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Title: Independent sets in hypergraphs

Summary:

Many important theorems and conjectures in combinatorics, such as the theorem of Szemerédi on arithmetic progressions and the Erdős-Stone Theorem in extremal graph theory, can be phrased as statements about families of independent sets in certain uniform hypergraphs. In recent years, an important trend in the area has been to extend such classical results to the so-called ‘sparse random setting’. This line of research has recently culminated in the breakthroughs of Conlon and Gowers and of Schacht, who developed general tools for solving problems of this type. Although these two papers solved very similar sets of longstanding open problems, the methods used are very different from one another and have different strengths and weaknesses.

In this talk, we explain a third, completely different approach to proving extremal and structural results in sparse random sets that also yields their natural ‘counting’ counterparts. We give a structural characterization of the independent sets in a large class of uniform hypergraphs.

The talk is intended to be a survey type talk, targeting general audience.