Additive Combinatorics
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Freiman's theorem in vector spaces over $\mathbb{F}_2$

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Abstract

A famous result of Freiman describes the subsets A, of the integers, for which $|A+A| \leq K|A|$. In this short talk we address the analagous question for subsets of vector spaces over $\mathbb{F}_2$. This problem has been tackled by a number of authors; most recently Green and Ruzsa showed that if A is a subset of a vector space over $\mathbb{F}_2$ and $|A+A| \leq K|A|$ then A is contained in a coset of size at most $2^O(K^2)|A|$. We improve the bound on the size of the coset to $2^{O(K^{3/2}\log K)}|A|$. A simple example shows that the size may need to be at least $2^{\Omega(K)}|A|$.