Conference on Generic Structures

University of Warsaw IDUB Thematic Research Programme
STRUCTURES & Banach Center.

Schedule

Sunday	
19:30 - 21:00	Welcoming dinner
Monday	
8:15 - 9:00	Breakfast
9:00 - 9:45	**Adam Bartoš**, *Category-theoretic Fraïssé theory: an overview*
9:45 - 10:15	Coffee break
10:15 - 11:00	**Tristan Bice**, *Constructing Compacta from Posets*
11:10 - 11:55	**Márton Elekes**, *Generic groups*
12:00 - 14:30	Lunch break
14:30 - 15:15	**Noé de Rancourt**, *Big Ramsey degrees of the Urysohn sphere*
15:15 - 15:45	Coffee break
15:45 - 16:15	**Martin Doležal**, *Categorical approach to graph limits*
16:20 - 16:50	**Ondřej Kurka**, *A generic Banach space and a generic operator*
17:00 - 17:30	**Tamás Katay**, *Generic Besicovitch sets in the plane*
18:30 - 19:30	Dinner
Tuesday	
8:15 - 9:15	Breakfast
9:30 - 10:15	**Katrin Tent**, *On the model theory of free and open generalized polygons*
10:15 - 10:45	Coffee break
10:45 - 11:30	**Tomasz Rzepecki**, *Inner ultrahomogeneous groups*
11:40 - 12:25	**Aleksander Iwanow**, *Generics in invariant subsets of automorphisms of homogeneous structures*
12:30 - 15:00	Lunch break
15:00 - 15:45	**Andre Nies**, *The Borel complexity of the bi-interpretability relation BI between omega-categorical structures*
15:45 - 16:15	Coffee break
16:15 - 16:45	**David Bradley-Williams**, *Efficiently extending partial automorphisms of graphs*
16:50 - 18:30	Problem session
18:30 - 19:30	Dinner
Wednesday	
8:15 - 9:15	Breakfast
9:30 - 10:15	**Bhishan Jacelon**, *Random graph $C*$-algebras*
10:15 - 10:45	Coffee break
10:45 - 11:30	**Piotr Niemiec**, *Absolute homogeneity*
11:40 - 12:25	**Christian Bargetz**, *Homogeneous isosceles-free spaces*
12:30 - 18:30	Lunch and free afternoon
18:30 - 23:00	Conference dinner
Thursday	

8:15 - 9:15	Breakfast
9:30 - 10:15	**Jernej Činč**, *Generic properties of Lebesgue measure-preserving maps on one-dimensional manifolds*
10:15 - 10:45	Coffee break
10:45 - 11:30	**Piotr Oprocha**, *Generic one-dimensional maps and planar attractors*
11:40 - 12:25	**Yonatan Gutman**, *On Universal Minimal Spaces*
12:30 - 15:00	Lunch break
15:00 - 15:45	**Gianluca Basso**, *Chains on Peano continua, combinatorics and dynamics*
15:45 - 16:15	Coffee break
16:15 - 16:45	**Jakub Tomaszewski**, *On extending Cantor subsystems on dendrites*
16:50 - 17:20	**Michał Kowalewski**, *Topological properties of trenched graphs*
17:30 - 18:00	**Andrzej Kucharski**, *On generic topological embeddings*
18:30 - 19:30	Dinner
Friday	
8:15 - 9:15	Breakfast
9:30 - 10:15	**Michael Pinsker**, *Topologies on endomorphism monoids of generic structures*
10:15 - 10:45	Coffee break
10:45 - 11:30	**Manuel Bodirsky**, *Generic Structures for Monotone Sentences in Monadic Second-Order Logic*
11:40 - 12:25	**Dragan Mašulović**, *On topological Ramsey spaces over and around Fraïssé limits*
12:30 - **14:40**	Lunch break
14:40 - 15:10	**Rob Sullivan (online)**, *Generic embeddings into Fraïssé structures*
15:15 - 15:45	**Joanna Garbulińska-Węgrzyn (online)**, *Fraïssé limits in some metric categories*
15:45 - 16:15	Coffee break
16:15 - 16:45	**Nadav Meir (online)**, *Ramsey and indiscernibles*
16:50 - 17:20	**Agnieszka Widz**, *Random graph*
17:30 - 18:00	**Kentaro Yamamoto**, *Elementary equivalence in positive logic via prime products*
18:30 - 19:30	Dinner
Saturday	
8:15 - 9:15	Breakfast

