

Dynamics of Heterogeneous Networks

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Rich-clubs are common network structures in neuroscience and other fields such as sociology. They are characterized by a small group of highly connected nodes. In neuron, transitions to collective motion in the rich-club are associated with network pathologies. Strikingly, understanding the dynamics of such networks remains an open problem. In this work, we develop a theory to predict the emergent dynamics. We show that the behavior of such networks can be decomposed in terms of an emergent deterministic component and a fluctuation term. Traditionally, such fluctuations are filtered out. However, as we show, they are key to accessing the interaction structure and guide the way to predict the transition.