Polarization dynamics in complex networks: a model for opinion formation

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Currently, the dynamics of opinion became a standard topic in sociophysics. Indeed, a myriad of models was studied aiming to understand under what conditions this dynamics leads to consensus, polarisation, or other interesting types of clustering. Here, an agent based model with continuous opinions and a bounded confidence update rule is proposed. So, every agent is mostly influenced by opinions close to his and tends to reject opinions too far away, but also try to rewire his links with those dissenting agents. The rewiring process consists of steps: disconnection and reconnection between nodes, both based on a mechanism of comparison of their states. Our numerical analyses demonstrate a cascade of dynamical phase transitions from a regime of consensus to increasingly polarized regimes driven by the parameter controlling the agent's tolerance for different opinions. Concerning the network structure, these transitions correspond to two parallel phenomena: the emergence of communities and the progressive network fragmentation. In the parameter space, the final network structure (degree distribution, clustering coefficient, community sizes, etc.) was characterized.