Abstracts: Invited talks

Christian Bargetz, *Homogeneous isosceles-free spaces*

We consider iscosceles-free metric spaces, i.e. metric spaces in which all triples of distinct points admit pairwise different distances. We discuss homogeneity properties of these spaces and characterise all homogeneous isosceles-free spaces up to isometry as vector spaces over the two-element field, endowed with an injective norm. We discuss a number of constructions which allow us to study homogenous spaces using isosceles-free and related spaces. Moreover, we consider bounds on he maximal number of distances in arbitrary homogeneous finite metric spaces.

This is joint work with Adam Bartoš, Wiesław Kubiś, and Franz Luggin.

Adam Bartoš, *Category-theoretic Fraïssé theory: an overview*

I will give an overview of abstract Fraïssé theory formulated in the language of category theory. Familiarity with category theory is welcome but not necessary.

The key notions of Fraïssé theory – (ultra)homogeneity, injectivity, universality, amalgamation, etc. – can be formulated purely in the language of category theory: objects, morphisms, composition, commutative diagrams, (co)limits. The theorems on existence and uniqueness of the Fraïssé limit can be proved at this level of abstraction as well, in fact with simple proofs capturing the essence of the constructions involved. Extra structure like the induced topology of the automorphism group of the Fraïssé limit also arises naturally.

Such treatment of Fraïssé theory provides a unified framework: there is essentially no difference between classical Fraïssé theory of first-order structures and projective Fraïssé theory of topological structures. It also provides flexibility: we can easily consider other morphisms than embeddings like left-invertible embeddings, embeddingprojection pairs, relational morphisms, or abstract elements of a monoid.

In the talk we shall start with the "common core setup": a pair $\langle \mathcal{K}, \mathcal{L} \rangle$ of categories forming a free sequential cocompletion, i.e. satisfying certain natural conditions, which are implicitly present in classical Fraïssé theory of countable structures. Then we consider various generalizations of this common core and demonstrate the related phenomena on examples. These include: lack of full amalgamation property, lack of factorization property, lack of countability, only approximate homogeneity.

Gianluca Basso, *Chains on Peano continua, combinatorics and dynamics*

We generalize a theorem of Gutman, Tsankov and Zucker on the non-existence of generic chains of subcontinua in manifolds of dimension at least 3 to a large class of spaces. Among them is the Menger curve, a 1-dimensional planar continuum. Using Bing's partition theorem, we reduce the problem to a combinatorial statement about walks on finite graphs. The theorem has dynamical consequences which can be interpreted as non-rigidity results for the homeomorphism groups of the spaces involved. This is joint work with A. Codenotti and A. Vaccaro.

Tristan Bice, *Constructing Compacta from Posets*

Various dualities exist between topological spaces and order theoretic structures. However, none have found much application in building spaces commonly considered in other fields like continuum theory. We present a new duality more amenable to such constructions. In principle, it allows us to build any second countable compact T_1 space from a countable graded poset with finite levels. Time permitting, we will outline how this can be used to construct spaces like the pseudoarc and Lelek fan as Fraïssé limits in appropriate categories of graphs with relational morphisms. Joint work with Adam Bartoš and Alessandro Vignati.

