Symmetric threshold model

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Granovetter's threshold model assumes an irreversible process of adoption. Depending on the initial conditions and the threshold value there are two possible steady states of the system: an absorbing state when only adopters are present, and a frozen disordered state which matches initial conditions. We here introduce the symmetric threshold model where an adopter (a non-adopter) can become a non-adopter (an adopter) if a fraction of its adjacent non-adopters (adopters) exceeds the threshold. This work answers the question of how recovery process changes the phase diagram of the threshold dynamics. Interestingly, a new steady state arises, namely an active disordered state characterized by constant flips of the agents. In addition, there are two possible absorbing states, when only the adopters or only the non-adopters remain in the system. We observe the same qualitative behavior for several topologies, complete graph, square lattice, random network, and scale-free network. We study how a network structure modifies the shape of the transition lines on the phase diagram. Our numerical findings are also well-described by analytical calculations.