

SHUFFLED FROG LEAPING ALGORITHM FOR SOLVING ECONOMIC LOAD DISPATCH PROBLEM

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



MOHAMMAD ARIFFIN AIZAT BIN EZANEE
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA
JULY 2015

ACKNOWLEDGEMENT

Alhamdulillah, I would like to express my greatest gratitude and thanks to Allah S.W.T, because finally I am able to complete my Final Year Project titled Shuffled Frog Leaping Algorithm For Solving Economic Load Dispatch Problem.

I would also like to convey my sincere gratitude to my project supervisor, Assoc Prof. Bibi Norasiqin Binti Sheikh Rahimullah for her invaluable kindness, support, advice, guidance, and suggestions during the progression of this project. Her guidance throughout the completion of my project has enabled me to develop understanding of this project thoroughly.

Last but not least , I acknowledge my deepest indebtedness and gratitude to my beloved family members for their moral and spiritual support. Their love, dream and sacrifice throughout my life had inspired me a lot from the day I learned how to read and write until what I have become now. I cannot find the appropriate words that could properly describe my appreciation for their devotion, support and faith in my ability to achieve my dreams.

ABSTRACT

This thesis presents the solution to Economic Load Dispatch (ELD) problem in order to minimize the generation cost. Shuffled Frog Leaping Algorithm (SFLA) is proposed to solve Economic Load Dispatch (ELD) problem. The proposed SFLA method is developed using MATLAB programming. This SFLA method is tested on IEEE 30 bus system and the results show that it can solve ELD problem by providing minimum cost. This method provides a better result compared to Classical Method using lamda iteration and Genetic Algorithm (GA).

Keywords- Shuffled Frog Leaping Algorithm, Genetic Algorithm, Economic Load Dispatch, Classical method

TABLE OF CONTENTS

APPROVAL	i
AUTHOR DECLARATION	ii
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
ABBREVIATIONS.....	ix
CHAPTER 1	1
INTRODUCTION.....	1
1.1. BACKGROUND OF STUDY	1
1.2. PROBLEM STATEMENT	2
1.3. SIGNIFICANT OF STUDY	2
1.4. OBJECTIVES.....	3
1.5. SCOPE OF WORK.....	3
1.6. THESIS ORGANIZATION.....	3
CHAPTER 2	5
LITERATURE REVIEW	5
2.1. INTRODUCTION	5
2.2. SOLVING METHODS FOR ECONOMIC LOAD DISPATCH	6
2.3. BASIC THEORY OF ECONOMIC LOAD DISPATCH.....	7
2.3.1 FUEL COST FUNCTION	8
2.3.2 INCREMENTAL FUEL COST.....	9
2.3.3 THE COST FUNCTION SUBJECTED TO LINEAR AND NON-LINEAR EQUALITY	10
2.3.4 POWER BALANCE.....	10
2.3.5 MINIMUM AND MAXIMUM LIMITS OF POWER.....	11
2.4. SHUFFLED FROG LEAPING ALGORITHM DETAILS	12
CHAPTER 3	14
METHODOLOGY	14

3.1.	INTRODUCTION	14
3.2.	PHILOSOPHY BEHIND THE DEVELOPMENT OF THE SHUFFLED FROG LEAPING ALGORITHM	14
3.3.	SHUFFLED FROG LEAPING ALGORITHM.....	16
3.4.	BASIC STEPS IN SHUFFLED FROG LEAPING ALGORITHM	18
3.4.1	INITIAL POPULATION	18
3.4.2	SORTING AND DISTRIBUTION.....	18
3.4.3	MEMEPLEX EVOLUTION.....	19
3.4.4	SHUFFLING.....	20
3.4.5	TERMINAL CONDITION.....	20
3.5.	SOLVING OPTIMIZATION PROBLEM USING SFLA.....	21
3.6.	SOLVING ECONOMIC LOAD DISPATCH PROBLEM USING SFLA	27
CHAPTER 4	33
RESULTS AND DISCUSSION	33
4.1.	INTRODUCTION	33
4.2.	TEST SYSTEM	33
4.3.	INITIAL VALUE	35
4.4.	CHANGES IN THE NUMBER OF POPULATION	37
4.5.	CHANGES IN THE NUMBER OF MEMEPLEX.....	39
4.6.	CHANGES IN THE NUMBER OF GLOBAL ITERATION	41
4.7.	THE BEST RESULTS FROM CHANGING THE SFLA PARAMETERS	43
4.8.	COMPARISON OF CLASSICAL METHOD, GENETIC ALGORITHM AND SFLA	45
CHAPTER 5	46
CONCLUSION AND RECOMMENDATION	46
5.1.	CONCLUSION.....	46
5.2.	FUTURE RECOMMENDATION.....	47
REFERENCES	48