

Recent advances in the branch-and-cut approach for solving stochastic integer programs

mercredi 30 juillet 2025 09:15 (55 minutes)

Stochastic integer programs model problems where discrete decisions must be made under uncertainty. This combination provides significant modeling power, leading to wide a wide variety of applications such as supply chain network design, power systems design and operations, and service systems design and operations. This combination also leads to computational challenges due to the need to consider many possible scenarios of the uncertain parameters and the exponential growth in the solution space associated with the discrete decisions. The branch-and-cut approach for solving this class of problems works by dynamically adding Benders and other cuts derived from considering each scenario independently into a main problem containing the first-stage decision variables. We will review this approach and discuss recent advances, including new techniques for efficiently generating single-scenario cuts. While I will highlight some work in my own group, the presentation will be a broad (but not exhaustive) overview of recent progress on this topic.

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Classification de Session: Plenary session

Classification de thématique: Stochastic integer programming