Characterizing Omega-Regularity through Strategy Complexity of Zero-Sum Games

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Abstract

We consider zero-sum games on graphs, in which two antagonistic players interact on a graph for an infinite duration. Such games have played a crucial role in proving the decidability of multiple logical theories in seminal works of Rabin, Büchi, and Landweber. A key property to obtain decidability is called finite-memory determinacy, which requires that whenever a player has a winning strategy, this player also has a winning strategy using only finite memory. This motivates more generally the question of strategy complexity: in a given game, how much information should be remembered about the past to make optimal decisions about the future?

In this talk, we will discuss the automatic structures needed to define winning strategies in games. We will describe a connection between the automata on infinite words representing the game objectives and the automatic structures the players use for their winning strategies.