سمینار علمی دانشکده مهندسی صنایع

Optimal Joint Replenishment and Transshipment Policies in a Multi-Period Inventory System

Hossein Abouee Mehrizi

Assistant Professor of University of Waterloo

Abstract : Mismatch between supply and demand when the uncertainty of the demand is high and the supply lead time is relatively long such as seasonal good markets can result in high overstocking and understocking costs. In this paper we propose proactive transshipment as a powerful mechanism to mitigate themismatchbetween the supply and demand. We consider a finite horizon multi-period inventory systemwhere in eachperiod two retailers have the options to replenish their inventory from a supplier (if there is any supply) orvia proactive transshipment from the other retailer. Each retailer observes non-negative stochastic demandwith general distribution during the season and incurs overstocking/understocking costs as well as costs forreplenishment and transshipment which may be time dependent. We study a stochastic control problemwhere the objective is to determine the optimal joint replenishment and proactive transshipment policiesso as to minimize the total expected cost over the season. We characterize the structure of the optimalpolicy, and show that, unlike the known order-up-to level inventory policy, the optimal ordering policy ineach period is determined based on two switching curves. Similarly, the optimal transshipment policy is also identified by two switching curves. These four curves together partitions the optimal joint ordering andtransshipment polices to eight regions where in each region the optimal policy is an order-up-curve policy.We demonstrate that the structure of the optimal policy holds for any known sequence and combinationof ordering and proactive transshipment over time. We also show that in the optimal policy retailers tryto share the risk of the overstocking and understocking costs. We investigate the benefits of transshipment under different circumstances through a numerical study.

Biography : Hossein Abouee Mehrizi is an Assistant Professor of Applied Operations Research and Canada Research Chair at University of Waterloo. His primary research interests are modeling and analysis of complex stochastic systems, queuing theory, and stochastic processes. His primary application focus is on problems related to service industries and healthcare operations. He received his BS and MS from Sharif University of Technology in Industrial Engineering, and PhD from University of Toronto in Operations Management.

دو شنبه ۹۳/۶/۲۴ ، ساعت ۱۱:۰۰ تا ۱۲:۰۰

دانشکده مهندسی صنایع، طبقه چهام، سالن سمعی بصری