

THE GRAHAM–POLLAK THEOREM AND ALON–SAKS–SEYMOUR CONJECTURE

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ABSTRACT. The Graham–Pollak Theorem says: any edge partitioning of a complete graph on n vertices into complete bipartite graphs requires at least $n - 1$ such bipartite graphs. All known proofs of this simple combinatorial statement use linear algebra in one way or another. It has been a big challenge to find a combinatorial proof of this in the last 3 decades, and many possible extensions have been proved/conjectured to this end.

Among these is a conjecture of Alon–Saks–Seymour which claims: if a graph G is edge partitioned into $n - 1$ complete bipartite graphs then G is n -colourable.

In this talk after some introduction to the problem I will talk about our approach to the problem, which proves the statement for $n \leq 10$, and raises many other interesting questions.

This is a joint work with Jason Gao, Brendan McKay and Brett Stevens

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