Mixed dynamics in evolutionary games

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In the repeated Prisoner's Dilemma (PD) game, agents play with each other and update their strategies in every generation according to some microscopic dynamical rule[1]. In this work, we explore mixed PD systems composed of two types of agents, each kind with a certain update rule. We investigate two possibilities: in the first case, update rules remain fixed for the entire evolution of the system. In the second case, agents update both strategy and update rule in every generation. Our results show that, for an important range of the parameters of the game, the final state of the system is much different than the one obtained with the usual setup of a single, fixed, dynamical rule or with two fixed rules. Our model implements representative dynamical rules and shows that, certain type of rules may become extinct while others prevail. We describe the new and rich variety of final outcomes that arise from mixed dynamics configuration.

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[1] R. Axelrod (1984), "The evolution of cooperation", New York, Basic Books