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Network Reliability: A novel betweenness measure using structural motifs YASAMIN KHORRAMZADEH, Department of Physics Virginia Tech, Blacksburg, Virginia 24061, STEPHEN EUBANK, MINA YOUSSEF, Network Dynamics and Simulation Science Laboratory, Virginia Bioinformatics Institute — This paper applies the concept of network reliability, introduced by Moore and Shannon in 1956, for studying the effect of network structure on the spread of diseases. We exhibit a representation for the reliability polynomial in terms of what we call structural motifs that is well suited for reasoning about the effect of a network's structural properties on diffusion across the network. We illustrate by deriving several general results relating graph structure to dynamical consequences. We conclude by exploring a novel centrality measure based on structural motifs.

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