

Special Issue on Complex Engineered Networks: Reliability, Risk, and Uncertainty

Complex engineered networks form a technological skeleton of our modern society. Examples include electric power grids, road and airline networks, cellular grids, and various distribution networks, such as water, gas, and petroleum networks. These distributed complex systems with many interconnected components provide critical services for everyday life, such as water, food, energy, transport, communication, banking, and finance. As a result of technological progress and worldwide urbanization and globalization processes, the dependence of our society on these complex systems spanning cities, countries, and even continents constantly grows. Given the critical role that engineered networks play in the functioning of our world, there is an increasing demand for these systems to be highly reliable and resilient. A deep understanding of their actual capabilities to withstand natural hazard, such as earthquakes, tsunamis, and hurricanes, and man-made threats, e.g., accidents and terrorism, is crucial. The related issues of resilient network design and operation are also closely related to sustainability problems which are of increasing importance today. In particular, the degree to which an engineered network subjected to internal or external stresses (e.g., cascading failures or seismic hazards) is capable of keeping (or recovering) the service demanded needs to be quantitatively estimated. A failure of a critical infrastructure to provide the required service could lead to a range of serious consequences for business, government, and the community. Quantitative assessment of network reliability and associated risks and uncertainties is therefore a key aspect of system design, optimization, and operation.

This Special Issue of the *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems: Part B* is dedicated to reliability, risk, and uncertainties in complex engineered networks. It consists of eight papers written by leading researchers, academics, and practicing engineers from Australia, Canada, Finland, France, Germany, Italy, Norway, and the U.S. on recent advances in the interdisciplinary field of complex engineered networks. The

Special Issue covers a broad spectrum of research topics, including robust design and resilience analysis of critical infrastructures, reliability of technological networks in the presence of cascading failures, resilience of electricity distribution networks against extreme weather conditions, and strategies for reducing risks associated with attacks on airport terminals.

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