学术报告会

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Robustness of Complex Networks: Criteria, Computation, and Optimization

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摘要:

Network robustness is a crucial property for industrial and social networks, ensuring sustained functionality under malicious attacks. In this context, robustness refers to a network's ability to remain operational despite the failure of certain components. With the rapid advancements in complex network research, ensuring robustness has become a critical priority in analyzing and optimizing network structures for engineering applications. This talk, grounded in a comprehensive survey and recent advancements, provides a review of network robustness, with a particular focus on a posteriori structural robustness measures for single-layer static networks. It examines four key perspectives: (1) network functionality, encompassing connectivity and controllability; (2) malicious attack strategies; (3) robustness evaluation and estimation techniques, including analytical approximations and machine learning-based predictions; and (4) optimization strategies aimed at improving robustness. Furthermore, the concept of a practical threshold for network destruction is introduced, proposing that robustness evaluation should prioritize performance within this threshold. The talk concludes with key insights and recommendations for future research directions.

简介:

Yang Lou received the Ph.D. degree from the Department of Electrical Engineering, City University of Hong Kong, Hong Kong, China, in 2017. He is currently an Associate Professor and the H&J Youth Chair Professor in the Department of Computer Science at National Yang Ming Chiao Tung University, Taiwan, China. From 2017 to 2023, he held various research and academic positions at City University of Hong Kong, Lingnan University, and Osaka University. His research interests include network science, graph learning, machine learning, and optimization. He is a Fellow of the Higher Education Academy (FHEA) and a Senior Member of the IEEE.