Program
Date: 27 February 2008 (Wednesday)
Time: 2.00 – 4.15 pm

2:00 - 2:45 pm  Value chain management for commodities: a case study from the chemical industry by Prof Hans-Otto Günther, Technical University of Berlin.
2:45 - 3:15 pm  Tea Break
3:15 - 3:45 pm  Capacity Reservation for Time-Sensitive Service Providers by Prof Jeff Hong, Hong Kong University of Science and Technology
3:45 - 4:15 pm  Optimization under Partitioned Information by Prof Leon, Victor Jorge, Texas A&M

Venue: EA 06-03, Faculty of Engineering, NUS

Value chain management for commodities: a case study from the chemical industry
By Prof Hans-Otto Günther, Technical University of Berlin, Department of Production Management

Abstract
A global value chain planning model for application in the production of chemical commodities is presented. Major modules of the model formulation reflect sales, distribution, production, and procurement activities. The focus of the modelling approach is on dynamic pricing for spot sales demand and on the coordination of sales and supply decisions throughout the entire value chain. To consider the volatility of spot sales prices and demand, respective price-quantity functions are derived. The objective of the model is to maximize profit by coordinating all activities within the supply chain from sales to procurement by volume and value.

About the speaker
H.-O. Günther is the chaired Professor of Production Management in Department of Industrial Management at the Technical University of Berlin, Germany. He received his Masters degree in Management from the University of Saarbrucken and PhD degrees from the Free University of Berlin and the University of Mannheim, Germany. Dr. Günther is the Managing Editor of the journal “OR Spectrum: Quantitative Approaches in Management”, and editorial board member of a number of journals. He has published widely in journals such as International Journal of Production Research, European Journal of Operational Research (EJOR), OR Spectrum, etc., in the areas such as production and operations management, automated manufacturing and assembly systems, logistics, and operations research. He has also authored and co-authored several books on Production Management / Production and Logistics. His current research interests include supply chain management and advanced planning systems, logistics control in container port terminals, operations planning and scheduling in process industries, and simulation and optimization of printed circuit board assembly.

Capacity reservation for time-sensitive service providers
By Prof Jeff Hong, The Hong Kong University of Science and Technology, Department of Industrial Engineering and Logistics Management

Abstract
This paper studies a capacity management problem in which a facility provider offers its facility to two service providers. The facility provider can either pool the service providers together to share the facility or reserve a dedicated facility for the service providers. The service providers determine their service capacity levels to serve each market with linear time-sensitive demand. We assume that both the facility provider and the service
providers maximize demand rates. We find that the facility provider's optimal capacity strategy critically depends on the ratio of the service providers’ demand loss rates, which are the demand loss per unit time increase. The facility provider prefers the reservation strategy to the pooling strategy if one service provider's demand loss rate is fourteen times larger than the other's. Otherwise, the facility provider prefers the pooling strategy. From the service providers' perspective, the dominant service provider prefers the reservation strategy if its demand loss rate is four times larger than the other's. In contrast, the smaller service provider, whose demand loss rate is less than the other's, prefers the pooling strategy.

About the speaker

L. JEFF HONG is an assistant professor in industrial engineering and logistics management at The Hong Kong University of Science and Technology. His research interests include Monte-Carlo method, sensitivity analysis and simulation optimization. He is currently associate editors of Naval Research Logistics and ACM Transactions on Modeling and Computer Simulation.

Optimization under partitioned information

By Prof Leon, Victor Jorge, Texas A&M, Departments of Industrial and Systems Engineering and Engineering Technology and Industrial Distribution

Abstract

A linear optimization problem can be expressed as:

Minimize $cx$

subject to $Bx \geq b$.

Where, the $n$-dimensional vectors $x = (x_1, \ldots, x_n)$ and $c$ are the variables and objective function coefficients, respectively. Further, the constraints are defined in terms of an $m$-dimensional vector $b$ is, and an $m \times n$ matrix $B$. An instance of the linear program is specified by the data ($c$, $B$, $b$). If the variables and data in ($x$, $c$, $B$, $b$) are a priori partitioned into $p$ information subsets, $P_i = (x_i, c_i, B_i, b_i)$, $i = 1, \ldots, p$, such that the information in different subsets cannot be directly combined to solve the problem, then the resulting problem is termed optimization under partitioned information (PI).

The study of PI is important because it manifests in a variety of real life scenarios. The ubiquitous information networks and their multiple applications to remote collaborations and interactions among multiple enterprises exacerbate the importance of PI problems. For instance, supply-chain inventory management requires that the overall inventory costs are minimized. Companies in the supply chain are usually heterogeneous, possibly competitors, and most likely in different countries. Under these circumstances, it may be unrealistic to require that all participants in the supply chain openly provide sensitive cost and capacity information. More realistically, the companies would like to operate efficiently as a supply chain but without disclosing private information. Similar examples are observed in the contexts of scheduling, resource allocation, design, and many other scenarios involving collaborating entities. This line of research has potential for implementations in virtual enterprises, web-based applications, and other distributed environments.

This talk will apply PI in the context of supply-chain inventory management. Specifically, we will describe a method developed to solve the single-product, dynamic demand, multi-echelon lot-sizing problem, where each objective functions is private information to the corresponding facility, and delivery policies are shared only between adjacent facilities. Experimental results suggest that the proposed methodology performs similar to competing methods that have unrestricted access to information.

About the speaker

Dr. Leon is the Allen-Bradley Professor at Texas A&M University (Texas-USA) where he holds a joint appointment in the departments of Industrial and Systems Engineering, and Engineering Technology and Industrial Distribution. His interests are in the areas of operations modeling and applied optimization. Dr. Leon's research work has been sponsored by the National Science Foundation, the U.S.A. Army, the National Aeronautical and Space Agency (NASA), and the high-tech industry, among others. Dr. Leon has received several recognitions at Texas A&M University including the Halliburton Professorship Award, the 3M Fellowship, the Ford Faculty Fellowship, and the Center for Teaching Excellence Award. Dr. Leon is the Program Director of the Manufacturing and Mechanical Engineering Technology program at TAMU (2000-present), and the Editor of the Journal of Manufacturing Systems (2004-2007). Dr. Leon is a member of ASEE, IEE, INFORMS, and SME.

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