

The Hong Kong University of Science and Technology
Dept of Information Systems, Business Statistics and Operations Management
Dept of Industrial Engineering & Decision Analytics
Joint Seminar Announcement



Randomized Robust Price Optimization
by
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Date : **29 November 2024 (Friday)**
Time : **10:30 – 11:45 AM**
Venue : **Classroom 1034, LSK Business Building**

Abstract: The robust multi-product pricing problem is to determine the prices of a collection of products so as to maximize the worst-case revenue, where the worst case is taken over an uncertainty set of demand models that the firm expects could be realized in practice. A tacit assumption in this approach is that the pricing decision is a deterministic decision: the prices of the products are fixed and do not vary. In this work, we consider a randomized approach to robust pricing, where a decision maker specifies a distribution over potential price vectors so as to maximize its worst-case revenue over an uncertainty set of demand models. We formally define this problem – the randomized robust price optimization problem – and analyze when a randomized price scheme performs as well as a deterministic price vector, and identify cases in which it can yield a benefit. We also propose two solution methods for obtaining an optimal randomization scheme over a discrete set of candidate price vectors based on constraint generation and double column generation, respectively, and show how these methods are applicable for common demand models, such as the linear, semi-log and log-log demand models. We numerically compare the randomized approach against the deterministic approach on a variety of synthetic and real problem instances.

Bio: Xinyi Guan is an assistant professor in the Department of Logistics and Maritime Studies at the Hong Kong Polytechnic University. She obtained her Ph.D. degree in operations management from UCLA Anderson School of Management in 2024. Her research centers around developing data-driven methodologies for the problems involving decision making under uncertainty in the application areas including stochastic control and revenue management.