

Logic Seminar

Colorings of finite subgraphs of the universal triangle-free graph

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Abstract: It is a central question in the theory of homogeneous relational structures as to which structures have finite big Ramsey degrees. This question, of interest for several decades, has gained recent momentum as it was brought into focus by Kechris, Pestov, and Todorcevic in 2005. An infinite structure S is homogeneous if any isomorphism between two finitely generated substructures of S can be extended to an automorphism of S . A homogeneous structure S is said to have finite big Ramsey degrees if for each finite substructure A of S , there is a number n , depending on A , such that any coloring of the copies of A in S into finitely many colors can be reduced down to no more than n colors on some substructure S' isomorphic to S . This is interesting not only as a Ramsey property for infinite structures, but also because of its implications for topological dynamics.

Prior to work of the speaker, finite big Ramsey degrees had been proved for a handful of homogeneous structures: the rationals (Devlin 1979) the Rado graph (Sauer 2006), ultrametric spaces (Nguyen Van Thé 2008), and enriched versions of the rationals and related circular directed graphs (Laflamme, Nguyen Van Thé, and Sauer 2010). According to Nguyen Van Thé , "so far, the lack of tools to represent ultrahomogeneous structures is the major obstacle towards a better understanding of their infinite partition properties." We address this obstacle by providing new tools to represent the

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homogeneous triangle-free graph and developing the necessary Ramsey theory to deduce finite big Ramsey degrees. The methods developed seem robust enough that correct modifications should likely apply to a large class of homogeneous structures omitting some finite substructure.

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