

Abstract Submitted
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Large Fluctuations and Rare-Events in Complex Networks¹ JASON HINDES, IRA SCHWARTZ, U.S. Naval Research Lab. — Networks form the backbone of complex systems ranging from ecological food-webs to computer and social networks, and sustain a variety of important dynamical behaviors necessary for some function or task. However, many networks of interest often operate in noisy environments and fluctuate due to random internal interactions, both of which can cause sudden transitions from one network state to another. These noise induced events can be associated with desirable outcomes, such as the extinction of an epidemic, or undesirable, such as a drastic change in network consensus. In this talk, we discuss a general theory of rare-events occurring in complex networks, including extinction and rare-opinion switches, that captures the transition pathway through a network between states and predicts the characteristic time-scale for switching. Lastly, using the formalism, we demonstrate how to design optimal controls that leverage fluctuations in order to enhance or inhibit rare switches in networks.

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