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The voter model on an adaptive network.[1] BEATE SCHMITTMANN, IZABELLA BENCZIK, ROYCE K.P. ZIA, SANDOR BENCZIK, Virginia Tech — In social networks, friendships emerge and fade, as individuals change their opinions. We discuss a simple model of such a network, in which the individuals are modeled by Ising spins (taking just two values: up or down) on the nodes of the network, while their connections are modeled by the presence or absence of edges. Nodes and edges evolve simultaneously. The spins are updated according to a simple majority rule (the voter model). Then, any pair of spins is then connected by an edge with probability p (q) if they are in the same (different) state. Thus, the edges also become dynamic variables, correlated with the state of the nodes, and the network is termed "adaptive." Using simulations and exact solutions, we find four phases in the thermodynamic limit. There are two absorbing states in which all nodes are in the same state (all up or down). Then, there is a disordered phase in which the nodes take random values, and a phase in which the system remembers its initial magnetization. For finite systems, only the two absorbing states survive in the long-time limit. Consequences for social networks will be discussed.

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