

CONTENTS

CERTIFICATE.....	I
ACKNOWLEDGEMENT.....	II
LIST OF SYMBOLS.....	III
ABSTRACT.....	IV

Chapter 1: INTRODUCTION

1.1 Overview.....	1
1.2 Flexible AC Transmission Systems.....	2
1.3 Load flow solution.....	3
1.4 Literature Review.....	3
1.5 Objective of thesis.....	4
1.6 Organization of thesis.....	4

Chapter 2: LOAD FLOW

2.1 Study of load flow analysis.....	6
2.2 Type of buses.....	7
2.3 Load flow equations and their solutions.....	8
2.4 Comparison of solution methods.....	19

Chapter 3: FACTS IN POWER SYSTEM

3.1 General.....	20
3.2 Power system stability.....	21
3.3 Basic principal of active and reactive power flow control.....	21
3.4 FACTS controllers.....	24
3.5 Different FACTS controllers.....	25
3.6 Opportunities for FACTS.....	32
3.7 Application of FACTS under steady state.....	34
3.8 Application of FACTS under dynamic state.....	35

Chapter 4: LOAD FLOW INCLUDING STATCOM

4.1 Power flow analysis with STATCOM.....	39
4.2 Control function of STATCOM.....	40
4.3 Implementation of STATCOM to a Bus network.....	41
4.4 Algorithm for load flow with STATCOM.....	43

Chapter 5: CASE STUDIES AND RESULTS

5.1 Case study of a 5-bus network.....	44
5.2 Results	
5.2.1 Bus voltages without STATCOM.....	46
5.2.2 Bus voltages with STATCOM.....	46
5.2.3 Line flow without STATCOM.....	47
5.2.4 Line flow with STATCOM.....	47
5.3 Case study of IEEE-14 bus test system.....	48
5.4 Results	
5.4.1 Bus voltages without STATCOM.....	51
5.4.2 Bus voltages with 2-STATCOM.....	51
5.4.3 Line flow without STATCOM.....	52
5.4.4 Line flow with 2-STATCOM.....	52
5.5 Case study of IEEE-30 bus test system.....	54
5.6 Results	
5.6.1 Bus voltages without STATCOM.....	58
5.6.2 Bus voltages with 4-STATCOM.....	59
5.6.3 Line flow without STATCOM.....	59
5.6.4 Line flow with 4-STATCOM.....	61

Chapter 6: FUTURE SCOPE AND CONCLUSION

6.1 Conclusion.....	64
6.2 Scope for further research.....	64
APPENDIX.....	65
REFERENCES.....	87