
* Princeton Discrete Math Seminar *

Date: Wednesday, February 16, 2:15 in Fine Hall 224

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Pairwise intersections and forbidden configurations

Abstract

Let $f_m(a, b, c, d)$ denote the maximum size of a family \mathcal{F} of subsets of an m -element set so that there is no pair $A, B \in \mathcal{F}$ with

$$|A \cap B| \geq a, \quad |\bar{A} \cap B| \geq b, \quad |A \cap \bar{B}| \geq c, \quad |\bar{A} \cap \bar{B}| \geq d.$$

By symmetry we can assume $a \geq d$ and $b \geq c$. We show that $f_m(a, b, c, d)$ is $\Theta(m^{a+b-1})$ if either $b > c$ or $a, b \geq 1$. We also show $f_m(0, b, b, 0)$ is $\Theta(m^b)$ and note that $f_m(1, 0, 0, 0)$ and $f_m(1, 0, 0, 1)$ are $\Theta(m)$. This can be viewed as a result concerning forbidden configurations, and provides further evidence for a conjecture of Anstee and Sali. Our key tool is a strong stability version of the Ahlswede-Khachatrian Complete Intersection Theorem, which is of independent interest.

This is joint work with Richard Anstee.