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中国科学院数学与系统科学研究院
Academy of Mathematics and Systems Science
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Academy of Mathematics and Systems Science, CAS
Colloquia & Seminars

Speaker:	施凌教授, 香港科技大学
Inviter:	
Title:	A LASSO-based Detection and Identification Method on Actuator Integrity Attacks in Remote Control Systems
Language:	English
Time & Venue:	2022.12.09 17:00-18:00 腾讯会议：303 170 974
Abstract:	

We consider actuator attacks in a remote control system. Compared with sensor attacks that have been studied in most existing literature, the malicious attacks over actuators can cause more disastrous results due to their direct influence on the system performance. We consider not only detecting the existence of actuator attacks but also identifying the actuators under attack, which is especially important for industrial systems due to the high troubleshooting cost. More specifically, we introduce the notion of prediction residues in Kalman filtering and design a $\chi 2$ attack detector based on the change of residue's probability distribution when the system is under attack. To identify the actuators under attack, we further propose a LASSO-based method that characterizes the optimal estimates of sparse actuator attacks in the sense of maximum likelihood and develop an explicit-form ADMM iterative scheme for numerical computation. Numerical simulations and hardware experiments are provided to illustrate the effectiveness of the results

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