1. **Editor’s note**

In the year 2014, the field of selection principles found its way into several additional, fascinating mathematical realms. The field enters the consensus as a mainstream part of set theory and topology, and as a promising direction for young researchers that are well trained in these fields.

Some of the interesting developments in the field during 2014 are reported in this issue.

With best regards,

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2. **Long announcements**

2.1. **A note on condensations of function spaces onto σ-compact and analytic spaces.** Modifying a construction of W. Marciszewski we prove (in ZFC) that there exists a subspace of the real line $\mathbb{R}$, such that the realcompact space $C_p(X)$ of continuous real-valued functions on $X$ with the pointwise convergence topology does not admit a continuous bijection onto a $\sigma$-compact space. This answers a question of Arhangel’skii.

http://arxiv.org/abs/1312.6081

Mikołaj Krupski

2.2. **Mathias forcing and combinatorial covering properties of filters.** We give topological characterizations of filters $F$ on $w$ such that the Mathias forcing $M_F$ adds no dominating reals or preserves ground model unbounded families. This allows us to answer some questions of Brendle, Guzmán, Hrušák, Martínez, Minami, and Tsaban.

http://arxiv.org/abs/1401.2283

David Chodounský, Dušan Repovš, Lyubomyr Zdomskyy

2.3. **Baire spaces and infinite games.** It is well known that if the nonempty player of the Banach–Mazur game has a winning strategy on a space, then that space is Baire in all powers even in the box topology. The converse of this implication may be true also: We know of no consistency result to the contrary, and in this paper establish the consistency of the converse relative to the consistency of the existence of a proper class of measurable cardinals.

http://arxiv.org/abs/1401.6061

Fred Galvin and Marion Scheepers
2.4. **Selective Games on Binary Relations.** We present a unified approach, based on dominating families in binary relations, for the study of topological properties defined in terms of selection principles and the games associated to them.

[http://arxiv.org/abs/1405.4929](http://arxiv.org/abs/1405.4929)

Rodrigo R. Dias and Marion Scheepers

2.5. **Some observations on filters with properties defined by open covers.** We study the relation between the Hurewicz and Menger properties of filters considered topologically as subspaces of $P(\omega)$ with the Cantor set topology.

[http://arxiv.org/abs/1405.5568](http://arxiv.org/abs/1405.5568)

Rodrigo Hernández–Gutiérrez, Paul J. Szeptycki

2.6. **Combinatorial aspects of selective star covering properties in Ψ-spaces.** Which Isbell–Mrówka spaces (Ψ-spaces) satisfy the star version of Menger’s and Hurewicz’s covering properties? Following Bonanzinga and Matveev, this question is considered here from a combinatorial point of view. An example of a Ψ-space that is (strongly) star-Menger but not star-Hurewicz is obtained. The PCF-theory function $\kappa \mapsto \text{cof}(\kappa^{\aleph_0})$ is a key tool. Using the method of forcing, a complete answer to a question of Bonanzinga and Matveev is provided. The results also apply to the mentioned covering properties in the realm of Pixley–Roy spaces, to the extent of spaces with these properties, and to the character of free abelian topological groups over hemicompact $k$ spaces.

[http://arxiv.org/abs/1405.7208](http://arxiv.org/abs/1405.7208)

Boaz Tsaban

2.7. **Countable dense homogeneous filters and the Menger covering property.** In this note we present a ZFC construction of a non-meager filter which fails to be countable dense homogeneous. This answers a question of Hernández–Gutiérrez and Hrušák. The method of the proof also allows us to obtain a metrizable Baire topological group which is strongly locally homogeneous but not countable dense homogeneous.

Journal reference: Fundamenta Mathematicae 224 (2014), 233–240.

[http://arxiv.org/abs/1406.0692](http://arxiv.org/abs/1406.0692)

Dušan Repovš, Lyubomyr Zdomskyy, and Shuguo Zhang

2.8. **Productively Lindelöf spaces and the covering property of Hurewicz.** We prove that under certain set-theoretic assumptions every productively Lindelöf space has the Hurewicz covering property, thus improving upon some earlier results of Aurichi and Tall.

Journal reference: Topology and its Applications 169 (2014), 16–20.

