Online Ramsey Games for Triangles in Random Graphs

Andreas Noever

Institute of Theoretical Computer Science
ETH Zürich, 8092 Zürich, Switzerland
anoever@inf.ethz.ch

Abstract

Consider the following one-player game played on an initially empty graph with $n$ vertices. At each stage a randomly selected new edge is added and the player must immediately color the edge with one of $r$ available colors. Her objective is to color as many edges as possible without creating a monochromatic copy of a triangle.

We use sparse regularity techniques to prove a tight upper bound on the typical duration of this game with an arbitrary, but fixed, number of colors. The upper bound confirms a conjecture of Marciniszyn, Spöhel and Steger for triangles and yields the first tight result for online graph avoidance games with more than two colors.