OPINION DYNAMICS: CONFORMIST AND NONCONFORMIST INTERACTING AGENTS

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We study two models of binary decisions in a connected network of interacting agents. Individual decisions are determined by social influence, coming from direct interactions with neighbours, and a group level pressure that accounts for social environment. We study the convergence of the mean field variables associated to the processes as the number of agents goes to infinity and we show that propagation of chaos occurs.
In the first model, [2], we have a family of conformist or nonconformist agents that interact with each other. When the number of agents is large but fixed, we study the amount of time spent by the mean field variables associated to the process around the stable points of the macroscopic dynamics. In a nonconformist environment, there is a persistent disordered phase where no majority is formed: We show how in this case the introduction of a delay mechanism in the agent's detection of the global average choice may drastically change this scenario, giving rise to a coordinated self sustained periodic behavior.
In the second model, [1], the population is divided into two social groups, each one characterized by its attitude with respect to the other. Agents of the same group interact with each other, while the other group exerts on them a social influence, that may also be null or even negative. We focus in particular on models with Lotka-Volterra type interactions, i.e., models with conformist vs. nonconformist groups. For these models, although the microscopic system is driven a.s. to consensus within each group, a periodic behaviour arises in the macroscopic scale. In order to describe fluctuations between the limiting periodic orbits, we identify a slow variable in the microscopic system and, through an averaging principle, we find a diffusion which describes the macroscopic dynamics of such variable on a larger time scale.
This is a joint work with Ida Germana Minelli.

References

[1] M. A., I.G. Minelli , *Opinion dynamics with Lotka-Volterra type of interactions*, Electronic Journal of Probability, pp. 1–31, no.122, 24(2019).
[2] M. A., I.G. Minelli, *Delay-Induced Periodic Behaviour in Competitive Populations*, Journal of Statistical Physics 186:6 (2021)

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