CHAPTER 7

CONCLUSION AND SCOPE FOR FUTURE WORK

7.1 CONCLUSION

In this chapter overall conclusion along with the scope for the future work is presented. The ELD is a significant problem in order to schedule the generation among the units in a power system to overcome the required demand. The main objective of the ELD problem is to minimize the total generation cost subjected to various constraints. In addition, the transmission loss and emission is also to be minimized. Many optimization algorithms have been developed in order to obtain the optimum solution. But due to premature convergence, those algorithms fail in obtaining the best results. In this Thesis, Power Search Algorithm (PSA) with forward and reverse search strategy have been applied to solve various ELD problems. The value of ‘k’ varies from 0 (minimum) to 2 (maximum) with an iteration value of 0.001, such that 2000 iterations are performed. The search criteria travel throughout the search space and bring out the global optimum solution for all the problems considered. This inherent characteristic makes the algorithm to perform better than the existing algorithms. The proposed algorithm has been evaluated for various IEEE standard test systems related to ELD problems considering VPL effects, Combined Emission – Economic Dispatch (CE-ED) problems, Dynamic Economic Dispatch problems and ELD problems considering Multiple Fuel Options. The simulated results obtained with the help of the PSA-RSA and PSA-FSA are superior when compared to other optimization techniques. The robustness and efficiency of the proposed approach is proved in terms of obtaining global optimum solution for various cases analyzed.
7.2 SCOPE FOR FUTURE WORK

This proposed algorithm can be explored further for solving the problems related to various fields of optimization. The development of Intelligent Algorithms (IA) can improve the processing speed of the algorithm which results in very less computational time. This algorithm can be explored to solve the problems related to Unit commitment, Economic Power Dispatch and very large scale power system network consisting of 140 generating units.

Renewable energy is being promoted as a solution for reducing our reliance on imported hydrocarbon fuels and cutting greenhouse gas emissions. Although wind and solar power continue to receive the most attention, these renewable resources are inherently intermittent and demand significant infrastructure and systems changes. The current power grid systems and operation methods are not yet ready for handling such fluctuations on a systematic basis. Thus, it is an infant research arena which poses great challenges, and there are still many open-ended problems.

Electrical power systems have become ever more complex, some analytical methods based on strict mathematical derivations oftentimes suffer from the so-called “curse of dimensionality.” It means that when the system size increases, the time needed to solve the problem will increase exponentially. Thus, they will become less efficient or even unable to solve the problem when the system becomes highly complex. Approximation methods based on CI techniques can be used in these challenging scenarios, which are quite often able to achieve an adequate solution within a reasonable amount of time. Building the connections between the target problem and the mathematical tool (i.e., CI algorithms) is a key step to solving complex problems using CI techniques. Moreover, for a specific problem, the CI technique should be modified accordingly in order to achieve the best result, if necessary. Although CI has shown great promises in dealing with highly complex power systems, some
“killer applications” are desirable to corroborate its superiority in handling some kinds of practical problems. Meanwhile, more theoretic research should be carried out to justify its performance (e.g., convergence, optimality, sensitivity to initial values, etc.) in a more systematic fashion.