
Discrete Analysis Seminar

Oliver Janzer
University of Cambridge

Resolution of the Erdős–Sauer problem on regular subgraphs

We completely resolve the well-known problem of Erdős and Sauer from 1975 which asks for the maximum number of edges an n -vertex graph can have without containing a k -regular subgraph, for some fixed integer $k \geq 3$. We prove that any n -vertex graph with average degree at least $C_k \log \log n$ contains a k -regular subgraph. This matches the lower bound of Pyber, Rödl and Szemerédi and substantially improves an old result of Pyber, who showed that average degree at least $C_k \log n$ is enough.

Our method can also be used to settle asymptotically a problem raised by Erdős and Simonovits in 1970 on almost regular subgraphs of sparse graphs and to make progress on the well-known question of Thomassen from 1983 on finding subgraphs with large girth and large average degree.

Date: 25th May, 2023

Time: 4:00pm - 5:00pm

Location: 262, Science Building



연세대학교 수학기산학부

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