Title: Introduction to Evolutionary Game Theory

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Abstract: Many biological, social and economic processes are naturally modeled as a system of interacting individuals. Game theory provides a natural framework for capturing behavior in such systems. In particular, game theory techniques have been widely used to study one of the great open questions in nature: how does cooperation grow in populations? This talk provides an introduction to evolutionary game theory, which combines the principles of evolution and classical game theory to see how cooperative behavior might evolve in populations. The talk begins with a brief introduction to classical game theory covering concepts such as payoff matrices, Nash equilibrium, and evolutionary stable strategies. Widely investigated games such as the iterated prisoner's dilemma and the hawk-dove game will also be discussed. From there the fundamentals of evolutionary game theory are presented. Concepts such as frequency dependent fitness selection, evolution in finite populations via the Moran process, spatial games, and public goods games will be discussed. A survey of the recent work in this area is presented along with a critique on what has been accomplished and where future research efforts should concentrate.