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Majority coloring games

A vertex coloring of graph satisfies the *majority rule*, if for each vertex v at most half of its neighbors receive the same color as v. A coloring which satisfies the majority rule is called *majority coloring*. The problem of such colorings was introduced in [1,5] and continued with different variants in [2,4]. We consider its game version. For given graph G and color set C two players, Alice and Bob, in alternating turns color vertices with respect to the majority rule. Alice wins when every vertex becomes colored, while goal for Bob is to create a vertex which cannot be colored with any color belonging to the set C without breaking the majority rule. We show that if the color set C is finite, there exists a graph G on which Bob has winning strategy. Number of colors that Alice needs to have to win the game on graph G is clearly bounded by game coloring number of G. We improve that bound for some classes of graphs.

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