Ramsey properties of random graphs and the Erdős-Hajnal problem

Andrzej Ruciński

(joint work with Vojtech Rödl and Mathias Schacht)

We give a new, simpler proof of the 1995 result establishing a threshold probability $p = p(n)$ for the Ramsey property of a binomial random graph $G(n,p)$ with respect to a given graph F. In the case $F = K_k$, a careful analysis of that proof leads to a self-contained derivation of a double exponential bound upper on the Folkman number f_k, the smallest number of vertices in a graph G such that $G \longrightarrow K_k$ and $G \not\supset K_{k+1}$.

In addition, relying on a recent result of Balogh-Morris-Samotij, we provide a new proof of the Ramsey threshold result and, consequently, obtain a better bound on the Folkman number for large k.