Abstract

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Title On Macbeath regions, Semialgebraic set systems, Shallow Packings, and Polynomial Partitioning.

Abstract Abstract: The *packing lemma* of Haussler can be paraphrased as 'ℓ_1-packing for bounded VC dimension behaves like ℓ_2-packing in Euclidean space'. In other words, it states that given a set system of bounded VC dimension, any sub-collection of sets with large pairwise symmetric difference, cannot have too many sets. Recently it was generalised by Dutta-Ezra-Ghosh and by Mustafa to the shallow packing lemma. In this talk, I shall present the following consequences of the shallow packing lemma:

1. The existence of combinatorial analogs of Macbeath regions, called M-nets, for a large class of semi-algebraic set systems, using the polynomial partitioning framework of Elekes-Sharir, Guth-Katz and others.
2. Construction of optimal ε-nets from M-nets.

Time permitting, I shall also discuss a matching lower bound to the shallow packing lemma.
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