

HIGH DIMENSIONAL EXPANDERS, AGREEMENT TESTS, AND PCPS

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I will describe a new connection between PCPs and high dimensional expanders, that goes through "agreement tests".

PCPs are a way to encode a system of constraints so that the new system has a *robust* solution set: any "almost solution", i.e. one that solves 99% of the constraints, is close to a perfect solution. This can be viewed as expansion of the new constraint system.

A relatively new area of study considers generalizations of graph edge expansion to higher dimensional simplicial complexes. This is naturally suited for studying PCPs.

A key component in PCPs is a so-called agreement test. I will describe what this is and then describe new work with Tali Kaufman where we show that the "Ramanujan" simplicial complexes constructed by Lubotzky, Samuels, and Vishne, are high dimensional expanders that imply agreement tests with optimal parameters.