The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

Applications of Joint Stochastic Orders in Arrangement and Allocation

by

Prof. J. George SHANTHIKUMAR
Richard E. Dauch Distinguished Chair
Manufacturing and Operations Management
Krannert School of Management
Purdue University

(joint work with Prof. Qi Annabelle Feng)

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Time: 10:30am-11:30am
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The Hong Kong Polytechnic University

(Conducted in English)

Abstract:
It is common in many applications one faces the problem of allocating limited budget, resources or effort among different options (subsystems). Example of such include but are not limited to financial asset allocation in investment, allocation of deductibles in insurance, allocation of compensation limits in insurance policy, inventory allocation among different locations, reliability improvement allocation in performability systems, and spare parts allocation in maintenance. In these problems one needs to understand whether a seemingly "fair", as opposed to a seemingly "unfair," allocation would result in better profitability or system performance. For example, should one allocate more inventory to a location with a larger demand or one with a lower transportation cost, or should one impose a higher deductible to a riskier insured asset? Answers to such questions boils down to understanding the joint stochastic ordering in arrangement. In this study, we provide a general framework to model a system consisting of multiple subsystems. Each subsystem's performance depends on the allocation policy and some random parameters. Our interest is in identifying the conditions on the response function of the subsystems, the system performance function and the random parameters under which the random system performance as a function of the resource allocation has stochastic arrangement increasing property. This allows one to substantially reduce the number of allocation that needs to be searched to identify an optimal allocation that maximizes the expected utility derived from the system response as a result of the resource allocation.

(This presentation is based on the joint work, titled "Arrangement Increasing Resource Allocation," with Prof. Qi Annabelle Feng)

Bio:
Prof. J. George Shanthikumar is the Richard E. Dauch Distinguished Chair in Manufacturing and Operations Management at Krannert School of Management, Purdue University. He was previously a Chancellor's Professor of Industrial Engineering and Operations Research at the University of California, Berkeley. His research interests are in integrated interdisciplinary decision making, model uncertainty and learning, production systems, queueing theory, reliability, scheduling, semiconductor yield management, simulation and stochastic processes. He has published over 300 papers on these topics and 3 books—*Stochastic Models of Manufacturing Systems* (with John A. Buzacott) and *Stochastic Orders and Their Applications* and *Stochastic Orders* (with Moshe Shaked). He has extensively consulted for various companies including Applied Materials, Bellcore, IBM, KLA-Tencor, Nippon Telegraph and Telephone (Japan), Intel, Intermolecular, ReelSolar, Safeway, Southern Pacific Railways, Advanced Micro Devices, International Business Machines, Intel, LSI, Motorola, Texas Instruments, Toshiba, Fujitsu, Taiwan Semiconductor Manufacturing Company, and UMC. He is an advisory consultant for Sensor Analytics and a member of the technical advisory board of Inter Molecular Inc. and Reel Solar, Inc.

Please email to **eunice.yt.wong@polyu.edu.hk** for enquiries.

All are welcome!