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A Robust Optimization Approach to an Inventory System with Emergency Lateral Transshipment

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Abstract

This paper considers a single echelon inventory system with two retailers. We assume that when a stockout occurs at one retailer, its demand can be fulfilled from the other retailer. This policy is known as *emergency lateral transshipment*. Using emergency lateral transshipments can be beneficial in order to improve service levels and to reduce system costs. This problem has been studied in the past using stochastic optimization, which needs full knowledge of the demand distribution. We assume that the distributional information on demand is not available, and it is only known that the demand in each period of a finite planning horizon takes a value in a known interval. The robust optimization is a powerful approach in dealing with this situation. In this paper, we first propose an inventory control model for emergency lateral transshipments. Then, to deal with the uncertainty of the demand, we apply a robust optimization approach through formulating a robust linear programming model. Moreover, resorting to duality theory, an equivalent robust optimization model is obtained which allow the solution to be delivered more efficiently.

Keywords

Inventory control, Emergency lateral transshipment, Demand uncertainty, Finite planning horizon, Robust optimization.

Biography

Hamed Tayebi is an assistant professor of Industrial Engineering at Islamic Azad University, Karaj branch, Iran. He holds a B.A. in Industrial Engineering from Isfahan University of Technology, and M.S. and Ph.D. degrees in Industrial Engineering from Sharif University of Technology. His research interests are in Supply chain management, Logistics, and inventory control. The courses he teaches include Inventory control, Queuing theory, and Stochastic processes.

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