CO-EVOLUTIONARY MODELS OF COMMUNITY STRUCTURE IN NETWORKS

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Community structure and network segregation-where two or more groups of homogeneous actors form dense subgraphs with relatively few linkages across groups-is a salient feature of many real-world networks. While much work has been done on approaches to identify communities within networks, relatively few studies have developed theoretical models of how and why community structure emerges. Even fewer studies have accounted for the coevolution of nodal attributes and link structures-a commonly-observed phenomenon within many complex, self-organizing networks. This research proposes a general model of network self-organization driven by both homophily (where nodes with similar attributes are more likely to be connected) and contagion processes (where connected nodes become more similar to one another over time). While previous work has shown that even very small levels of homophily are sufficient to produce community structures in networks when attributes are held constant, we find that adding even very small levels of contagion are sufficient to prevent community structures from emerging-even in the presence of relatively strong homophily processes. This research paves the way for more complex models of co-evolving attributes and link structures, a necessary step in the development of better theories of community structure in networks.