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RELIABILITY OF CRITICAL INFRASTRUCTURE NETWORKS AT LOCAL AND GLOBAL SCALE

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Complex infrastructure networks are a pervasive feature of modern society. Examples include transportation systems (road, rail, and airlines), electric power grids, cellular grids, and the internet. These distributed network systems with many interconnected components provide critical services for everyday life, such as water, food, energy, transport, communication, banking, and finance. Moreover, most of these critical infrastructures are interconnected and interact with social networks. As a result of worldwide urbanization and globalization processes, the dependence of our society on these complex systems spanning cities, countries, and even continents, constantly grows. This makes the estimation of the reliability of critical infrastructure networks, enhancement of their resiliency, and quantification of the associated uncertainties the most challenging and important problems of modern civil engineering. In this talk, I will discuss efficient stochastic simulation methods for solving the local reliability problem, at a component level, possible extensions of this methods to a global reliability problem, at a network level, and challenges arising on this way.

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