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Title: Evolutionary game theory: overview and recent results

Abstract: We provide an overview of the methods of evolutionary game theory and describe a variety of recent results. Evolutionary game theory provides dynamic models of behavior for populations of agents engaged in recurring strategic interactions. Population games provide a general model of strategic interactions among large numbers of agents; network congestion, multilateral externalities, and natural selection are among their many applications. As the direct assumption of equilibrium play seems difficult to justify in these games, behavior is most naturally modeled as a dynamic adjustment processes. To accomplish this, one begins with an explicit stochastic description of how individual agents make decisions. When the number of agents is large enough and the time horizon of interest not too long, the evolution of aggregate behavior is well approximated by solutions to ordinary differential equations. We discuss various classes of population games in which these deterministic evolutionary dynamics lead to equilibrium play, and also consider simple examples in which more complicated limit behavior occurs. If one is interested in behavior over very long time spans, one studies the stochastic evolutionary processes directly, focusing on their ergodic and large deviations properties; this is the context for analyses of stochastic stability.