Minisymposium 18

Hypergraphen

Leiter des Symposiums:

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Dienstag, 19. September

Übungsraum 2, Geographisches Institut, Meckenheimer Allee 166

15:00 – 15:50 **Mathias Schacht** *(Berlin)*
Generalizations of the removal lemma for hypergraphs

16:00 – 16:20 **Harout Aydinian** *(Bielefeld)*
t.b.a.

16:30 – 16:50 **Akos Kisvölscey** *(Budapest)*

17:00 – 17:20 **Christian Sohler** *(Paderborn)*
Sublinear-time approximation of the average degree in hypergraphs

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17:30 – 17:50 **N.N.**
t.b.a.

Mittwoch, 20. September

Übungsraum 2, Geographisches Institut, Meckenheimer Allee 166

15:00 – 15:20 **Anand Srivastav** *(Kiel)*
Lower bound proofs for hypergraph discrepancy

15:30 – 16:00 **Mahmoud Fouz** *(Saarbrücken)*
Hereditary discrepancies in different numbers of colours

16:00 – 16:50 **Nils Hebbinghaus** *(Saarbrücken)*
Ales Privetivy *(Prag)*
Discrepancy of sums of arithmetic progressions

17:00 – 17:20 **Martin Kutz** *(Saarbrücken)*
A decomposition-conjecture on weak positional games on hypergraphs

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17:30 – 17:50 **N.N.**
t.b.a.

Vortragsauszüge

Mathias Schacht *(Berlin)*
Generalizations of the removal lemma for hypergraphs

Ruzsa and Szemerédi established the *triangle removal lemma* by proving that: Every n-vertex graph with $o(n3)$ triangles can be made triangle free by removing $o(n2)$ edges. More general statements of that type regarding graphs were successively proved by several authors. In particular, Alon and Shapira obtained a generalization (which extends all the previous results of this type), where the triangle is replaced by a possibly infinite family of graphs and containment is induced.
We prove the corresponding result for k-uniform hypergraphs and show that: *For every (possibly infinite) family $\mathcal{F}$ of k-uniform hypergraphs and every $\eta > 0$ there exist constants $c > 0$ and $C > 0$ such that every sufficiently large k-uniform hypergraph on n vertices, which contains at most cn^{v_F} induced copies of any hypergraph $F \in \mathcal{F}$ on $v_F \leq C$ vertices can be changed by adding and deleting at most $\eta\binom{n}{k}$ edges in such a way that it contains no induced copy of any member of $\mathcal{F}$*. As a consequence we obtain that every decidable, hereditary property of uniform hypergraphs is testable with one-sided error.
The proof is based iterated applications of the hypergraph generalizations of Szemerédi's regularity lemma. This is joint work with Vojtěch Rödl from Emory University.

Harout Aydinian *(Bielefeld)*
t.b.a.

(Abstrakt lag bei Redaktionsschluss noch nicht vor.)

Akos Kisvölscey *(Budapest)*
t.b.a.

(Abstrakt lag bei Redaktionsschluss noch nicht vor.)

Christian Sohler *(Paderborn)*
Sublinear-time approximation of the average degree in hypergraphs

(Abstrakt lag bei Redaktionsschluss noch nicht vor.)

N.N.
t.b.a.

(Abstrakt lag bei Redaktionsschluss noch nicht vor.)

Anand Srivastav *(Kiel)*
Lower bound proofs for hypergraph discrepancy

In this talk we discuss proofs for lower bounds on the geometric discrepancy function starting with classical results of K. Roth for geometric as well combinatorial hypergraph discrepancy. We then proceed to szenarios with discrepancy like functions appearing in Koksma-Hlawka type inequalities of the integration error of smooth functions, for example functions in Haar wavelet spaces or Sobolev spaces. Here some new and interesting discrepancy notions arise, for which lower bounds sometimes can be proved with an variation of Roths method.

Mahmoud Fouz *(Saarbrücken)*
Hereditary discrepancies in different numbers of colours

We examine the hereditary discrepancy problem of hypergraphs in different numbers of colors. We show that the hereditary discrepancies for a hypergraph in different numbers of colors differ only by factors depending linearly on the respective numbers of colors, i.e., for any hypergraph $\mathcal{H}$ and arbitrary numbers $a, b \in \mathbb{N}_{\geq 2}$ of colors, we have

$$\text{herdisc}(\mathcal{H}, b) \leq O(a)\text{herdisc}(\mathcal{H}, a).$$

Furthermore, this bound is proven to be almost tight.

Nils Hebbinghaus *(Saarbrücken)*
Ales Privetivy *(Prag)*
Discrepancy of sums of arithmetic progressions

(Abstrakt lag bei Redaktionsschluss noch nicht vor.)

Martin Kutz *(Saarbrücken)*
A decomposition-conjecture on weak positional games on hypergraphs

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