Dynamic Pricing for Perishable Products via Robust Dynamic Optimization

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Abstract
With the rapid development of technology and the ever-changing customers’ tastes, the accuracy of demand forecast decreases dramatically in recent years, especially for perishable products. This paper addresses the dynamic pricing problem for a single perishable product when demand is uncertain, in a robust framework. Different from traditional static robust mathematical programming approaches, this paper studies the pricing problem via robust dynamic programming. Both unlimited supply case and limited supply case are discussed. In particular, for the limited supply case, the property of the policy and the impact of the uncertainty are analyzed with a stationary demand. Simulation experiments show that though a little reduction of average profit is paid for the “price” of robustness, the standard deviation associated with the risk reduces significantly.

Key words: dynamic pricing, uncertainty, robust optimization, revenue management, dynamic programming

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