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Date: Friday, Apr 28, 2017

Time: 1 - 1:50 pm

Location: D3 W122

Applied Optimization in Improving Energy Efficiency in Process Industries

Abstract: This seminar talk will present two optimization applications in improving energy efficiency in process industries. The first application is a multi-objective optimization of natural gas pipeline operations. Natural gas is transported by pipeline networks which serve as the most cost effective transportation means over long distances. Compressors installed in pipeline networks provide the propelling force necessary to boost the pressure of the gas to reach its destination. The two objectives considered are to minimize the fuel consumption of the compressor stations and maximize the throughput of the system. A set of constraints are developed based on the flow equations and operating conditions of the compressors. The second application is a production scheduling optimization for an ice cream processing facility. Energy efficiency has become an important aspect in manufacturing facilities including those in food processing. Traditional scheduling approaches typically do not consider energy efficiency with the optimization objectives such as make-span and tardiness. This research attempts to improve the scheduling by incorporating energy conservation constraints into the optimization model. It is proposed to adapt schedule to lower in-process product storage that requires electricity in order to maintain a low storage temperature. The model has been tested with a set of cases from the literature, and compared with the results from the scheduling models without considering energy efficiency.

Biography: Dr. Zhu (Ph.D., North Carolina State University) is an Associate Professor, directing the Zhu Lab and supervising the Manufacturing Lab at Lamar University. He has 20 years of experience in engineering research and development and has participated in the projects supported by NSF, American Bureau of Shipping, NIST, DARPA, etc. He is currently the PI of \$1.2M and Co-PI of \$1M active research grants. He has two years of experience in commercial haptic and virtual reality development, and extensive experience in computational optimization, haptics and robotics, virtual reality and augmented reality, mobile computing, multimedia learning, etc.