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## Understanding the Dynamics of Interacting Complex Systems

by

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### ABSTRACT

Complex systems such as power transmission grids, communications networks, forests, confined plasmas etc exhibit complicated but often-similar behavior. Understanding this behavior has led to the area of study of complex system dynamics. Taking this one step further we can ask, how do coupled complex systems behave. For example, if we look at the dynamics of a communications network that is coupled to a power transmission system, does this coupled systems have predictable/useful characteristics? Many "critical infrastructure systems" have characteristic properties of complex systems and are coupled to each other. Therefore, understanding interacting complex systems could shed some light on interconnected infrastructures as well as natural systems such as forests and weather. In this talk, a set of models are used to study to impact of coupling complex systems. A probabilistic model and a dynamical model that have been used to study blackout dynamics in the power transmission grid are used as paradigms. Using results form these models we look at what can be said about the dynamics of coupled systems. At the end, time permitting we will mention some results from the most complex system of all, namely humans interacting with systems through decision-making and the intrinsic risk of risk aversion.

Friday, Nov. 5, 2004  
Globe Room, Elvey Bldg  
3:45 pm