

SELF-ORGANISATION UNDER BOUNDED CONFIDENCE: FROM SWARMS OF PARTICLES TO OPINION DYNAMICS

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Recent progress in the fields of collective motion and social science is related to application of ideas from statistical physics of materials like magnets or fluids to the mechanisms of self-organisation and steady state properties of active systems [1,2]. Many models used in these areas incorporate a wide range of physically-relevant interactions. In this work, we study possible scenarios of self-organized collective behaviour in two different models with a bounded confidence rule [3]. First, we introduce a selectivity rule in the Vicsek model. The rule is represented by a fixed restriction angle in the velocity plane which quantifies the open-mindedness of the individuals [4]. The modified model demonstrates a rich phase behaviour: the transition to aligned state (consensus) changes from continuous to discontinuous at a tricritical point, at very small restriction angles opinions of the agents become polarised and opinion clusters develop. Next, we extend this analogy to a more simple but no less interesting XY-type model and show that the dynamic steady states predicted in our model can be interpreted well in terms of opinion dynamics.

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