CHAPTER 6

CONCLUSION

6.1 GENERAL

The proposed research work introduces three efficient algorithms namely GSO, GSO-T and MOEP to solve the power economic dispatch problems. These three approaches have its own merits and abilities while solving the various power economic dispatch related problems. Various applications and case studies have been presented to demonstrate the suitability in applying these proposed optimization techniques for solving power economic dispatch problems. The outcome of this proposed work is summarized and suitable suggestions for the future research work under this topic purview are also outlined.

6.2 CONTRIBUTIONS OF THE RESEARCH

The main contributions of this research work are summarized as follows:

- In this research work, more realistic economic dispatch with valve point effects and multiple fuel option are formulated as non-convex optimization problem.
- In this work, a novel Glowworm Swarm Optimization (GSO) algorithm is introduced to solve the complex and non-convex ED problem and the better optimal solutions are obtained.
• The performance and ability of the GSO algorithm are analysed and compared with Particle Swarm Optimization algorithm.

• The environmental economic dispatch problem is formulated as an optimization problem with simultaneously optimizing the multiple conflicting objectives.

• This research work has proposed a novel multi model, heuristic optimization method named GSO with TOPSIS (GSO-T) algorithm, in which, a multi-criteria decision making method is incorporated as ranking tool in GSO, for solving the multiple objective environmental economic dispatch problem.

• The optimization with GSO-T algorithm is performed by considering two objectives initially, and then increased to three and four objectives subsequently.

• The optimal solutions are obtained for all the three cases considered and the results are compared with other optimization methods reported in the literature.

• Through this proposed work, a novel multi objective optimization algorithm named Multi Objective Evolutionary Programming (MOEP) algorithm is developed to solve the multi objective environmental economic dispatch problems.

• In the MOEP based optimization, the non dominated solution ranking and diversity-preserving mechanism using clustering are employed to improve the performance. The time varying scaling factor is proposed to improve the algorithm efficiency.

• The effectiveness of MOEP is demonstrated by comparing the results and Pareto-optimal front solutions with MOPSO results and also with other MOEAs results reported in literature.
• The superiority of the proposed MOEP methods is evaluated by performance metrics and results are also compared with MOPSO.

• This proposed work has offered the effective single objective and multi objective optimization tools to solve the power dispatch problems with ease.

6.3 RECOMMENDATION FOR FUTURE RESEARCH

Further research work may be on the following areas:

• The power economic dispatch related optimization problems may be renovated with more realistic objective functions and constraints by reconsidering the challenges arising due to the introduction of competitiveness in power industry.

• The better neighbourhood selection techniques may be suggested to reduce the computation time in GSO algorithm for solving non-convex optimization problems.

• Similar to the GA and PSO tool box in the MATLAB environment, GSO tool box may be constructed to get better utilization for real time applications.

• The MOEP performance may be improved with better Pareto optimal front solutions selection mechanism, which will perform better for more than two objectives.

• An approach for solving many objective optimization problems may be proposed to get solved the power system related real world applications.