
* Princeton Discrete Math Seminar *

Date: Wednesday, December 8 , 2:30 in Fine Hall 224

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Parameters of codes on bipartite graphs

Abstract

Graph expansion is well known to be related to the minimum distance and decoding performance of error-correcting codes constructed on graphs. Expander codes form a class of codes in a large group of constructions obtained by combining several shorter codes to obtain a longer code, called code concatenations. The distance of code concatenations is usually bounded below as a product of the distances of the component codes. For instance, if C_1 and C_2 are two linear codes of dimensions k_1 and k_2 then they can be "concatenated" to form a linear code $C_1 \otimes C_2$ of dimension $k_1 k_2$, in which the distance $d = d(C_1)d(C_2)$. Even though it is well known that ensembles of concatenated codes contain codes well above the product bound, no explicit code families were known to exceed it. Following introductory remarks on expander codes, such a construction will be presented in this talk. Construction complexity is $n \log n$, where n is the code length.

Joint work with Gilles Zemor.