

Oberseminar Theoretische Informatik
Sommersemester 2010

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**Two-Stage Stochastic Steiner Tree: Models
and Exact Solution Strategies**

Mo, 5.07.2010 um 14 Uhr (c.t.) im SR 3319 (Ernst-Abbe-Platz 2, 3. Stock).

We consider the Steiner tree problem under a 2-stage stochastic model with recourse and finitely many scenarios (SSTP). Thereby, edges are purchased in the first stage when only probabilistic information on the set of terminals and the future edge costs is known. In the second stage, one of the given scenarios is realized and additional edges are purchased to interconnect the set of (now known) terminals. The goal is to choose an edge set to be purchased in the first stage while minimizing the overall expected cost of the solution. We provide a new semi-directed cut-set based integer programming formulation that is stronger than the previously known undirected model. To solve the formulation to provable optimality, we suggest a two-stage branch-and-cut framework, facilitating (integer) L-shaped cuts. The framework itself is also applicable to a range of other stochastic problems. As SSTP has yet been investigated only from the theoretical point of view, we also present the first computational study for SSTP, showcasing the applicability of our approach and its benefits over solving the extensive form of the deterministic equivalent directly.

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