

*The Department of Engineering Management, Information,
and Systems*

would like to announce...

Inventory Routing Problems

A Dissertation Defense Presented By

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(Advisor Eli Olinick)

Monday, November 9, 2015

10:00-11:00 a.m.

Cullum Family Conference Room, Caruth 347

Abstract: This dissertation addresses vehicle routing and inventory control in Inventory Routing Problems (IRPs). It closes a gap in the literature by proposing and evaluating exact and heuristic algorithms for the selective delivery and pickup vehicle routing problem (VRP) with the objective of maximizing profit by accepting unscheduled deliveries during a time-limited trip from the vehicle's origin to its scheduled destination. The dissertation also determines the optimal on-hand inventory level for a manufacturer replenishing supply at a retailer who places orders at random time intervals as a result of random customer arrivals.

We present a compact mixed integer program (MIP) for the selective delivery and pickup problem with the objective of maximizing profit by accepting unscheduled deliveries during a time-limited trip. The MIP is inspired by a novel formulation of multicommodity flow that significantly reduces the size of the constraint matrix and the linear programming upper bound compared to a model based on the classical approach. This in turn leads to faster solution times when using commercial MIP codes, as we demonstrate in an empirical study.

We also consider a production lot sizing problem consisting of customers, one retailer, and one manufacturer. The inventory processes at both the manufacturer and the retailer are renewal processes that are difficult to solve analytically for a general distribution of order arrival time. The elements that are difficult to solve turn out to have the form of the Volterra equation of the second kind, which does not have a closed-form solution. Therefore, a numerical search procedure is developed to obtain the optimal solution to the problem. Employing this approach, the dissertation investigates how optimal solutions in different cases will change over the spectrum of some key parameters of the problem.

Bio: Yuanyuan Dong is a candidate for the Ph.D. in Operations Research in the department of Engineering Management, Information, and Systems. She received her Master's degree in Management Science from Nanjing University in 2006, and her Bachelor's degree in Civil Aviation Transportation from Nanjing University of Aeronautics and Astronautics, Nanjing, China, in 2003.

Everyone invited and welcome!