Manuel Bodirsky, *Generic Structures for Monotone Sentences in Monadic Second-Order Logic*

I will show that for every monotone property of finite structures that can be expressed in Monadic Second-Order Logic (MSO), or, more generally, in Guarded Second-Order Logic, there exists a finite set S of countably categorical structures such a finite structure has the property if and only if it does not homomorphically map to any of the structures in S. In particular, every CSP that can be expressed in MSO is the CSP for a countably categorical structure. This provides a large class of structures with a rich automorphism group. As a consequence, the computational complexity of monotone properties in MSO can be studied with tools from model theory and universal algebra. Joint work with Sebastian Rudolph and Simon Knaeuer.

Jernej Činč, *Generic properties of Lebesgue measure-preserving maps on one-dimensional manifolds*

In this talk I will survey recent advances in the study of generic properties of Lebesgue measure-preserving maps on one-dimensional compact connected manifolds with particular emphasis on the circle case. If time permits I will also argue that there exists an open dense set of Lebesgue measure-preserving circle maps which satisfy a very strong topological expansion property. The talk is based on joint works with Jozef Bobok (CVUT Prague), Serge Troubetzkoy (Aix-Marseille) and Piotr Oprocha (AGH Krakow and IRAFM Ostrava).

Noé de Rancourt, *Big Ramsey degrees of the Urysohn sphere*

In most countable discrete structures, the obvious analogue of the infinite Ramsey theorem doesn't hold. This is in particular the case of all ultrahomogeneous structures, by a result of Hjorth. Nevertheless, in many cases, a weak infinite Ramsey result can be proved, involving integers called the "big Ramsey degrees" of the structure and quantifying its default of Ramseyness. This is for instance the case for the ordered set of rationals, the Rado graph...

In a joint work in progress with Tristan Bice, Jan Hubička and Matěj Konečný, we extended the notion of big Ramsey degrees to metric structures; here, those degrees are not numbers anymore but compact metric spaces. I will illustrate this theory on the Urysohn sphere, for which we proved the existence of compact big Ramsey degrees; our results extend Nguyen Van Thé–Sauer's oscillation stability result to Lipschitz functions on finite powers of the Urysohn sphere.

Márton Elekes, *Generic groups*

We study generic properties of groups in the sense of Baire category.

First we investigate countably infinite (discrete) groups. Goldbring, Kunnawalkam and Lodha proved that every isomorphism class is meager among countably infinite groups. In contrast, we show that there is a comeager isomorphism class among countably infinite *abelian* groups. We also show that the generic countably infinite *torsion-free* abelian group is the additive group of the rationals. Along the way, we extend a classical result of B. H. Neumann, H. Simmons and A. Macintyre on algebraically closed groups and the word problem.

Then we turn to compact metrizable abelian groups. We use Pontryagin duality to show that there is a comeager isomorphism class among compact metrizable abelian groups, namely the countable power of the so-called universal odometer. We then prove that the generic *connected* compact metrizable abelian group is the so-called universal solenoid. We also prove partial results in the non-abelian case.

Various parts of the talk are joint work with U. B. Darji, B. Gehér, T. Kátay, T. Keleti, A. Kocsis and M. Pálfy.

Yonatan Gutman, *On Universal Minimal Spaces*

Given a topological group G, Ellis (1960) proved the existence of a unique G-minimal system which factors onto all G-minimal systems. Since then the theory of universal minimal spaces (UMS) has developed in several directions. We will concentrate on Uspenskij's maximal chain construction (2000). On one hand, it enables the calculation of UMS for certain groups, e.g. Glasner and Weiss' characterization of the UMS of the homeomorphism group of the Cantor set (2003). On the other hand, it enables to show that given an acting group, certain natural candidates are not UMS and in conjugation with other techniques that the UMS is not metrizable. In this talk, I will elaborate on these topics based on my joint works with Eli Glasner, Hanfeng Li, Todor Tsankov and Andy Zucker.

