Memory size in the Prisoner's Dilemma

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Abstract

The two player Iterated Prisoner's Dilemma is a fundamental iterated game used for studying the emergence of cooperation. The two players interact repeatedly and they have the ability to adopt strategies. A strategy allows a player to map the outcomes of the previous interactions to an action. A set of strategies that consider only the outcome of the previous round are called memory one. These players gain attention after a publication in 2012 that showed that a memory one strategy can manipulate its opponent.

In this manuscript we build upon a framework provided in 1989 for the study of these strategies and identify the best responses of memory one players. The aim of this work is to show the limitations of memory one strategies in multi-opponent interactions. A number of theoretic results are presented.