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Prevalence of and Epidemic Spreading on Hierarchical Networks
JIANKUI HE, Department of Physics & Astronomy, Rice University, Houston, TX, 77005, USA, MICHAEL DEEM, Department of Physics & Astronomy, Department of Bioengineering, Rice University, Houston, TX, 77005, USA, MICHAEL W. DEEM TEAM — Recent studies show that real networks are organized in a modular or even hierarchical fashion. However, there is no clear mathematical definition of hierarchy and current studies do not tell us the degree to which a network is hierarchical. In this talk, we will discuss a quantitative measurement of hierarchy. We find that networks of protein interactions, metabolic pathways, electronic circuits, power grids, and emails display strong hierarchy compared with networks generated at random or scale free networks of the Barabási-Albert model. Further, we investigated the spread of virus in hierarchical networks. Viral spread on hierarchical networks displays quite different pattern from scale free and random networks.

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