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Consensus formation in social networks[1]

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In social networks, friendships emerge and fade, as individuals develop and change their opinions. Here, we discuss a simple model of such a network, in which the agents ("individuals") are modeled by Ising spins on the nodes of the network, while their connections ("friendships") are modeled by the presence or absence of edges. Nodes evolve according to a simple majority rule, and links are established or removed between pairs of nodes, depending on their spin content. Thus, both nodes and links become dynamic variables, correlated with each other, and the network is termed "adaptive." Using simulations and exact solutions, we look at an extensive vs an intensive version of the model: In the former, the average degree scales with the number of nodes while remaining fixed in the latter. We analyze the long-time behavior of these two versions, both for finite systems and in the thermodynamic limit. We find significant differences, both with regards to the number of phases found in the thermodynamic limit, and with regards to the life times of metastable states in finite systems. Consequences for social networks with spatial structure will be discussed.

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