SOLVING ECONOMIC DISPATCH PROBLEM USING MATLAB OPTIMIZATION TOOLBOX

Thesis is represented in partial fulfillment for the award of the Bachelor of
Electrical Engineering (Hons)
UNIVERSITI TEKNOLOGI MARA



ANIS NURHIDAYATI BT OTHMAN
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR

ACKNOWLEDGEMENT

In the name of Allah S.W.T. the merciful, beneficent, and the almighty one, praise to him endowment for allowing me to complete this final year project. Alhamdullilah, and very grateful to Allah for giving me the strength to fulfilled this final year thesis completely beside gaining valuable experiences and knowledge throughout completing this thesis, this experiences and knowledge may assist me to develop my personal skill in the future.

Special thanks are dedicated to my beloved supervisor, Assoc. Prof. Bibi Norasiqin Bt Sheikh Rahimullah for her guiding and never give up encouraging me during completing this report, her willingness to advice, motivate, teach, and her patience, a special dept of gratitude towards her.

My beloved father and mother, brothers and sister, thank you so much. Without their continue support and encouragement, I could not have gone far. Thank you so much for an always being there for support me.

Not forgetting my housemate and friends for their opinion and advice, appreciation to all my friends especially Muhd Hafizuddin, thank you so much for always is being there for me. Lastly to the names that I forgot to mention, you know who you are, thank you so much from the bottom of my heart.

May Allah repay all your kindness...

ABSTRACT

In economic dispatch problem, the objective is minimizes the total generation cost and fulfills the equality and inequality constraints. This thesis attempts to use Matlab Optimization Toolbox to solve economic dispatch problem. The objective of this study is to minimize the fuel cost while considering losses. The proposed method was tested on two system consisting three generator units and six generator units. The results show that the Matlab Optimization Toolbox can be used to solve the economic dispatch problem.

Keywords:

Economic dispatch problem, Matlab Optimization Toolbox.

TABLE OF CONTENTS

CONTENTS	PAGE
DECLARATION	i
ACKOWLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENT	iv
LIST OF FIGURE	vii
LIST OF TABLE	viii
ABBREVATIONS	ix
CHAPTER 1	\$
INTRODUCTION	
1.0 Introduction	1
1.1 Research Objective	3
1.2 Scope of work	3
1.3 Summary of thesis	3
CHAPTER 2	
LITERATURE REVIEW	
2.0 Introduction	5
2.1 Economic dispatch problem	5
2.1.1 Lambda iteration method	8
2.1.2 Evolutionary Algorithm	10
2.1.3 Lagrange Multiplier	12
2.2 Problem formulation of economic	
dispatch problem	12
2.2.1 Transmission loss formulation	14
2.2.2 The B matrix loss formula	19
2.2.3 Effect of Equality constraint	20
2.2.4 Effect of Inequality constraint	20

TABLE OF CONTENTS

CONTENTS	···		PAGE
CHAPTER 3			
]	MET	HODOLOGY	
	3.0	Introduction	21
	3.1	Matlab Optimization Toolbox	21
	3.2	Matlab Optimization Toolbox Operation	23
		3.2.1 Global variables	23
		3.2.2 Optimization parameter setting	24
		3.2.3 Minimization algorithm	26
	3.3	Matlab Optimization Toolbox development	29
		3.3.1 Constraint for economic dispatch problem	31
		3.3.2 Objective function for economic	31
		dispatch problem	
		3.3.3 B-matrix loss formula	32
	3.4	Data application	33
		3.4.1 Case study 1: Three generator units	33
		3.4.1.1 Objective function	33
		3.4.1.2 Constraint equations	34
		3.4.2 Case study 2: Six generating units	35
e		3.4.2.1 Objective function	35
		3.4.2.2 Constraint equations	35
CHAPTER 4			**
]	RESU	JLT AND DISSCUSSION	
4	4.0 Int	troduction	37
•	4.1 Re	esult for three generating units	37