On property B of hypergraphs

D.D. Cherkashin [1]

I am going to speak about a classical quantity $m(n)$ introduced by Erdős and Hajnal in 1961 (see [1]).

A hypergraph $H = (V, E)$ is said to have *property* B, if there is a 2-coloring of V with no monochromatic edges. Denote by $m(n)$ the minimum number of edges in a hypergraph that does not have property B.

The best known bounds for $m(n)$ are as follows:

$$c\sqrt{\frac{n}{\ln n}}2^n < m(n) < c'n^2 2^n.$$

The lower bound is due to Radhakrishnan and Srinivasan (see [2]), and the upper bound was given by Erdős.

I want to present a new simple proof of the lower bound (based on ideas by A. Pluhár from [3]) and a new lower bound for a quantity $m(n, r)$ that generalizes $m(n)$ onto the case of r colors.

This is my joint work with J. Kozik.

References

[1] P. Erdős, A. Hajnal, "On a property of families of sets", *Acta Mathematica of the Academy of Sciences*, **12**:1-2 (1961), 87–123.

[2] J.Radhakrishnan, A.Srinivasan, "Improved bounds and algorithms for hypergraph two-coloring", *Random Structures and Algorithms*, **16**:1 (2000), 4–32.

[3] A. Pluhár, "Greedy colorings for uniform hypergraphs", *Random Structures and Algorithms*, **35**:2 (2009), 216–221.

[1] Saint-Petersbourg State University, Mathematics and Mechanics Faculty