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Date: Friday, Sept 8, 2017

Time: 1 - 1:50 pm

Location: D3 W122

Decentralized Generation Scheduling in Energy Networks

Abstract: Day-ahead scheduling of electricity generation or unit commitment is an important and challenging operational activity of power system operators. Mixed integer linear programming (MILP) has been firmly established as an effective technology for this problem for moderate scale integrated systems. In this work, we consider decentralized unit commitment in a large-scale network of generation systems. We develop a decomposition-coordination approach by which independent unit commitment MILP models can be integrated to achieve high quality solutions to the network-wide problem. The approach is based on the alternating direction method of multipliers (ADMM) originally developed for decentralized convex optimization. We adapt ADMM to the highly nonconvex unit commitment problem and demonstrate its computational effectiveness. A key component of this work is a strong duality result for the augmented Lagrangian dual problem of an MILP. This talk is based on joint papers with Javad Feizollahi, Mitch Costley, Andy Sun and Santiago Grijalva.

Biography: Dr. Ahmed is the Anderson-Interface Chaired Professor in the School Industrial & Systems Engineering at the Georgia Institute of Technology. His research interests are in large-scale stochastic and discrete optimization methodology, and their applications in energy and networked systems. He has over 70 publications in these areas. Dr. Ahmed was a Chair of the Stochastic Programming Society, a Vice-chair of the INFORMS Optimization Society, and is a council member of the Mathematical Optimization Society. He serves on the editorial board of various journals including Mathematical Programming, Operations Research, and the new INFORMS Journal on Optimization. Dr. Ahmed's honors include the Stewart Fellowship and the College of Engineering Dean's Professorship from Georgia Tech, the NSF CAREER award, two IBM Faculty Awards, and the INFORMS Dantzig Dissertation award.