

Fractional Aspects of the Erdős-Faber-Lovász Conjecture

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Abstract

The 40 year old Erdős-Faber-Lovász conjecture is the following seemingly innocent assertion:

”If a graph G is the union of n cliques of size n such that any two of these cliques intersect in at most one vertex, then $\chi(G) = n$ ”

Let G be the union of n n -cliques intersecting pairwise in at most one vertex. Consider the game played on G where player A picks a vertex and player B picks an independent set. Player B wins if the independent set he chooses contains the vertex player A selected. The Erdős-Faber-Lovász conjecture implies that player B should have probability $\frac{1}{n}$ of winning. I will show how this is related to the Kahn, Seymour theorem on the Erdős-Faber-Lovász conjecture, then investigate variants of the game where player B is allowed to pick bipartite subgraphs, triange-free subgraphs, and other subsets of G instead of an independent set.