CHAPTER 8

CONCLUSION AND FUTURE WORK

In this research, an inventory model is formulated with demand dependent unit cost with possible inequality constraints like limited warehouse space, restricted investment amount and finite number of orders. The objective of the inventory model is to minimize the annual total cost under the mentioned constraints. The proposed model is solved using Karush Kuhn-Tucker conditions with demand rate, lot size and shortage level as decision variables. The sensitivity analysis has been presented for possible inequality constraints and various values of the parameter.

The results from the research consists of the optimal values of the unit price, lot size, shortage level, lead time and the demand that minimizes the annual total cost. The values are obtained by varying the parameter under possible constraints like limited storage space, percentage of utilization of volume of the warehouse space, finite amount of investment and allowable orders. The effect of the parameters on the decision variables and the objective function is explained through graphical representation.

In the inventory problems, credit can have significant influence on the inventory decisions, that is, ordering quantity and ordering cycle length.

In a real world situation, the objective function, the constraints and the cost parameters are imprecise in nature. Hence, a decision maker may impose these terms under fuzzy environment. Here the unit price is taken
under fuzzy environment with linear membership function. Similarly, in practical situations, resources like warehouse space, number of orders etc are also imprecise in nature. Hence, in future, any of the cost parameters or resources can be taken in fuzzy environment. The proposed model presented here is quite general and can be applied to the real inventory problems faced by the practitioners in industry or in other areas.

**FUTURE WORK**

Fuzzy geometric programming technique can also be applied for this model for improvement of the value of annual total cost. Parameters like demand, lot size and lead time can also be fuzzified.

The models developed in this research can help the practitioners who are faced with uncertain demands that do not follow a probability distribution. Moreover, the demand or other parameters of the problem may take uncertain forms like stochastic or rough as well. Some other probability density functions rather than uniform and exponential may be considered for the time between replenishments. The problem can also be extended for more than one item and other constraints like restrictions on setup cost and budget limitations.

In the future, it may be interesting to examine a scenario in which the system deals with stochastic consumer demand as well as stochastic lead time in order to define the system more accurately. Considering a multi-period system and planning of the prices of the product as a dynamic pricing may be a scope for future research. In this case, conducting more numerical tests to justify the developed algorithm would be necessary. Additionally, uncertainty of costs and demand parameters can be taken into account in the model, and new solution methodologies including uncertainty can be developed via fuzzy models.
The multi-item model is solved by KKT technique. In future this model can be extended by taking deterioration parameter as fuzzy.

The present analysis can be easily extended to other types of inventory models with finite replenishment, fully or partially backlogged shortages, varying time horizon etc. Hence, the determination of the exact weights for the multi objective fuzzy inventory models and their solutions may be the topics of the future research.