Graz University of Technology

Institut für Diskrete Mathematik

Combinatorics Seminar

Friday 10th January 12:30

AE06, Steyrergasse 30

Turan densities for hypercubes and daisies, and related problems

David Ellis

(University of Bristol)

The vertex-Turan problem for hypercubes asks: how small a family of vertices F can we take in $\{0,1\}^n$, in such a way that F intersects the vertex-set of every d-dimensional subcube? A widely-believed folklore conjecture stated that the minimal measure of such a family is (asymptotically) $1/(d+1)$, which is attained by taking every $(d+1)$th layer of the cube. (This was proven in the special case $d = 2$ by Kostochka in 1976, and independently by Johnson and Entringer.) In this talk, we will outline a construction of such a family F with measure at most c^d for an absolute constant $c < 1$, disproving the folklore conjecture in a strong sense. We will explain the connection to Turan questions for 'daisies', and discuss various other widely-believed conjectures, e.g. on forbidden posets, that can be seen to fail due to our construction. Several open problems remain, including the optimal value of c above. Based on joint work with Maria-Romina Ivan and Imre Leader.

Joshua Erde, Mihyun Kang, Ronen Wdowinski