

# Industrial & Systems Engineering Seminar

**Wednesday, October 20, 2010**

3:15 PM – Refreshments before the seminar

3:30 PM – Graduate Seminar

**Mechanical Engineering Room 4125 A & B**



## *Managing Capacitated Multiechelon Systems with Domain-Optimal Policies*

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### **Professor Alexandar Angelus**

Associate Professor of Operations Management  
Singapore Management University  
Lee Kong Chian School of Business

We consider a multiechelon system with stochastic demand and processing capacity constraints at each stage. When the smallest capacity is at the lowest echelon, we identify an inventory domain, a subset of the feasible state space characterized by a high level of pipeline inventory, where this system, in the spirit of Clark and Scarf (1960), preserves additive convexity of the objective function. We show the form of the optimal policy to be a state-dependent echelon basestock policy, whose novel feature is that the optimal inventory decision at each stage is determined (only) by echelon inventories upstream of that stage, in a piecewise linear manner. We conduct a numerical study to evaluate the heuristic performance of this policy for a capacitated system with no pipeline inventory constraints. The results demonstrate that the policy yields an excellent approximation to the optimal cost across a wide range of model parameters at high system utilizations.

**BIO:** Alex Angelus is an Associate Professor of Operations Management at Singapore Management University (SMU). He holds a Ph.D. from the Graduate School of Business at Stanford University, and a B.S. from Massachusetts Institute of Technology. After receiving his Ph.D., Alex joined a management consulting firm, where he specialized in valuing capacity investments under uncertainty, developing commodity price and volatility forecasts, and pricing options on real assets. During his years in the consulting industry, he encountered a variety of multiechelon problems whose solution seemed to elude both practice and research. Consequently, he decided to go back to academia to work on solving some of them, and those problems now form the core of his research agenda. He is currently wrestling with multiechelon systems under secondary market sales, capacity constraints, multiple supply sources, and assembly structures. Help is always welcome and invited.

**FOR MORE INFORMATION ON DR. ANGELUS' RESEARCH, please visit:**

[http://www.business.smu.edu.sg/faculty/operations\\_management/angelus.asp](http://www.business.smu.edu.sg/faculty/operations_management/angelus.asp)