rules, so that the power system is able to face at each instant the current uncertainties, such as loss of one or several transmission or power production equipments (N-1 criteria) [1]. These rules do not cover all contingencies and do not offer the guarantee that the power system is completely protected against major incidents [2].

Load shedding is one of the issue that has no exemption [3]. Load shedding is normally used in industrial, large commercial and utility operations. It is the term used to describe the deliberate switching off of electrical supply to parts of the electricity network, and hence to the customers in those areas. As a role in monitoring electric usage continuously and shutting down certain pre-arranged