
* **UCLA Combinatorics Seminar** *

Date: Thursday, May 1, 1.50-2.50 in Room 6943

Eyal Lubetzky

Microsoft Research

Uniformly cross intersecting families

Abstract

Let A and B denote two families of subsets of an n -element set. The pair (A, B) is said to be l -cross-intersecting iff the intersection of X and Y is precisely l for all sets X in A and Y in B . Denote by $P_l(n)$ the maximum value of $|A||B|$ over all such pairs.

The best known upper bound on $P_l(n)$ is $\Theta(2^n)$, by [Frankl and Rödl (1987)]. For a lower bound, [Ahlsvede, Cai and Zhang (1989)] showed a simple construction of an l -cross-intersecting pair (A, B) with $|A||B| = \Theta(2^n/\sqrt{l})$, and conjectured that this is best possible. Consequently, [Sgall (1999)] asked whether or not $P_l(n)$ decreases with l .

In this paper, we confirm the above conjecture of Ahlsvede et al. for any sufficiently large l , implying a positive answer to the above question of Sgall as well. Furthermore, we determine the precise structure of all the pairs of families which attain the maximum of $P_l(n)$.

This is joint work with Noga Alon.