Towards a Science of Attack Composition, Mitigation, and Verification in Cyber-Physical Systems: A Passivity-Based Framework

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Model cyber attacks in the same mathematical language as physical system

Compose multiple simultaneous and sequential attacks on CPS

Develop efficient mitigation strategies for composed attacks
1) Showed that in-band and out-of-band wormholes can be modeled and composed in a passivity framework

2) Proposed passivity-based adaptive patching strategies for mitigating multi-virus propagation

3) Developed distributed defense strategies for Stackelberg patrolling games