

Robust and Resilient Critical Infrastructure Systems

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Critical infrastructures such as transportation systems, communication networks, electric power grids, and health delivery systems are highly networked and interdependent architectures. Nation's security, and at a global level, our economic well being rely heavily on the protection and reliable operation of these infrastructure systems. Such systems are usually characterized by complex nonlinear behavior, dynamic topology, and experience uncertainty both in their internal description and in the external environments/disturbances. The overall goal of this minitrack is the development of models, analysis tools, and simulation environments with focus on characterization and assessment of vulnerabilities, impact of

interdependencies among some or all of these critical infrastructures on failure modes, and threat analysis.

Seven papers are included in this minitrack, presented in two sessions. First session concentrates on assessment of vulnerabilities in interconnected networked systems. Topics include a survey of interdependencies in critical infrastructure systems, assessment of performance and optimal investments in such interconnected architectures, assessment of vulnerabilities for robust design, and design of survivable distributed systems.

The second session concentrates on failure modes in interdependent critical infrastructures, with focus on dynamic and probabilistic approaches to specific infrastructure systems such as blackout vulnerability of power transmission grid and load-dependent cascading failures power grids. In a more general setting, the session also considers control and state estimation techniques for building trustworthy systems.