Aleksander Iwanow, *Generics in invariant subsets of automorphisms of homogeneous structures*

Let M be a countable ultrahomogeneous structure and let $\rho \in \mathsf{Aut}(M)$. Let $\mathcal{C}_\rho = cl(\rho^{\mathsf{Aut}(M)})$, where $\rho^{\mathsf{Aut}(M)}$ is the conjugacy class of ρ and cl denotes the operation of topological closure in the automorphism group. We study the following question: *When does the subspace $\mathcal{C}_\rho$ contain a conjugacy class of $\mathsf{Aut}(M)$ which is comeagre in it?* Having an answer to this question for all $\rho \in \mathsf{Aut}(M)$ we, in fact, describe all closed subsets $\mathcal{C} \subseteq \mathsf{Aut}(M)$ which are invariant under conjugacy in $\mathsf{Aut}(M)$ and have comeagre conjugacy classes.

Let $\mathcal{P}$ be the set of all finite partial isomorphisms of M. The set $\mathcal{P}$ is ordered by the relation of extension of maps. In this terms we can formulate the standard definitions of the joint embedding property (JEP), the amalgamation property (AP), the cofinal amalgamation property (CAP) and the weak amalgamation property (WAP). Let

$$\mathcal{P}_\rho = \{p \in \mathcal{P} : p \text{ extends to an automorphism from } \mathcal{C}_\rho\}.$$

Then the set $\mathcal{C}_\rho$ has a comeagre conjugacy class if and only if the family $\mathcal{P}_\rho$ has WAP. Since for all known examples of structures M and automorphisms $\rho \in \mathsf{Aut}(M)$ with comeagre conjugacy classes in $\mathcal{C}_\rho$, the family $\mathcal{P}_\rho$ has CAP, we also ask: *Is it true that in this context properties WAP and CAP are equivalent?*

Let G be a closed highly homogeneous subgroup of S_∞. We show that any $\mathcal{C}_\rho$ from G contains a conjugacy class which is comeagre in it. Furthermore, the corresponding $\mathcal{P}_\rho$ has the cofinal amalgamation property. In the case of the automorphism group of a typical ultrahomogeneous partially ordered set similar results are proved.

Some of these results were obtained jointly with Monika Drzewiecka and Bartosz Mokry.

Bhishan Jacelon, *Random graph $C*$-algebras*

Given a (row-finite) directed graph, the associated graph algebra is the universal C*-algebra described by generators and relations extracted from the graph. I will report on a joint project with Igor Khavkine in which, motivated by Droste and Kuske's work on random relational structures, we analyse the K-theoretic distribution of the graph algebras of random finite graphs. I will explain how results from $C*$-classification and combinatorial random matrix theory allow us to compute or estimate the asymptotic probability of obtaining a $C*$-algebra stably isomorphic to a Cuntz algebra.

Dragan Mašulović, *On topological Ramsey spaces over and around Fraïssé limits*

In this talk we present three constructions of topological Ramsey spaces that are related to Fraïssé sequences and Fraïssé limits. The first construction is just an appetizer: it generalizes the construction from Dobrinen, Mijares, Trujillo "Topological Ramsey spaces from Fraïssé classes Ramsey-classification theorems, and initial structures in the Tukey types of p-points" to arbitrary Fraïssé sequences. The main dish is the second construction which is more specific and is performed over a Hrushovski sequence. The dessert comes in the form of the third construction in which we use a very simple idea to construct a tiny topological Ramsey space of copies of an arbitrary Fraïssé limit whose age is strongly amalgamable. Joint work with Natasha Dobrinen.

