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An Economic Order Quantity Model for Deteriorating Items with Ramp Type Demand, Time Dependent Holding Cost and Price Discount Offered on Backorders

Authors : Arjun Paul, Adrijit Goswami

Abstract : In our present work, an economic order quantity inventory model with shortages is developed where holding cost is expressed as linearly increasing function of time and demand rate is a ramp type function of time. The items considered in the model are deteriorating in nature so that a small fraction of the items is depleted with the passage of time. In order to consider a more realistic situation, the deterioration rate is assumed to follow a continuous uniform distribution with the parameters involved being triangular fuzzy numbers. The inventory manager offers his customer a discount in case he is willing to backorder his demand when there is a stock-out. The optimum ordering policy and the optimum discount offered for each backorder are determined by minimizing the total cost in a replenishment interval. For better illustration of our proposed model in both the crisp and fuzzy sense and for providing richer insights, a numerical example is cited to exemplify the policy and to analyze the sensitivity of the model parameters.

Keywords : fuzzy deterioration rate, price discount on backorder, ramp type demand, shortage, time varying holding cost
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