DEPARTMENT OF INDUSTRIAL AND ENTERPRISE SYSTEMS ENGINEERING
GE/IE 590 SEMINAR

A Stochastic Programming Based Approach to Assemble-to-Order Inventory Systems

Marty Reiman
Distinguished Member-Technical Staff
Industrial Mathematics & Operations Research
Alcatel-Lucent Bell Labs

Abstract

The assemble-to-order system is a classical model in inventory theory, in which multiple components are used to produce multiple products. All components are obtained from an uncapacitated supplier after a deterministic (component dependent) lead time, while demand for the products is random. The optimal control for this system (where the goal is to minimize the long run average inventory + backlog cost) is not known except for some very special cases. In this talk I will describe an approach to solving this problem using a particular multi-stage stochastic linear program with complete recourse, which we have shown provides a lower bound on achievable cost in the inventory system. Our approach requires translating the solution of this stochastic program into a control policy for the inventory system. I will describe how to do so, focusing on two special cases. I will also present a set of sufficient conditions under which a control policy achieves the lower bound (and is hence optimal), and show some examples where this occurs. Finally, I will outline how a modified version of these sufficient conditions can be used to prove asymptotic optimality of our control policy.

(Based on joint work with Mustafa Dogru and Qiong Wang)

Biography

Marty Reiman is a distinguished member of the technical staff in the Industrial Mathematics and Operations Research department of Alcatel-Lucent Bell Labs in Murray Hill, NJ. He has been at Bell Labs since receiving his Ph.D in operations research from Stanford University in 1977. His research has focused on the analysis, optimization and control of various stochastic service systems, with an emphasis on fluid and diffusion limits. His work has been motivated by problems in communication, computing and manufacturing systems. Dr. Reiman has been an associate editor and area editor of Mathematics of Operations Research, as well as an associate editor of the Annals of Applied Probability. He has served as chair of the Applied Probability Society of INFORMS and is an INFORMS Fellow.

Location: 303 Transportation Building
Date: Thursday, April 18, 2013
Time: 4:00 p.m.