VCU Discrete Mathematics Seminar

Chance-constrained reliably-connected network design

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Tuesday, Oct. 29
12:30–1:20
4119 Harris Hall

We study solution approaches for the design of reliably connected networks. Specifically, given a network with arcs that may fail at random, the goal is to select a minimum cost subset of arcs such the probability that a connectivity requirement is satisfied is at least 1-ϵ, where ϵ is a given risk tolerance. For simplicity, we talk about the problem of requiring an s-t path to exist with high probability in a directed graph.

We model each problem as a stochastic integer program with a joint chance constraint, and present two formulations that can be solved by a branch-and-cut algorithm.

Computational results demonstrate that the approaches can effectively solve instances on large graphs with many failure scenarios.