



جلسه ارائه علمی دانشکده مهندسی صنایع

# Decentralized Mixed Integer Programming: Theory and Application in Power Systems

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## Abstract

Mixed Integer Programming (MIP) is a very strong tool for modeling and solving many real-world optimization problems. In practice, there are a lot of large-scale MIPs with specific structure of loosely coupled blocks of constraints. Fast solution time, scalability, distributed databases and data privacy motivate exploiting decentralized methods in these problems. One possible decentralized approach is relaxing the joint constraints and then solving the relaxed problem in parallel. In this research, we investigate the augmented Lagrangian relaxation and its dual for MIP problems. We show that under some mild assumptions, using any norm as an augmenting function with a sufficiently large penalty coefficient closes the duality gap for MIPs. We also propose a decentralized approach to solve large-scale unit commitment problems in rapidly growing electric power systems. We present and discuss the promising results from testing the method on large-scale power systems.

## Biography

Mohammad Javad Feizollahi is an Assistant Professor of Business Analytics in the Robinson College of Business at Georgia State University in Atlanta, GA, USA. He received his PhD and MSc in Operations Research from the School of Industrial and Systems Engineering at the Georgia Institute of Technology. He received his MSc and BSc in industrial engineering from Sharif University of Technology. His research interests include theory and application of operations research and analytics. In particular, he has been working on large-scale mixed-integer programming, distributed optimization, robust and stochastic programming, and their application in different fields such as power systems, reliability, finance, and health care.