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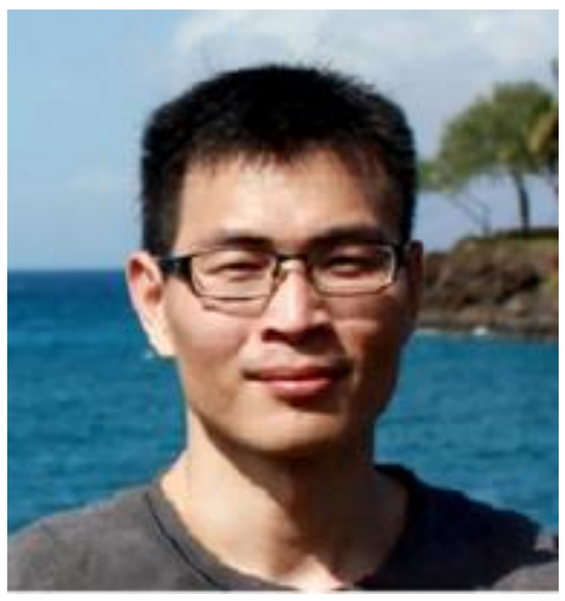
學術報告

Privacy-preserving Average Consensus: Theory and Algorithm



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***Biography*: Jianping He received the Ph.D. degree from Zhejiang University in 2013. He is currently an Associate Research Fellow with Department of ECE, University of Victoria, Canada. His research interests include control and optimization of CPS, scheduling and optimization in VANETs and social networks, and investment decision in financial market and electricity market. Dr. He serves as an Associate Editor for the KSII TIIS. He is also a Guest Editor of the International Journal of Robust and Nonlinear Control, Neurocomputing, and the International Journal of Distributed Senor Networks. He is the winner of Outstanding Thesis Award, Chinese Association of Automation, 2015.**

The goal of the privacy-preserving average consensus (PPAC) is to guarantee the privacy of initial states and asymptotic consensus. In this talk, we analyze the privacy of PPAC algorithm in the sense of the maximum disclosure probability. We introduce a privacy definition, (ϵ,σ)-data-privacy, to depict the maximum disclosure probability. We prove that PPAC provides (ϵ,σ)-data-privacy, and obtain the closed-form expression of the relationship between ϵ and σ. We also prove that the added noise with uniform distribution is optimal in terms of achieving the highest (ϵ,σ)-data-privacy and the disclosure probability will converge to one when all information used in the consensus process is available. Finally, we propose an optimal privacy-preserving average consensus algorithm to achieve the highest (ϵ,σ)-data-privacy.