CHAPTER 5

CONCLUSION AND SCOPE FOR FUTURE WORKS

5.1 INTRODUCTION

In this thesis, an attempt is made to mitigate the power system Congestion problem using (i) Generation Rescheduling; (ii) Generation Rescheduling with Load shedding (adopted only at the worst case scenario) and (iii) Generation Rescheduling with FACTS devices like TCSC. To decide on the amount of real power to be rescheduled and to verify the voltage profiles of buses and reactive power values, Optimum Power Flow OPF based on conventional (Interior Point) method, Particle Swarm Optimization (PSO) and Evolutionary Programming (EP) techniques are proposed and tested for validation. The effectiveness of the proposed methods have been analyzed and validated on IEEE 30 bus, IEEE 118 bus, IEEE 300 bus, Indian utility 66 bus systems.

5.2 REVIEW OF THE METHODS

For all the test systems considered, the transmission line limits, voltage profiles of all buses, total real power loss in the system are minimized simultaneously satisfying all the equality and inequality constraints considered.

On the basis of detailed analysis and comparisons carried out with the objective of concluding the best method for the problem defined in
specific to the systems concerned as well as a universal one, the following observations and inferences have been made:

1. The interior point method has provided solutions with higher transmission power limit and requires much computation time due to the complex calculations involved. The cost of generation after the optimization of the function is also higher than other methods.

2. Both Evolutionary algorithms (PSO, EP) provide for less computation time with better results in terms of lower transmission limit, more stable voltage profile, less total real power loss in the entire system under consideration. More importantly, the overall cost of the fitness/objective function is well reduced.

3. In general, for the entire set of test systems considered in this work, on comparing both the evolutionary algorithms (PSO, EP), not much difference were found in terms of computation times and accuracy of all the results computed. However, on a closer look into them, it is revealed that PSO outperforms the EP.

4. From the comparison of the convergence characteristics of different algorithms, it is evident that PSO has faster convergence and also it is found that PSO gives better results than other methods.
5.3 SCOPE FOR FUTURE WORK

The operational aspects of power systems pose most demanding problems encountered in the restructured electric power industry. In this thesis, the objective is the minimization of the congestion management in deregulated power system.

1. The same objective can also be extended to bilateral and multilateral market. The bilateral and multilateral markets are commonly used in many electricity markets. The congestion management based on generation rescheduling, will help both the utility and the consumers in bilateral and multilateral electricity markets.

2. The congestion management problem can be considered as a multi objective optimization to get a set of Pareto solutions.

3. The Congestion Management can be extended into economic aspects quantifying the economic risk faced by market players and their willingness to pay to avoid curtailment.

4. Evolutionary procedures may be made to compute faster by selecting proper modifications in different aspects. It will be a good attempt to consider also Multi objective Differential Evolution or Modified Evolutionary Algorithm to alleviate congestion.