Graz University of Technology

Institut für Diskrete Mathematik

Combinatorics Seminar

Friday 29th November 12:30

Online meeting (Webex)

The probability that a random graph is even-decomposable

Oliver Janzer

(ETH Zürich)

A graph G with an even number of edges is called even-decomposable if there is a sequence $V(G) = V_0 \supset V_1 \supset \cdots \supset V_k = \emptyset$ such that for each i, $G[V_i]$ has an even number of edges and $V_i \setminus V_{i+1}$ is an independent set in G. The study of this property was initiated recently by Versteegen, motivated by connections to a Ramsey-type problem and questions about graph codes posed by Alon. Resolving a conjecture of Versteegen, we prove that all but an $e^{-\Omega(n^2)}$ proportion of the n-vertex graphs with an even number of edges are even-decomposable. Moreover, answering one of his questions, we determine the order of magnitude of the smallest $p = p(n)$ for which the probability that the random graph $G(n, 1-p)$ is even-decomposable (conditional on it having an even number of edges) is at least $1/2$.

We also study the following closely related property. A graph is called even-degenerate if there is an ordering $v_1, v_2, \ldots, v_n$ of its vertices such that each v_i has an even number of neighbours in the set $\{v_{i+1}, \ldots, v_n\}$. We prove that all but an $e^{-\Omega(n)}$ proportion of the n-vertex graphs with an even number of edges are even-degenerate, which is tight up to the implied constant.

Joint work with Fredy Yip.

Meeting link:

https://tugraz.webex.com/tugraz/j.php?MTID=m01b0553e547155cca576e9d6e12f2c55

Joshua Erde, Mihyun Kang, Ronen Wdowinski