

Abstract Submitted
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Epidemic Fault Propagation and Synchronization for Networks of Networks GREGORIO D'AGOSTINO, ENEA "Casaccia" - Italy, HUIJUAN WANG, PIET VAN MIEGHEM, Delft University of Technology, SHLOMO HAVLIN, Bar-Ilan University, EUGENE STANLEY, Boston University — We have employed spectral methods to deal with both epidemics and diffusion processes on Networks of Networks (NoNs). Resorting to the largest eigenvalue of the adjacency matrix, we have estimated the threshold for epidemic processes. The algebraic connectivity has provided information on the slowest diffusion mode. The former quantities and their interplay are worth studying for their own sake. However, the motivation of the work arises in the context of Critical Infrastructure Protection. In fact, epidemics on NoNs provide a modeling of fault propagation on interdependent infrastructures and the diffusion processes are strictly related to their synchronization modes. Different theoretical approaches have been employed including exact bounds estimates, mean-field approximations and perturbative expansions. All these approaches provided tools to compare the resilience of NoNs with respect to both synchronization and fault propagation. We have modeled NoNs by different interdependent network models (BA, ER, RR etc) linked according to different strategies. Upon increasing the number of links among networks interesting emergent behaviors are observed.

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