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Cím: A Tractable Stochastic Model of Correlated Link Failures Caused by Disasters

Absztrakt:
In order to evaluate the expected availability of a service, a network administrator should consider all possible failure scenarios under the specific service availability model stipulated in the corresponding service-level agreement. Given the increase in natural disasters and malicious attacks with geographically extensive impact, considering only independent single link failures is often insufficient.

In this talk, we build a stochastic model of geographically correlated link failures caused by disasters, in order to estimate the hazards a network may be prone to, and to understand the complex correlation between possible link failures. With such a model, one can quickly extract information, such as the probability of an arbitrary set of links to fail simultaneously, the probability of two nodes to be disconnected, the probability of a path to survive a failure, etc.

Furthermore, we introduce a pre-computation process, which enables us to succinctly represent the joint probability distribution of link failures. In particular, we generate, in polynomial time, a quasilinear-sized data structure, with which the joint failure probability of any set of links can be computed efficiently.

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