Piotr Niemiec, *Absolute homogeneity*

Highly homogenoues structures, such as Fraïssé limits, very often appear as generic ones (e.g., a random graph). In this talk we study in greater detail absolutely homogeneous structures (that is, objects with the property that each partial isomorphism extends to a global automorphism), with special emphasis on metric spaces and (possibly infinite, full) graphs with edge-coloring. Besides, a general categorical approach to this concept will be presented and a one-to-one correspondence between absolutely homogeneous objects and certain classes (that become sets when isomorphic objects are identified) of "finite" objects that satisfy a few quite general axioms (such as amalgamation and heredity) will be established. We will also introduce the concept of products for graphs with edge-coloring (that produces an absolutely homogeneous graph provided all factors are so). A full classification (up to isometry) of all absolutely homogeneous ultrametric spaces as well as of all absolutely homogeneous graphs with edge-coloring in which all triangles are isosceles or in which all triangles are (precisely) tricolored will be given. Related ideas will briefly be discussed.

Andre Nies, *The Borel complexity of the bi-interpretability relation BI between omega-categorical structures*

The omega-categorical structures can be viewed as elements of a suitable space that is equipped with a notion of Borel subsets. The complexity of equivalence relations on Borel spaces can be compared using Borel reducibility. We study the Borel complexity of BI, or equivalently, the topological isomorphism relation between oligomorphic groups. With Schlicht and Tent, we have shown that BI is below a Borel equivalence relation with all classes countable. Only the trivial lower bound (identity on R) is known at present. For certain subclasses of omega-categorical structures, this bound turns out to be sharp.

Piotr Oprocha, *Generic one-dimensional maps and planar attractors*

In this talk we will survey results on generic properties of interval and circle maps preserving Lebesgue measure. These maps reveal very complicated dynamical behavior, compared to typical interval maps which are rather dynamically simple. We will then combine obtained description of these maps with a very useful technique called BBM (Brown-Barge-Martin), which incorporates inverse limits and natural extensions of the underlying bonding maps to embed attractors in manifolds. This will result in a large and interesting class of planar attractors. Joint work with J. Bobok, J. Cinc and S. Troubetzkoy.

Michael Pinsker, *Topologies on endomorphism monoids of generic structures*

Many mathematical objects are naturally equipped with both an algebraic and a topological structure. For example, the automorphism group of any first-order structure is, of course, a group, and in fact a topological group when equipped with the topology of pointwise convergence.

While in some cases, e.g. the additive group of the reals, the algebraic structure of the object alone carries strictly less information than together with the topological structure, in other cases its algebraic structure is so rich that it actually determines the topology (under some requirements for the topology): by a result of Kechris and Solecki, the pointwise convergence topology is the only compatible separable topology on the full symmetric group on a countable set. Which topologies are compatible with a given algebraic object has intrigued mathematicians for decades: for example, Ulam asked whether there exists a compatible locally compact Polish topology on the full symmetric group on a countable set (by the above, the answer is negative).

In the case of automorphism groups of first-order structures, the question of the relationship between the algebraic and the topological structure has been pursued actively over the past 40 years, and numerous results have been obtained: many of the most popular automorphism groups, including that of the order of the rationals and of the random graph, do have unique Polish topologies.

The endomorphism monoid of a first-order structure is algebraically not as rich as its automorphism group, and often allows many different compatible topologies. We show, however, that there is a unique compatible Polish topology on the endomorphism monoids of the random graph, the weak linear order of the rational numbers, the random poset, and many more.

This is from a joint work with L. Elliott, J. Jonušas, J. D. Mitchell, Y. Péresse, and works with C. Schindler.

Tomasz Rzepecki, *Inner ultrahomogeneous groups*

We say that a group is inner ultrahomogeneous if any isomorphism between its finitely generated subgroups is realised as conjugation. A well-known example is Hall's universal group, but it is easy to see that every group is embeddable in an inner ultrahomogenous group.

Under mild assumptions, we can show that a countable inner ultrahomogeneous group has ample generic automorphisms and is very wild in terms of model-theoretic classification theory.

In my talk, I will describe some examples and the proofs of some of these properties.

Katrin Tent, *On the model theory of free and open generalized polygons*

We show that for any $n \geq 3$ the theory of free generalized n-gons is complete, strictly stable and strictly 1-ample yielding a new class of examples in the zoo of stable theories. The construction proceeds via standard Hrushovski amalgamation.

