Modeling complex behavior in population dynamics

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Abstract

Social sciences often deal with complex problems. Complex means that emergent phenomena (self-organization) are appearing as the result of the interaction between the agents composing the population. The behavior of such systems can be studied on different levels going from a "microscopic" agents-based description to a "macroscopic"one (mean-field like approach). To gain some insight about the interplay between the "microscopic" interactions and the "macroscopic" properties, it is important to find the good modeling level. Good means that one is able to capture the emerging properties of the system without being flooded with irrelevant details. The generic advantages and drawbacks associated to different approaches will be illustrated on prey-predator models and self-propelling agents models.