

Online Ramsey Games for Triangles in Random Graphs

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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.