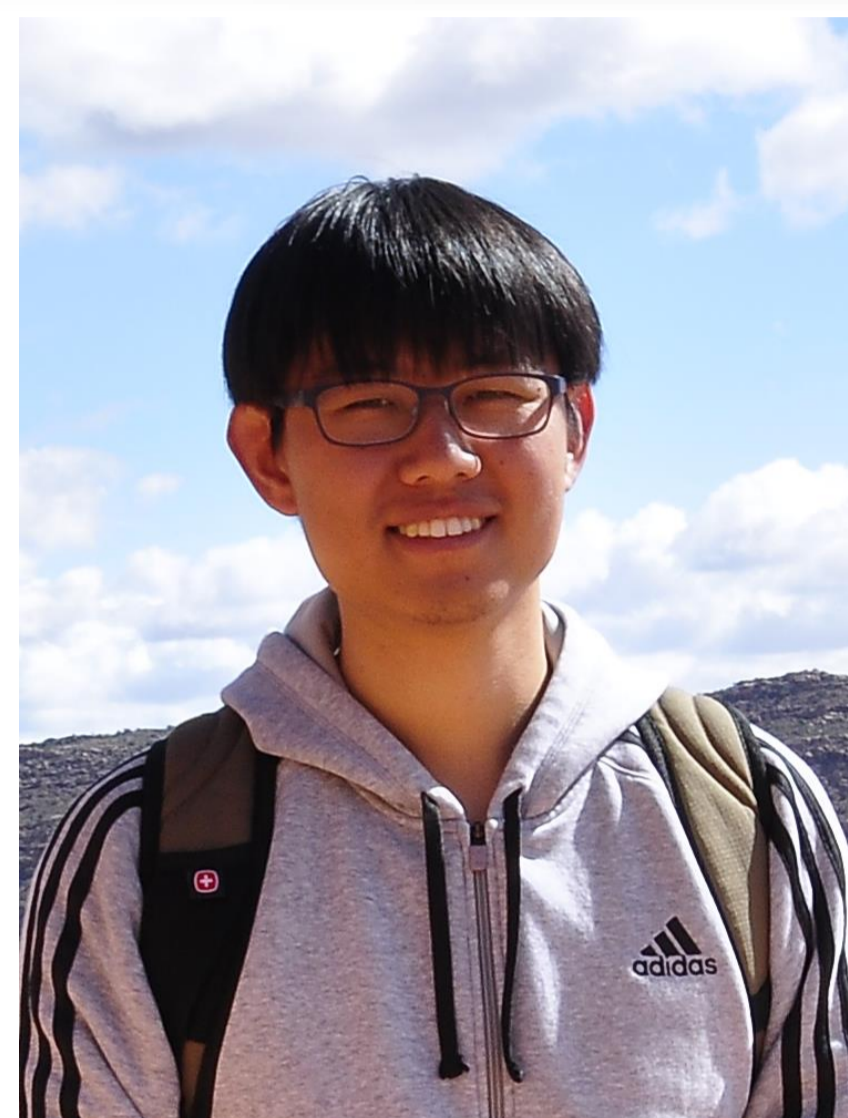




學術報告

Planning and Control of Distributed Energy Resources



报告人: Dr. Yujie Tang

California Institute of Technology, USA
Dept. of Electrical Engineering

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地点: 浙江大学工控新楼501室

Biography: Yujie Tang received the Bachelor's degree in electronic engineering from Tsinghua University in 2013, and is currently pursuing the Ph.D. degree in electrical engineering at California Institute of Technology. His research interests include optimization and control of power systems, with a particular focus on the planning and control of distributed energy resources in smart grids.

In this talk I will present my recent work on energy storage placement and real-time optimal power flow. In the first part, we consider the problem of optimally placing energy storage in distribution networks to minimize losses, analyze its structural properties when all loads have the same shape. We propose continuous trees to model distribution networks, prove that the scaled optimal storage capacity is monotonically increasing from the substation towards the leaf nodes. We prove that the locational marginal value of storage under optimal placement is equalized wherever nonzero storage is deployed and increases towards the leaves where there is zero storage deployment. In the second part, we propose a real-time algorithm for time-varying optimal power flow problems, motivated by the need to optimize over a large number of distributed energy resources on a fast timescale. We study the conditions under which the proposed algorithm has good tracking performance, and implement the algorithm by a network of controllable energy resources coordinated by an operator.