NYU Stern School of Business
Department of Information, Operations & Management Sciences
OPERATIONS MANAGEMENT RESEARCH SEMINAR

TOPIC: Approximation algorithms for Stochastic Inventory models: Two applications in industry
SPEAKER: Mahesh Nagarajan (University of British Columbia)
DATE: Wednesday, March 30, 2016
TIME: 11:00 AM-12:00PM
PLACE: KMC 3-60

ABSTRACT

In this talk, we look at two well known and somewhat well studied stochastic inventory problems. The first is a periodically reviewed Random Yield problem with correlated yield and correlated demand. This problem is known to be hard. In fact, the standard random yield model with i.i.d. problem parameters is itself unwieldy and a host of numerical recipes have been proposed in the literature. We use a variant of the so-called linear inflation heuristic to construct the first known approximation algorithm with a constant guarantee to the yield problem. We then discuss its application to a capacity and inventory management problem with a partner firm, Dow Agro Sciences. The second is a periodically reviewed stochastic inventory problem with N products where demand is random and products share a common capacity. Instances of this problem where no restrictions are imposed except that demands are independent over time are known to be NP-Hard and beyond the obvious implications of convexity, not much is known about the optimal policy. We propose a class of weighted shortfall based policies and show their theoretical properties and performance against a lower bound. We also link these policies to a policy class that can be intuited by looking at an ADP version of this problem. We discuss an application to the B.C. Children's hospital, where we use some of these results and insights to manage surgical capacity for elective surgeries.

BIO

Mahesh is an Associate Professor of operations research and logistics at the Sauder school of business., UBC He holds the Alumni Chair in stochastic optimization. He has been at Sauder since 2004 and is the division chair of the division. His research areas include cooperative game theory, mechanism design and stochastic inventory theory.