Joint work with A.-M. Ammer

Abstracts: Contributed talks and posters

Wojciech Bielas, *On compact subsets of the real line (poster)*

If X is a compact subset of the real line, then each non-trivial component of X is an arc of the form $[a, b]$ and the subset $[a, b] \setminus \{a, b\}$ is open in X. J. R. Kline and R. L. Moore showed that any compact subset of the plane $\mathbb{R}^2$, with non-trivial components satisfying the above condition, lies on an arc. We will show that the assumption of being a subset of the plane may be removed. We will also discuss conditions under which a compact metric space is homeomorphic to a Cantorval or one of variants of this notion.

David Bradley Williams, *Efficiently extending partial automorphisms of graphs*

It was established by E. Hrushovski that any finite graph G can be embedded into a finite graph H in such a way that every partial automorphism of G can be extended to an automorphism of H. This is called the extension property of partial automorphisms for finite graphs, or "EPPA for graphs" for short. This fact was directly employed by W. Hodges, I. Hodkinson, D. Lascar, and S. Shelah to prove the small index property for the automorphism group of the random graph M, being the generic countable limit of the Fraisse class of finite graphs. Such an H is called an EPPA extension of G.

One line of research is in finding other Fraisse classes of finite structures that have EPPA. A motivation for this is that a standard way to prove the existence of generic automorphisms in $\mathrm{Aut}(M)$, where M is a Fraïssé limit, relies on the corresponding Fraïssé class having EPPA. Another open direction involves asking how big H has to be for a given G. Questions of the bounds in the class of finite graphs for $\mathrm{eppa}(G)$, the minimal cardinality of an EPPA extension H in terms of the cardinality of G, have been asked repeatedly since Hrushovski's paper of 1991. While each known proof of EPPA provides an (often loose) upper bound by construction, there has been little progress in determining the true value of $\mathrm{eppa}(G)$ even for particular graphs G. In this talk I will discuss some general tools and preliminary results concerning $\mathrm{eppa}(G)$ developed in ongoing joint work with P. J. Cameron.

Martin Doležal, *Categorical approach to graph limits*

The use of category theory in graph theory is quite common. We show that category theory may be useful even in the world of graph limits. To do so, we introduce a new category whose objects are certain generalizations of graphs where both distributions of vertices and edges are represented by abstract measures. This is a similar (but more general) approach as that of s-graphons introduced by D. Kunszenti-Kovács, L. Lovász, and B. Szegedy in 2019. A morphism in our category can be viewed as a 'fuzzy' map between the underlying measurable spaces. The values of this map are not defined deterministically, we only know the probability that a given point is mapped to a given set. Formally, this idea is realized with the use of Markov kernels which, in a certain sense, preserve the distributions of vertices and edges. Further, we introduce a natural notion of convergence of sequences of graphs (or, more generally, of objects of our category) which is heavily inspired by convergence of s-graphons. Then we apply the categorical structure to show that each convergent sequence has a limit object.

Joanna Garbulińska-Węgrzyn, *Fraïssé limits in some metric categories (online talk)*

Paul Erdös constructed the space consisting of all vectors in the Hilbert space ℓ_2 all of whose coordinates are rational, and proved that this space is totally disconnected, almost zero-dimensional space but not zero-dimensional. Considering a category of finite metric spaces with morphisms defined as pairs consisting of isometries and contractions, we get some universal structures as a Fraïssé limit. We investigate connections between obtained objects and Erdös space (or its countable infinite power). Moreover, we prove that Erdös space has Boolean group structures.

Tamás Kátay, *Generic Besicovitch sets in the plane*

A set $B \subseteq \mathbb{R}^d$ is a Besicovitch set if it contains a line in every direction. A very nice classical theorem says that for $d \geq 2$ there exists a closed Besicovitch set $B \subseteq \mathbb{R}^d$ of d-dimensional Lebesgue measure 0. A long-standing open problem in geometric measure theory is the Kakeya Conjecture, which concerns Besicovitch sets:

Conjecture. For $d \geq 1$ every Besicovitch set $B \subseteq \mathbb{R}^d$ is of Hausdorff dimension d.

