DEPARTMENT of INDUSTRIAL ENGINEERING
UNIVERSITY of HOUSTON

FRIDAY SEMINAR SERIES
BROADEN HORIZONS | EXTEND MINDS

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Date: Friday, Nov 6, 2019
Time: 1 - 1:50 pm
Zoom Meeting ID: 970 7656 5407
Password: 477211

An Edge-Based Formulation for Combined-Cycle Units

Abstract: As the number of combined-cycle units increases, efficient modeling approaches for these units play important roles for independent system operators (ISOs). Based on various combinations of combustion turbines (CTs) and steam turbines (STs), the combined-cycle unit could work at different configurations (modes) with different efficiencies. In this talk, we discuss an edge-based formulation for the combined-cycle units in the unit commitment problem to improve the accuracy and effectiveness of current modeling approaches. Our formulation can 1) clearly describe the transition processes among different configurations so as to satisfy the ISO financial offer submission requirements and (2) capture physical constraints of each turbine, including the exact min-up/down time and time dependent startup cost, in the combined-cycle units so as to increase the operational flexibility while ensuring system feasibility. This model fits well with the current U.S. deregulated electricity market. The final numerical studies show that our approaches perform better than the current configuration-based modeling approach.

Biography: Dr. Lei Fan received the B.S. degree in electrical engineering from the Hefei University of Technology, Hefei, China, in 2009 and the Ph.D. degree in Industrial and Systems Engineering at the University of Florida, Gainesville, FL, USA in 2015. He was an application engineer in General Electric from 2015 to 2017. Then, he joined in Siemens Industry, Inc as a software engineer from 2017 to 2019. Currently, he is an assistant professor in engineering technology department in the college of technology at University of Houston. His research interests include the optimization of power system operations, planning, and energy market analysis.