ALLOCATION AND SIZING OF DISTRIBUTED GENERATION (DG) USING PARTICLE SWARM OPTIMIZATION (PSO) TECHNIQUE FOR LOSS MINIMIZATION

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~In the name of Allah, Most Beneficent, Most Merciful~

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ABSTRACT

Distributed generator (DG) is playing major role to supply energy resources and also for the development of co-generation plant which is absolutely very important in the electric power systems of the near future. The study involved in this project is to determine the optimal allocation and sizing of the DG in order to minimize the losses in the system.

Fast Voltage Stability Index (FVSI) technique has been used with the objective to identify the suitable location for the distributed generation in the networks. FVSI is used as the measuring instrument in predicting the sensitive lines which will be used to identify the location for DG installation. Once the locations are determined, Particle Swarm Optimization (PSO) technique is developed to identify the optimal size of the DG. It is an algorithm that represents the behavior of a flock of birds or a school of fish.

The feasibility of the proposed method is considered by using the fitness function in PSO technique to solve the load flow calculations for decision-making. In order to realize all the proposed technique, MATLAB programming software is used to develop the programming codes. The effectiveness of the proposed technique has been validated on standard IEEE 12-bus distribution system.

The obtained results show that the choice of the optimal locations and sizing of the DGs in the distribution system had minimized the total loss.

Keyword: Fast Voltage Stability Index (FVSI), Optimal allocation of DG units, Particle Swarm Optimization (PSO)

TABLE OF CONTENTS

CHAPTER	LIST OF TITLE	PAGE
	DECLARATION	i
	DEDICATION	ii
	ACKNOLEDGEMENT	iii
	ABSTRACT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	vii
	LIST OF TABLE	viii
	ABBREVIATIONS	ix
1.0	**INTRODUCTION**	
	1.1 Introduction	1
	1.2 Objective of Project	3
	1.3 Scope of Project	3
	1.4 Organization of thesis	4
2.0	**LITERATURE REVIEWS**	
	2.1 Introduction	5
	2.2 Distributed Generation (DG)	5
	2.2.1 Advantages of DG units	7
	2.2.2 Disadvantages of DG units	8
	2.3 Particle Swarm Optimization in Power System	9
3.0	**METHODOLOGY**	
	3.1 Introduction	10
	3.2 Research Design	11
	3.3 Fast Voltage Stability Index (FVSI)	13
	3.4 Initialization	14
	3.5 Particle Swarm Optimization (PSO) Algorithm	17

4.0 RESULTS AND DISCUSSION

4.1 Introduction 22

4.2 FVSI 22

4.3 PSO 23

4.4 Case A: Analysis of the losses with Three Swarm Sizes 23

4.4.1 Loading Condition at Bus 4 24

4.4.2 Loading Condition at Bus 5 26

4.4.3 Loading Condition at Bus 6 28

4.5 Case B: Analysis of the losses with Four Swarm Sizes 30

4.5.1 Loading Condition at Bus 4 30

4.5.2 Loading Condition at Bus 5 32

4.5.3 Loading Condition at Bus 6 34

5.0 CONCLUSION AND RECOMMENDATION FOR FUTURE WORK

5.1 Conclusions 36

5.2 Recommendation For Future Work 37

REFERENCES 38

APPENDICES 40