SEMINAR NOTICE

Department of Electrical and Systems Engineering

RECOURSE MODELING FOR THE AIRLIFT PROBLEM WITH RANDOM GROUND TIMES

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Stochastic programming is concerned with the study, analysis and solving of mathematical programming problems where some parameters or data are uncertain. A common way of modeling uncertainty in optimization problems is using recourse models, where long-term anticipatory decisions must be taken without full knowledge of random parameters and short-term corrective decisions are available as recourse actions.

Large-scale military deployment requires transporting equipment and personnel over long distances in appointed time windows, namely airlift problem. Finding the right allocation of given airlift resources to achieve maximum delivery efficiency is one of the primary aims of air mobility analysis. Several models exist in the literature to study this kind of problem. One common weakness of these models is the assumption that no random factors exist in the system. Generally, such type of models are over-optimistic and lack robustness when applied to a real airlift system full of random factors, such as weather condition, unexpected required maintenance service, and so on.

In this thesis, we introduce the use of recourse modeling technology, and present two studies on the airlift problem, where the ground times of aircraft are assumed to be random with a finite sample of scenarios, by the application of this modeling technology. This problem is from the Air Mobility Command headquartered at Scott Air Force Base, IL. The objective is to deliver a list of cargo with a given fleet of aircraft while minimizing the amount of late cargo.

In the first study, we first simplify the deterministic NRMO model to best describe our airlift problem. We then modify and extend the simplified model to a two-stage stochastic model by applying the recourse modeling technology. Relative to the corresponding deterministic model, this stochastic model is encouraged to select the efficient routes by anticipating potential bottlenecks in the system, and prevent unreliable aircraft from using capacity limited airfields. In the second study, we treat the airlift problem as a multistage stochastic decision problem, and represent this decision problem as sequences of two-period simple decision problems, and then implement the 'real' decision process by embedding stochastic optimization models in a simulation.

DATE:	Thursday, March 23, 2006
TIME:	11:00 a.m.
PLACE:	Bryan Hall, Room 305

Research Advisor:
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This seminar is in partial fulfillment
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SCHOOL OF ENGINEERING & APPLIED SCIENCE