

IE Decision Systems Engineering

Spring '22 Seminar Series

Solving Certain Type of Large-Scale Scheduling Problems via Hybrid Decomposition

Friday, February 4, 2022, 12:00PM (AZ time)
Via Zoom: <https://asu.zoom.us/j/8120740932>

Abstract

We propose an efficient solution method for the stochastic unit commitment problem with weekly-dispatched energy storage (an important large-scale scheduling problem). Using a Benders' framework, the proposed solution method decomposes the problem into a mixed-integer linear master problem, and linear and continuous subproblems. The master problem corresponds to the first-stage decisions and includes all the commitment variables and their corresponding constraints. The subproblems correspond to the actual dispatch of the generating units and the deployment of generation reserves. Based on the success of column-and-constraint generation algorithms to solve robust optimization problems, we improve the low communication between the master problem and the subproblems in the standard Benders' algorithm by adding primal variables and constraints from the subproblems to the master problem, which provides a better approximation of the recourse function. Our computational experiments demonstrate the effectiveness of the proposed decomposition method using an instance of the South Carolina 500-bus system under 40 scenarios.

Bio

Antonio J. Conejo, professor at The Ohio State University, OH, received an M.S. from MIT, and a Ph.D. from the Royal Institute of Technology, Sweden. He has published over 220 papers in refereed journals, and is the author or coauthor of 14 books published by Springer, John Wiley, McGraw-Hill and CRC. He has been the principal investigator of many research projects financed by public agencies and the power industry and has supervised 24 PhD theses. He is an INFORMS Fellow, an IEEE Fellow and a former Editor-in-Chief of the IEEE Transactions on Power Systems.



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