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Computational Analysis of Topological Survivability of Large-Scale Engineering Networks with Heterogeneous Nodes SVETLANA POROSEVA, Mechanical Engineering, University of New Mexico — The scale and complexity of modern networks, their integration, and the size of population and businesses they have impact on, make their massive damage catastrophic for the society and economy. Such damage is usually caused by adverse events and is not considered by traditional design practices. In the modern society, the likelihood of adverse events has substantially increased. Therefore, there is a need in evaluating the ability of a network to survive such damage. As the network topology is a key factor to consider, the goal of our research is to develop computational tools for quantifying its effect on the network survivability. "Selfish" algorithm will be presented that addresses exponential-time complexity associated with the problem of generation and analysis of all fault combinations possible in a given network. The reduction of computational complexity is achieved by mapping an initial network topology with multiple sources and sinks onto a set of simpler smaller topologies with multiple sources and a single sink. Application to the Texas power grid will be considered.

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