

学术报告会

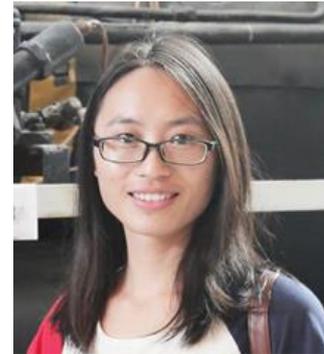
时间: 2018年3月12日(周一) 10:00-11:00

地点: 电院群楼2-410会议室

Consensus-based Distributed Energy Management and Resilient Optimization against Adversary Attacks in Network Systems

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Abstract:

In this talk, we first introduce the problem of distributed energy management for both generation and demand sides in smart grids. Different from existing works, we formulate a social welfare maximization problem for a more practical scenario by taking transmission losses into account, and the problem formulation is non-convex. To solve the problem, we transform it as a new convex optimization problem and then derive a sufficient condition to guarantee that both problems have the same optimal solution. Considering directed communication, we propose a consensus-based algorithm to solve the problem in a distributed way and prove its convergence and optimality. Then we explore the effect of adversary attacks on consensus and design a resilient optimization algorithm. We relax the assumption that the maximum number of tolerable attacks is strictly limited by the network connectivity and then propose a novel resilient algorithm. The proposed algorithm exploits trusted agents which cannot be compromised by adversary attacks and form a connected dominating set in the original graph to constrain effects of adversary attacks. It is shown that local variables of all normal and trusted agents achieve consensus under the proposed algorithm. Further, the final solution belongs to the convex set of minimizers of the weighted average of all trusted agents' local functions. Numerical results demonstrate the effectiveness of the proposed algorithms.

Biography:

Chengcheng Zhao received her B.E. degree in Measurement & Control Technology and Instrument from Hunan University, Changsha, China, in 2013. She is currently a Ph.D student at the College of Control Science and Engineering, Zhejiang University, and a visiting PhD student at the Department of Electrical and Computer Engineering, University of Waterloo. Her research interests include distributed computation and optimization in multi-agent networks, distributed energy management and synchronization in smart grid, security and privacy in distributed network systems. She received IEEE

PES-GM 2017 best conference papers award and IEEE ICCA 2017 best student paper award finalist. She also received the National Scholarship for PhD student in 2017. She is a peer reviewer for Automatica, IEEE Transactions on Information Forensics and Security, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Industrial Electronics, etc. She was the Technical Program Committee Member for IEEE GLOBECOM'17 and IEEE ICC'18.