Summary and Conclusion

Batch arrival retrial queueing models with negative customers and fluctuating modes of service are considered in this thesis.

Batch arrival retrial G-queue with fluctuating modes of service, admission control and feedback is analysed in Chapter 2. In Chapter 3, batch arrival retrial queueing system with negative customers, fluctuating modes of service, feedback and randomized vacation is discussed. Chapter 4 is an extended model of Chapter 3 by the inclusion of orbital search. Chapter 5 deals with non-persistent batch arrival retrial G-queue with fluctuating modes of service, random breakdown and repair. Single server batch arrival retrial G-queue with fluctuating modes of service, random breakdown and delayed repair is presented in Chapter 6. Batch arrival retrial G-queue with fluctuating modes of service, priority, random breakdown, delayed repair and orbital search is analysed in Chapter 7.

All the models are mathematically formulated and investigated using supplementary variable technique. The joint distributions of the server state and the orbit length under steady state are derived. Mean orbit size, mean system size, availability of the server and failure frequency of the server are obtained. Stochastic decomposition law is verified and special cases are deduced. Numerical results are carried out to analyse the effect of parameters on the performance measures.

Batch arrival retrial G-queue with fluctuating modes of service is applied in many practical situations. For example in a multi processor computer system, programs are submitted to the system in the form of instructions. Prior to execution, the submitted programs reside in the computer memory. Instructions in the program are admitted into the processor in batches. If the processor is busy they are placed in the instruction queue. The computer provides service by means of multi processors. Each processor is capable of providing specialized services. The
choice of service is made during the submission of the instruction. Viruses are programs that lead to the system failure. In the queueing scenario instructions, processor, specialized services, computer memory, virus correspond to positive customers, server, modes of service, orbit and negative customers respectively.
Future Work

- The models may be analysed in fuzzy environment.
- Busy period distribution may be derived for all the models.
- Cost analysis can be done to study the managerial aspects of the proposed models.