

**ARTIFICIAL NEURAL NETWORK APPROACH FOR OPTIMAL
ECONOMIC DISPATCH**

By

SIDRATUL HAKIM B. MD KERTA

**FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITY TEKNOLOGI MARA
MALAYSIA**

ACKNOWLEDGEMENT

Thanks to Allah and may His peace and blessings be upon all his prophets for granting me the chance and the ability to successfully complete this thesis.

I take this opportunity to express my profound gratitude and deep regards to my supervisor Assoc. Prof. Dr. Zuhaina Hj. Zakaria for her exemplary guidance, monitoring and constant encouragement throughout the course of this thesis. The blessing, help and guidance given by her time to time shall carry me a long way in the journey of life on which I am about to embark.

I also take this opportunity to express a deep sense of gratitude to Assoc.Prof. Dr. Ismail Musirin for the valuable information and guidance, which helped me in completing this task through various stages.

Lastly, I thank my parents, family and friends for their constant encouragement without which this assignment would not be possible.

ABSTRACT

The economic load dispatch plays an important role in the operation of power system, and several models have been used to solve these problems. Several classic approaches, like lambda-iteration and quadratic solution are used to find the economic load dispatch. More recently, the soft computing techniques have received more attention and practice for these applications. This thesis discusses the application of artificial neural networks feed forward back propagation for solving the optimization problems. Data has been taken from published work with the maximum and minimum power limit and cost function. All techniques are implemented in Matlab environment.

Keywords:

Keywords: Economic dispatch, Load Forecasting, Backpropagation

Table of Contents

	PAGE
DECLARATION	
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vii
LIST OF TABLES	viii
LIST OF SYMBOLS AND ABBREVIATIONS	ix
CHAPTER 1	
INTRODUCTION	
1.1 BACKGROUND	1
1.2 OBJECTIVE	2
1.3 PROBLEM STATEMENT	2
1.4 ORGANIZATION OF PROJECT REPORT	2
CHAPTER 2	
ECONOMIC DISPATCH	
2.1 INTRODUCTION	4
2.2 POWER SYSTEM OPERATIONAL PLANNING	4
2.3 LITERATURE REVIEW	6
2.4 BASIC THEORY OF ECONOMIC DISPATCH	11
2.4.1 Fuel Cost Function	12
2.4.2 Incremental Fuel Cost	14
2.5 CONSTRAINTS IN SOLVING ECONOMIC DISPATCH	15
2.6 LAMBDA ITERATION METHOD FOR SOLVING ECONOMIC DISPATCH	17
2.6.1 Algorithm Of Lambda Iteration Method For Solving Economic Dispatch	17
2.7 CONCLUSION	18
CHAPTER 3	
APPLICATION OF ARTIFICIAL NEURAL NETWORK	

CHAPTER 1

INTRODUCTION

1.1. Background

Cheap electricity with high operating efficiency is one of the objectives of power utilities. Competition in the electricity supply is allowed in generation and in the marketing of electricity. Economic dispatch (ED) is to allocate power generation among available generators in the most economical way, while satisfying the physical and operational constraints. ED also understands as the optimal output of power generation, to meet the load at the lowest cost while serving to the public in a robust and reliable manner. Therefore, the economic dispatch plays an important role in our daily life.

Due to the energy crisis in the world and continuous to hiking in prices, it is important to reduce the running charges of the electricity energy. Although it is small percentage in saving the operation system but it effects the reduction in operating cost and fuel consumed operational constraints. When the power output of generation can be optimized neglect the losses constraint, the cost of generating unit can be reduce and less fuel will be used in generation.

Power utilities try to achieve high operating efficiency to produce cheap electricity[1]. Several method had been used and proposed in economic dispatch. Several classic approaches, like lambda-iteration and quadratic solution are used to find the economic load dispatch. More recently, the soft computing techniques have received more attention and practice for these applications. The problem using the classical method is that need a lot of time to converge to the good result.