Concluding remarks and suggestions for further study

In this thesis we have introduced and studied the notion of environment dependent server interruption and server vacation in queueing systems. Both random environment and Markovian environment are considered. Queueing systems with customer and server induced interruption have been extensively discussed in literature. In all cases the interruption is induced by some factors. These factors are called environmental factors. Sometimes these factors are interrelated. In this work we study different queueing models with environment dependent interruption and vacation. In the second chapter we analyzed a queueing model with interruption due to a finite number of environmental factors in which the interruption remains unidentified until a random amount of time elapses. The interruption is controlled by two clocks. In chapter 3 all the assumptions are same as in the second chapter except the interruption is inducing environmental factors are the states of a Markovian chain. In chapter 4 we have studied a queueing model with partially ignored interruption in Markovian environment. We introduced two clocks in the model to determine whether to resume or restart the service. Then we proceeded to a queueing model with totally ignored interruption (Chapter 5). We introduced the notion of self correction in this chapter.

Chapter 6 - chapter 8 discuss queueing models with environment dependent vacation. In chapter 6 we considered a queueing model with $n+1$ types of environment dependent vacations. The vacations are taken at the end of a nonzero busy period. We derived a formula to calculate the expected queue length and expected waiting time. In the 7th chapter we
obtained stochastic decomposition of expected queue length and expected waiting time of an $M/M/1$ queue with environment dependent working vacation. In the last chapter (chapter 8) we considered an $M/G/1$ queue with two types of vacation - normal vacation and working vacation. The type of vacation the server selects after service, is based on the environment. Since the models are not analytically tractable, a large number of numerical illustrations were given in each chapter to illustrate the working of the systems.

Extensions of the work reported in the thesis to the case of arbitrary distribution especially those in chapters 2-7 is being taken up. As a first step we replace exponential distribution by phase type distribution for service and vacation and go for Markovian arrival process.