



An integrated production-distribution inventory system for deteriorating products in fuzzy environment

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Abstract

A key issue for the organization of responsiveness to uncertainties is intelligent manufacturing design of a complex production inventory system. To effectively handle imprecision or uncertainty, fuzzy methodologies provide a useful way to model vagueness in human recognition and judgment. Fuzzy numbers are frequently used in applications to ensure easy handling of the realistic problem. Priyan and Uthayakumar (2015) proposed an integrated production-distribution inventory system for deteriorating products that involve fuzzy deterioration rate and variable setup cost environment. They offered strategic decision-making to produce and supply products to minimize total system cost under fuzzy deterioration rate and variable setup cost environment. In this paper, their model is extended by considering the demand, production rate, deterioration rate, holding cost for both the vendor and the buyer and the ordering cost for the buyer as the triangular fuzzy number and the setup cost as a function of capital expenditure. Signed distance method is used to defuzzify the total cost and differential calculus optimization technique is employed to find optimal solutions of the model. Numerical example and sensitivity analysis are depicted to feature the contrasts among crisp and the fuzzy cases.

Keywords

Triangular fuzzy number; signed distance method; inventory costs; logarithmic function.

AMS Subject Classification

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1. Introduction

Inventory collaboration schemes involve mechanization of a company's replenishment processes as well as the connection of buyers and suppliers circle with real-time forecast, inventory on-hand, optimal lot sizing, quality improvements and inspections, and shipment information to reduce inventory and eliminate unnecessary expenses. Henceforth, cooperation and integration are in hot board of supply chain management. The main goal of supply chain and inventory management research is to reduce unnecessary costs without sacrificing customer service. Our main objective is to study the impact and sensitiveness of the impreciseness of cost components in the