

Evolutionary Prisoner's Dilemma Games

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Abstract

This paper explores the impact of imitation rules on players' long run behavior in evolutionary prisoner's dilemma games. Players are assumed to interact only with their neighbors, and to imitate their successful neighbors and/or themselves, or successful actions taken by their neighbors and/or themselves. In the imitating-successful-player dynamics, full-defection is the unique long run equilibrium as the probability of players' experimentation (or mutation) tends to zero. By contrast, full-cooperation could emerge in the long run under the imitating-successful-action dynamics. Moreover, it is discovered that the convergence rate to the equilibrium under local interaction could be slower than that under global interaction.

Keywords: cooperation, imitation, local interaction, long run equilibrium, prisoner's dilemma game