

Inventory Optimization

Nita H. Shah  
Mandeep Mittal *Editors*

---

# Soft Computing in Inventory Management

 Springer

# Retailer's Optimal Ordering Policy Under Supplier Credits When Demand is Fuzzy and Cloud Fuzzy



Nita H. Shah and Milan B. Patel

**Abstract** This paper deals with retailer's optimal ordering inventory model under fuzzy and cloud fuzzy environment. In this study, crisp model is considered first and then by assuming demand rate as triangular fuzzy number and cloud triangular fuzzy number the model is formulated and solved. Extension of Yager's ranking index is utilized for defuzzification in cloud fuzzy model. The objective of the present work is to minimize the total inventory cost and to compare the results obtained by the existing crisp model. With the help of numerical examples for different cases under different environments, optimal solutions are compared and analysed by performing sensitivity analysis. For better visualization of results, graphical representation of solutions is given.

**Keywords** Inventory · Fuzzy demand · Cloud fuzzy demand · Deterioration · Delay in payments

## 1 Introduction

Among many of the factors affecting the performance of a business firm, management of inventory system is considered to be one of the most important aspects, as it directly affects the profit of the firm and the satisfaction of customers. From a small retailer shopkeeper to large industries always keep on applying new business tactics in order to attract new customers and to increase sales of their products. Out of these many business tactics, an idea implemented by many such suppliers is to provide a cash discount or grace period (i.e. trade credit period) to their customers in order to pay for the consignment. In such cases, it becomes indispensable for the retailer to make a balance between the situation of stock-out and the situation of overstocking. This study aims at modelling such phenomenon under uncertain demand rate and to provide retailers an optimal ordering policy when supplier offers some trade credit period.

---

N. H. Shah (✉) · M. B. Patel  
Department of Mathematics, Gujarat University, Ahmedabad, Gujarat 380009, India