

Multistage Maker-Breaker games

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We consider a new procedure, which we call Multistage Maker-Breaker Game. Maker and Breaker start from $G_0 := K_n$ and play several stages of a usual Maker-Breaker game where, for $i \geq 1$, the i -th stage is played as follows. They claim edges of G_{i-1} until all edges are distributed, and then they set G_i to be the graph consisting only of Maker's edges. They will then play the next stage on G_i .

This creates a sequence of graphs $G_0 \supset G_1 \supset G_2 \supset \dots$ and, given a monotone graph property, the question is how long Maker can maintain it, i.e., what is the largest k such that Maker has a strategy to guarantee that G_k satisfies such property. We will answer this question for several graph properties and pose a number of interesting questions that remain open.

This is joint work with Juri Barkey, Dennis Clemens, Fabian Hamann, and Mirjana Mikalački.