

A New Topological Game and its Strategies

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Abstract

A game is discussed that is played by two players on a topological space. Play continues for infinitely many turns. The existence a winning strategy for one player or the other corresponds to properties of the space in question. These properties are fairly well understood for metric spaces (spaces with a distance function).

Since we will not assume a background in topology we will survey the history of topological games in order to create some context for this game vis-à-vis other known games. Typically, in these games, one player has a winning strategy if the space satisfies some sort of completeness property and the other player has a winning strategy if the space is somewhat far from complete. A paradigm for completeness versus non-completeness that is relevant here is the real number line versus the set of rational numbers.

A game with infinitely many turns is necessarily unplayable in the real world. Nevertheless, we will attempt to address whether there are applications for such games.