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Date: Friday, Feb 16, 2018

Time: 1 - 1:50 pm

Location: D3 W122

Robust Quadratic Programming with Mixed-Integer Uncertainty

Abstract: We study robust convex quadratically constrained quadratic programs where the uncertain problem parameters can contain both continuous and integer components. Under the natural boundedness assumption on the uncertainty set, we show that the generic problems are amenable to exact copositive programming reformulations of polynomial size. The emerging convex optimization problems are NP-hard but admit a conservative semidefinite programming (SDP) approximation that can be solved efficiently. We prove that this approximation is stronger than the popular approximate S-lemma scheme for problem instances with only continuous uncertainty. We also show that all results can be extended to the two-stage robust optimization setting if the problem has complete recourse. We assess the effectiveness of our proposed SDP reformulations and demonstrate their superiority over the state-of-the-art solution schemes on stylized instances of least squares, project management, and multi-item newsvendor problems.

Biography: Grani A. Hanasusanto is an Assistant Professor of Operations Research and Industrial Engineering at the University of Texas at Austin (UT). Before joining UT, he was a postdoctoral researcher at the College of Management of Technology at école Polytechnique Fédérale de Lausanne. He holds a PhD degree in Operations Research from Imperial College London and an MSc degree in Financial Engineering from the National University of Singapore. His research focuses on the design and analysis of tractable solution schemes for decision-making problems under uncertainty, with applications in operations management, energy systems, machine learning and data analytics.