

Department of Information and Systems Management
School of Business and Management
The Hong Kong University of Science and Technology

Seminar Announcement

*A Customer-Item Decomposition Approach to Stochastic
Inventory Systems*

by

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Date: 20 June 2008 (Friday)

Time: 11:00 – 12:30 pm

Venue: Room 4379, ISMT Conference Room (L17/18)

~~~~~ All interested are welcome ~~~~~

### **Abstract**

Stochastic inventory problems are typically formulated as stochastic dynamic programs that use aggregate information about demand and inventory in each period, with decision variables corresponding to order quantities in these periods. Although effective for simple problems, this approach becomes intractable for more complex systems. In this talk, I will describe an alternative approach based on the so-called customer-item decomposition method. In this approach, demand is viewed as consisting of a stream of individual customers arriving over time, with a batch of such customers arriving in each period. Inventory (both in-stock, on-order, and yet to be ordered) is also viewed as a stream of individual items that are delivered over time, with a batch of such items delivered in each period. Each item is then matched to a customer, reducing the inventory control problem to making decisions about when to place an order for the item destined to a particular customer. This decision can be made, in some cases, by taking into account only the marginal cost associated with each customer-item pair. This allows the problem to be decomposed into independent sub-problems, one for each single customer-item pair. We show how these independent sub-problems can be formulated as optimal stopping problems which can be solved efficiently. This formulation also allows the direct characterization of the structure of the optimal policy. We illustrate the usefulness of the approach by studying problems involving systems with correlated demands and correlated and stochastic leadtimes for both single and multi-stage systems. (This is joint work with Yimin Yu, University of Minnesota)

### **Biography**

Saif Benjaafar is a Professor of Industrial & Systems Engineering at the University of Minnesota where he is also Director of the Industrial & Systems Engineering Division and Director of the Center for Supply Chain Research. He was a Distinguished Senior Visiting Scientist at Honeywell Laboratories and a Visiting Professor at Ecole Centrale Paris, Hong Kong University of Science and Technology, National University of Singapore, and Catholic University Leuven. He Holds PhD and MS degrees from Purdue University and a BS degree from the University of Texas at Austin. His research is in the areas of supply chain management, production and inventory systems, and service and manufacturing operations. His papers have been published in various journals including *Management Science*, *Operations Research*, *MSOM*, and *IIE Transactions*. He has served on the editorial board of several journals including *IIE Transactions*, *NRL*, *MSOM*, *POM*, and *IEEE Transactions*, among others. He is a Fellow of IIE.