

Department of Applied Mathematics and Statistics
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STUDENT SEMINAR

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304 Whitehead Hall
4:00 p.m.

**SOLVING AIRLINES' PILOT-COPILOT ROSTERING PROBLEM
BY SUCCESSIVE BIPARTITE WEIGHTED MATCHING**

ABSTRACT

In this talk, we introduce an important problem in the operation of airlines: modeling of and algorithmic design for crew rostering. We model the crew rostering problem as a multi-objective 0–1 integer program with some nondeterministic parameters. While satisfying the constraints stemming from the nature of the problem and the airlines' rules and regulations, the objectives are to let all pilots (respectively, copilots) in the same fleet at the same hub have approximately equal cumulative flying time. We build a sequential constructive heuristic algorithm to find a satisfactory solution. The basic idea is to sequentially decompose the dispatching process into a series of subphases. In each subphase, we partition the partial rostering problem into three subproblems. Each of the three subproblems can be formulated as a bipartite weighted matching problem. We design a network flow method to solve this bipartite weighted matching problem. We also present numerical simulation, in which the overall algorithm is tested for its effectiveness and efficiency.