Engineering Management, Information, and Systems
Seminar Series

Research Seminar

An Optimization Framework for Multi-agent Demand Response

Dr. Jay Rosenberger
Professor, Director of Research Development,
Associate Director of the Center for Transportation Equity, Decisions & Dollars (CTEDD)
University of Texas at Arlington

Friday, November 22, 2019
1:30 – 2:30 p.m.
Room 383, Caruth Hall

Abstract:

This research describes a real-time optimization model for multi-agent demand response (DR) from a Load Serving Entity (LSE) perspective. Three major categories of customers and five types of energy resources are considered simultaneously. Two infinite horizon stochastic optimization models are formulated; specifically, an LSE model and a dynamic pricing customer (DPC) model. The objective of these models is to minimize long-term costs and discomfort penalties of the LSE and DPC. Because preferences of these two agents are different, the models are inseparable and difficult to solve. Deterministic finite horizon linear programs are solved as an approximation of the stochastic models and computational experiments are provided. In addition, this study develops stochastic bounds under the two-agent framework in which the DPC operate independently of the LSE, but the LSE must react to the DPC actions. Experiments show that when the two agents both have perfect information, the LSE may have an inferior objective compared with the case of in which both agents follow a mean value problem policy. Nevertheless, there are bounds when the DPC follow the same set of actions.

Biography:

Dr. Jay Rosenberger is Professor and Director of Research Development in the Department of Industrial, Manufacturing, & Systems Engineering and the Associate Director and incoming Interim Director of a US Department of Transportation sponsored University Transportation Center, called the Center for Transportation Equity, Decision, and Dollar at The University of Texas at Arlington. He is also the former Director of the Center on Stochastic Modeling, Optimization, & Statistics. His research interests include mathematical optimization and operations research in transportation, defense, and health care. He is member of both the Institute for Operations Research and the Management Science (INFORMS) and the Institute of Industrial Engineers. He is the former chair and cluster chair of the INFORMS Section on Health Applications and held four different officer positions for the Dallas-Fort Worth Chapter of INFORMS. He is currently an associate editor of Omega: The International Journal of Management Science.