数学与系统科学研究院

计算数学所学术报告

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<u>报告题目</u>：

Decentralized demand side management for future smart grid networks

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计算数学所报告厅

Abstract:

Power balancing is one of the most important issues for a power grid system. However, it is challenging to achieve real-time power balancing when intermittent renewable sources, such as wind and solar powers, are mixed in the generation side. This talk considers the coordinated demand side management (CoDSM) problem for achieving real-time power balancing. Most of the existing CoDSM techniques either considered coarse appliance load models or are centralized approaches. The former are not always satisfactory for assessing the true impact of DR techniques on the power grid; while the latter require a control center for coordinating the customers in the neighborhood. Centralized control systems are not scalable since they typically require a complicated network infrastructure to support two-way communications between the control center and the customers. In view of these issues, focusing on the so called deferrable loads, this talk presents a fully decentralized CoDSM architecture and associated distributed optimization algorithms. In the proposed architecture, all the customers perform local computation and exchange messages with neighbors only. There is no uplink communication from the customers to the utility company. Simulation results will show that the proposed CoDSM algorithm can effectively improve the power balancing and reduce the cost of the utility company in the real-time market. A further issue of joint day-ahead power procurement and CoDSM problem will also be considered.

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