Partially motivated by the Kakeya Conjecture, Besicovitch sets have been intensively studied in recent decades. In this talk, we will outline the proof of the following theorem:

Theorem. A generic Besicovitch set B in the plane meets every line not contained in it in a set of measure 0. Moreover, every line in B meets the union of all the other lines in B in a set of measure 0.

Michał Kowalewski, *Topological properties of trenched graphs*

Topological closure of the graph of the function sin(1/x) defined on interval $(0, 1]$ is a standard example of a connected space that is not arcwise connected. By adding an arc to this continuum, we get a Warsaw circle - arcwise connected, but not locally arcwise connected continuum. In this talk I will present topological properties of two classes of continua that are inspired by concepts underlying the Warsaw circle -quasi-graphs and sin(1/x)-type continua. Family of trenched graphs encompasses both of these classes. We will discuss similarities and surprising differences between quasi-graphs and sin(1/x)-type continua, as well as provide characterizations that link them together. Based on joint work with Piotr Oprocha.

Andrzej Kucharski, *On generic topological embeddings*

In 2014 W. Kubiś [1] studied category-theoretic framework for universal homogeneous objects, nowadays often called *generic*. Applying Fraïssé theory we have obtained some results about generic topological embeddings, extending homeomorphism and retracts of some subsets of ω^* and generalized Baire spaces κ^λ.

References

[1] W. Kubiś, *Fraïssé sequences: category-theoretic approach to universal homogeneous structures*, Ann. Pure Appl. Logic 165 (2014) 1755–1811

[2] W. Kubiś, A. Kucharski, S. Turek, *Generic topological embeddings*, preprint (2023)

Ondrej Kurka, *A generic Banach space and a generic operator*

We will show that the Gurariĭ space is a generic element of the Polish space of separable Banach spaces. We will also discuss if there is an analogue of this result in the framework of operators between separable Banach spaces.

Mateusz Lichman, *On strong algebrability of families of non-measurable functions of two variables (poster)*

Recently Tomasz Natkaniec in [2] studied the lineability problem for several classes of non-measurable functions in two variables. We improve his results in the direction of algebrability. In particular, we show that most of the classes considered by Natkaniec contain free algebras with $2^\mathfrak{c}$ many generators.

References

[1] S. Głąb, M. Lichman, M. Pawlikowski, *On strong algebrability of famielies of non-measurable functions of two variables*, arXiv:2309.00830, (2023).

[2] T. Natkaniec, *On lineability of families of non-measurable functions of two variable*, Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Mat. RACSAM 115 (2021), no. 1, Paper No. 33, 10 pp.

Nadav Meir (online talk), *Ramsey and indiscernibles*

"One way to glimpse the sheer genius of this extraordinary young man is by looking at some of the things that bear his name. My favourite was coined by Donald Davidson: the Ramsey Effect is the phenomenon of discovering that your exciting and apparently original philosophical discovery has been already presented, and presented more elegantly, by Frank Ramsey." – Cheryl Misak.

The Ramsey property (of structures or classes thereof), a seemingly combinatorial definition, has been a useful tool in model theory since the coining of *order indiscernibles* by Ehrenfeucht and Mostowski (1996), through the classification of stable and simple theories by Shelah (1978) and to this date.

In this talk, I will present joint work with Aris Papadopoulos and Pierre Touchard, in which we find a new connection which we found to be useful in showing that certain structures, surprisingly (to us), do not have the Ramsey property. Before that, I will give a brief overview of the Ramsey property and indiscernibles.

Rob Sullivan (online talk), *Generic embeddings into Fraïssé structures (online)*

This project, still ongoing, is work with A. Codenotti (Münster), A. Panagiotopoulos (CMU) and J. Winkel (Münster).

