Industrial Engineering
Seminar Announcement

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“Discrete Two-Stage Stochastic Mixed Integer Programs with Applications to Airline Fleet Assignment”

Stochastic programming (SP) is an optimization technique that incorporates random variables as parameters. In this talk, we will discuss a two-stage SP approach applied in the airline fleet assignment problem, in which the first stage makes only a higher-level aircraft family-assignment decision, while the second stage performs subsequent family-based type-level assignments according to potential market demand realizations. We will describe decomposition-based solution approaches in concert with a polyhedral analysis of the model, and present computational results to exhibit the efficacy of the stochastic model and the proposed algorithms.

We will also introduce a decomposition-based branch-and-bound (DBAB) algorithm for solving generally-formulated two-stage stochastic mixed-integer programs (SMIPs) having continuous and binary variables in both stages. A branch-and-bound algorithm is designed based on a hyperrectangular partitioning process. A modified Benders' decomposition method is developed, where the Benders' subproblems define lower bounding second-stage value functions of the first-stage variables that are derived by sequentially constructing a certain partial convex hull representation of the two-stage solution space. Computational results will be reported to demonstrate the efficacy of this algorithm.

Thursday, January 26, 2006
1:30 – 2:20 p.m.
403 Electrical Engineering Building I