

Department of Mathematics, BGU

Combinatorics Seminar

On Monday, March ,5 2018

At 14:00 – 15:00

In 101-

Esther Ezra (Bar Ilan)

will talk about

Constructive Polynomial Partitioning for Lines in \mathbb{R}^3 and its Applications

Abstract: A recent extension of Guth (2015) to the basic polynomial partitioning technique of Guth and Katz (2015) shows the existence of a partitioning polynomial, for a given set of k -dimensional varieties in \mathbb{R}^d , which subdivides space into open cells each of which meeting only a small fraction of the total number of varieties. For most instances, it is unknown how to efficiently obtain an explicit representation of such a partitioning polynomial. This, in particular, applies to the (simple) case of lines in 3-space. In this work we present an efficient algorithmic (but somewhat suboptimal) construction for this setting. We then revisit the problem of eliminating depth cycles among n non-vertical pairwise disjoint triangles in 3-space, recently been studied by Aronov et al. (2017) and de Berg (2017). Our main result is an algorithmic $O(n^{5/3+\epsilon})$ bound, for any $\epsilon < .0$ on the number of pieces one needs to cut the triangles

such that the depth relation they induce does not contain cycles. The running time of our algorithm is comparable with the combinatorial bound.

Joint work with Boris Aronov.

Please Note the Unusual Time!