Recognising and evaluating the effectiveness of extortion in the Iterated Prisoner's Dilemma

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Abstract

The Iterated Prisoner's Dilemma is a model for rational and evolutionary interactive behaviour. It has applications both in the study of human social behaviour as well as in biology.

This game is used to understand when and how a rational individual might accept an immediate cost to their own utility for the direct benefit of another.

Much attention has been given to a class of strategies for this game, called Zero Determinant strategies. It has been theoretically shown that these strategies can "extort" any player.

In this work, an approach to identify if observed strategies are playing in a Zero Determinant way is described. Furthermore, experimental analysis of a large tournament with 204 strategies is considered. In this setting the most highly performing strategies do not play in a Zero Determinant way. This suggests that whilst the theory of Zero Determinant strategies indicates that memory is not of fundamental importance to the evolution of cooperative behaviour, this is incomplete.