São Paulo Logic Day 2021

Book of Abstracts

Christina Brech (São Paulo)

Title: A combinatorial Banach-Stone theorem

The Schreier family and its corresponding Banach space, called the Schreier space, can be generalized to regular families on ω and their corresponding Banach spaces, called combinatorial spaces. We prove that two combinatorial spaces of regular families are isometric if, and only if, the two families coincide. The proof is done in two steps, the first one being a version of the Banach-Stone theorem for combinatorial spaces (which holds also in uncountable setting) and the second being essentially combinatorial. We will sketch these two steps, based on joint works with Claribet Piña, Valentin Ferenczi and Adi Tcaciuc.

Vera Fischer (Vienna)

Title: Independent families in the countable and the uncountable

Independent families on ω are families of infinite sets of integers with the property that for any two finite subfamilies A and B the set $\bigcap A \setminus \bigcup B$ is infinite. Of particular interest are the sets of the possible cardinalities of maximal independent families, which we refer to as the spectrum of independence. Even though we do have the tools to control the spectrum of independence at ω (at least to a large extent), there are many relevant questions regarding higher counterparts of independence in generalised Baire spaces still remaining open.

Yurii Khomskii (Hamburg & Amsterdam)

Title: Bounded Symbiosis and Upwards Reflection

In [1], Bagaria and Väänänen developed a framework for studying the large cardinal strength of Löwenheim-Skolem theorems of strong logics using the notion of Symbiosis (originally introduced by Väänänen in [2]). Symbiosis provides a way of relating model theoretic properties of strong logics to definability in set theory. We continue the systematic investigation of Symbiosis and apply it to upwards Löwenheim-Skolem theorems and upwards reflection principles. To achieve this, the notion of Symbiosis is adapted to what we call "Bounded Symbiosis". As an application, we provide some upper and lower bounds for the large cardinal strength of upwards Löwenheim-Skolem principles of second order logic.

This is joint work with Lorenzo Galeotti and Jouko Väänänen.

[1] Joan Bagaria and Jouko Väänänen, "On the Symbiosis Between Model-Theoretic and Set-Theoretic Properties of Large Cardinals", Journal of Symbolic Logic 81 (2) P. 584-604

[2] Jouko Väänänen, "Abstract logic and set theory. I. Definability." In Logic Colloquium '78 (Mons, 1978), volume 97 of Stud. Logic Foundations Math., pages 391–421. North-Holland, Amsterdam-New York, 1979.

Victor dos Santos Ronchim (São Paulo)

Title: Almost-normality of Isbell-Mrówka spaces

In this lecture we make an overview about the results obtained in [2] regarding almost-normality in Isbell-Mrówka spaces and some related concepts. We use forcing to provide an example of an almost-normal not normal almost disjoint family, explore the concept of semi-normality in Isbell-Mrówka spaces, define the concept of strongly $(\aleph_0, < \mathfrak{c})$-separated almost disjoint families and prove the generic existence of completely separable strongly $(\aleph_0, < \mathfrak{c})$-separated almost disjoint families assuming $\mathfrak{s} = \mathfrak{c}$ and $\mathfrak{b} = \mathfrak{c}$. We also provide an example of a Tychonoff almost-normal not normal pseudocompact space which is not countably compact, answering a question from P. Szeptycki and S. Garcia-Balan in [1].

[1] Sergio A Garcia-Balan and Paul J Szeptycki. Weak normality properties in ψ-spaces. arXiv preprint arXiv:2007.05844, 2020.

[2] Vinicius de Oliveira Rodrigues and Victor dos Santos Ronchim. Almost-normality of Isbell-Mrówka spaces. Topology and its Applications, 288:107470, 2020.

Dorottya Sziráki (Budapest)

Title: The open dihypergraph dichotomy and the Hurewicz dichotomy for generalized Baire spaces

The open graph dichotomy for a given set X of reals is a generalization of the perfect set property for X, and it can also be viewed as the definable version of the open coloring axiom restricted to X. Raphaël Carroy, Benjamin Miller and Dániel Soukup have recently introduced an $\aleph_0$-dimensional generalization of the open graph dichotomy which implies several well-known dichotomy theorems.

We show that in Solovay's model, this $\aleph_0$-dimensional open dihypergraph dichotomy holds for all sets of reals. We then prove a version of this result for generalized Baire spaces ${}^\kappa\kappa$ for uncountable regular cardinals κ. As an application, we derive several versions of the Hurewicz dichotomy for definable subsets of ${}^\kappa\kappa$.

This is joint work with Philipp Schlicht.

Artur Hideyuki Tomita (São Paulo)

Title: Large countably compact groups without non-trivial convergent sequences

Recently Hrušák, van Mill, Ramos-Garcia and Shelah proved the existence of a countably compact group without non-trivial convergent sequences in ZFC, putting to rest an old problem asked by Wis Comfort. It is still unknown if there are arbitrarily large countably compact groups without non-trivial convergent sequences in ZFC or if there are torsion free countably compact groups without non-trivial convergent sequences of any cardinality in ZFC.

In this talk we will discuss some background to our recent construction of Large countably compact groups without non-trivial convergent sequences on direct copies of $\mathbb{Q}$ using selective ultrafilters and discuss some reasons for the extra difficulty to obtain large or non-torsion examples.