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Opinion dynamics with confidence threshold: an alternative to the Axelrod model

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The voter model and the Axelrod model are two of the main stochastic processes that describe the spread of opinions on networks. The former includes social influence, the tendency of individuals to become more similar when they interact, while the latter also accounts for homophily, the tendency to interact more frequently with individuals which are more similar. The Axelrod model has been extensively studied during the past ten years based on numerical simulations. In contrast, we give rigorous analytical results for a generalization of the voter model that is closely related to the Axelrod model as it combines social influence and confidence threshold, which is modeled somewhat similarly to homophily. Each vertex of the network, represented by a finite connected graph, is characterized by an opinion and may interact with its adjacent vertices. Like the voter model, an interaction results in an agreement between both interacting vertices -- social influence -- but unlike the voter model, an interaction takes place if and only if the vertices' opinions are within a certain distance -- confidence threshold. In a deterministic static approach, we first give lower and upper bounds for the maximum number of opinions that can be supported by the network as a function of the confidence threshold and various characteristics of the graph. The number of opinions coexisting at equilibrium is then investigated in a probabilistic dynamic approach for the stochastic process starting from a random configuration ...

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