Let M be a (classical) Fraïssé structure, and let A be a countably infinite structure which is embeddable in M. If M has free amalgamation, then there exists an embedding of A into M such that each automorphism of A extends to an automorphism of M, by a result of Bilge and Melleray. Is this embedding "common" or "uncommon"?

To answer this, we investigate generic embeddings of A into M. An embedding of A into M is said to be *generic* if it lies in a comeagre set inside the Polish space $\mathrm{Emb}(A, M)$.

We will answer the following three questions:

1. When are two embeddings of A into M generically isomorphic via an automorphism of M?
2. When is A generically corigid (i.e. Aut(M/A) trivial)?
3. Let $g \in Aut(A)$. When is g generically extensible to an automorphism of M?

We will also provide a wide range of examples in the context of these three questions.

Radovan Švarc, *Mazur-Ulam Property of Unital JB*-algebras (poster)*

JB*-algebras are generalizations of C*-algebra, exchanging the not necessarily commutative setting of associative algebras for commutative but not necessarily associative setting of Jordan algebras. In the paper behind this poster, we present a proof that unital JB*-algebras have Mazur-Ulam property, i.e. whenever X is a unital JB*-algebra, Y is a Banach space, and Δ is an isometry of unit sphere S_X of X onto unit sphere S_Y of Y, then Δ can be extended to a real-linear isometry mapping X onto Y. To prove this we had to discover some new properties of JB*-algebras. Probably the most interesting one of them states that if X is a unital JB*-algebra and e is a minimal tripotent in the bidual X^{**}, then there is a self-adjoint element h in X such that $e \leq \exp(ih)$. This is a joint work with Antonio M. Peralta (Universidad de Granada). The presenting author is supported by the Charles University, project GAUK no. 268521.

Jakub Tomaszewski, *On extending Cantor subsystems on dendrites*

During the talk we will focus on surjective Cantor systems. Each such system can be easily embedded in the Gehman dendrite, as its set of endpoints is a Cantor set. We will show that for each such embedding there exists a mixing map of the dendrite such that the endpoints' subsystem is conjugate to the Cantor system of choice. The main tool to obtain this result follows from Shimomura's method of approximating the dynamics on zero dimensional systems by analysing the dynamics of coverings of the underlying space. Moreover, we will show that one can modify the above mentioned construction to obtain an exact map with the same qualities. The talk is based on joint work with Dominik Kwietniak and Piotr Oprocha.

Agnieszka Widz, *Random graph*

The Rado Graph, sometimes also known as the (countable) Random Graph, can be generated almost surely by putting an edge between any pair of vertices with some fixed probability $p \in (0, 1)$, independently of other pairs.

In my talk, I will show the influence of allowing different probabilities for each pair of vertices. More specifically, I will show characterize for which sequences $(p_n)_{n\in\mathbb{N}}$ of values in $[0, 1]$ there exists a bijection f from pairs of vertices in $\mathbb{N}$ to $\mathbb{N}$ such that if we put an edge between v and w with probability $p_{f(\{v,w\})}$, independently of other pairs, then the Random Graph arises almost surely.

Kentaro Yamamoto, *Elementary equivalence in positive logic via prime products*

A generalisation of ultraproducts called prime products will be introduced. While ultraproducts preserve sentences of first-order logic (Łoś), prime products preserve sentences of positive logic in the sense of Poizat. The main result is an analogue of the Keisler-Shelah Theorem: two structures in the same language have the same positive theory if and only if some prime product of ultrapowers of one is isomorphic to some prime product of ultrapowers of the other. If, in addition, the structures have endomorphisms that factor through embeddings from certain substructures, then they have isomorphic prime powers. The last condition plays an important role in the theory of constraint satisfaction problems with infinite homogeneous templates. This is a joint work with Tommaso Moraschini and Jamie Wannenburg.