

Department of Mathematics, BGU

Combinatorics Seminar

On Tuesday, January, 1 2019

At 10:45 – 11:45

In 101-

Chaya Keller (Technion)

will talk about

Improved lower and upper bounds on the Hadwiger-Debrunner numbers

Abstract: A family of sets F is said to satisfy the (p,q) -property if among any p sets in F , some q have a non-empty intersection. Hadwiger and Debrunner (1957) conjectured that for any $p < q < d$ there exists a constant $c = c_d(p,q)$, such that any family of compact convex sets in \mathbb{R}^d that satisfies the (p,q) -property, can be pierced by at most c points. Helly's Theorem is equivalent to the fact that $c_d(p,p)=1$ ($p < d$).

In a celebrated result from 1992 Alon and Kleitman proved the conjecture. However, obtaining sharp bounds on the minimal such $c_d(p,q)$, called 'the Hadwiger-Debrunner numbers', is still a major open problem in combinatorial geometry.

In this talk we present improved upper and lower bounds on the Hadwiger-Debrunner numbers, the latter using the hypergraph container method. Based on joint works with Shakhar Smorodinsky and Gabor Tardos.