[http://arxiv.org/abs/1406.0696](http://arxiv.org/abs/1406.0696)

Dušan Repovš and Lyubomyr Zdomskyy

2.9. **Point Networks for Special Subspaces of $\mathbb{R}^\kappa$.** Uniform characterizations of certain special subspaces of products of lines are presented. The characterizations all involve a collection of subsets (base, almost subbase, network or point network) organized by a directed set. New characterizations of Eberlein, Talagrand and Gulko compacta follow.

[http://arxiv.org/abs/1409.7337](http://arxiv.org/abs/1409.7337)

Ziqin Feng and Paul Gartside
2.10. **Luzin and Sierpiński sets, some nonmeasurable subsets of the plane and additive properties on the line.** In this paper we shall introduce some nonmeasurable and completely nonmeasurable subsets of the plane with various additional properties, e.g., being Hamel basis, intersection with each line is a super Luzin / Sierpiński set. Also some additive properties of Luzin and Sierpiński sets on the line are investigated. One of the result is that for a Luzin set \( L \) and a Sierpiński set \( S \), the set \( L + S \) cannot be a Bernstein set. 

http://arxiv.org/abs/1406.3062
Marcin Michalski, Szymon Zeberski

2.11. **Between countably compact and \( \omega \)-bounded.** Given a property \( P \) of subspaces of a \( T_1 \) space \( X \), we say that \( X \) is \( P \)-bounded iff every subspace of \( X \) with property \( P \) has compact closure in \( X \). Here we study \( P \)-bounded spaces for the properties \( P \in \{ \omega D, \omega N, C_2 \} \) where \( \omega D \equiv \"countable discrete\", \omega N \equiv \"countable nowhere dense\", and \( C_2 \equiv \"second countable\" \). Clearly, for each of these \( P \)-bounded is between countably compact and \( \omega \)-bounded. We give examples in ZFC that separate all these boundedness properties and their appropriate combinations. Consistent separating examples with better properties (such as: smaller cardinality or weight, local compactness, first countability) are also produced. We have interesting results concerning \( \omega D \)-bounded spaces which show that \( \omega D \)-boundedness is much stronger than countable compactness:

1. Regular \( \omega D \)-bounded spaces of Lindelöf degree < \( \text{cov}(\mathcal{M}) \) are \( \omega \)-bounded.
2. Regular \( \omega D \)-bounded spaces of countable tightness are \( \omega N \)-bounded, and if \( b > \omega_1 \) then even \( \omega \)-bounded.
3. If a product of Hausdorff space is \( \omega D \)-bounded then all but one of its factors must be \( \omega \)-bounded.
4. Any product of at most \( t \) many Hausdorff \( \omega D \)-bounded spaces is countably compact.

As a byproduct we obtain that regular, countably tight, and countably compact spaces are discretely generated.

http://arxiv.org/abs/1406.7805
István Juhász and Lajos Soukup and Zoltán Szentmiklóssy

2.12. **When is a space Menger at infinity?** We try to characterize those Tychonoff spaces \( X \) such that \( \beta X \setminus X \) has the Menger property.

http://arxiv.org/abs/1407.7495
Leandro F. Aurichi, Angelo Bella

2.13. **Algebra in the Stone–Čech compactification, selections, and additive combinatorics.** The algebraic structure of the Stone–Čech compactification of a semigroup, and methods from the theory of selection principles, are used to establish qualitative coloring theorems extending the Milliken–Taylor Theorem and, consequently, Hindman’s Finite Sums Theorem. The main result is the following one (definitions provided in the main text): Let \( X \) be a Menger space, and \( \mathcal{U} \) be a point-infinite open cover of \( X \) with no finite subcover. Consider the complete graph, whose vertices are the open sets in \( X \). For each finite coloring of the edges of this graph, there are disjoint finite subsets \( \mathcal{F}_1, \mathcal{F}_2, \ldots \) of the cover \( \mathcal{U} \) whose unions \( V_1 := \bigcup \mathcal{F}_1, V_2 := \bigcup \mathcal{F}_2, \ldots \) have the following properties:

1. The family \( \{V_1, V_2, \ldots\} \) is a point-infinite cover of \( X \).
2. The sets \( \bigcup_{n \in F} V_n \) and \( \bigcup_{n \in H} V_n \) are distinct for all nonempty finite sets \( F < H \).
3. All edges \( \{ \bigcup_{n \in F} V_n, \bigcup_{n \in H} V_n \} \), for nonempty finite sets \( F < H \), have the same color.
A purely combinatorial consequence of this result is provided. A self-contained introduction to the necessary parts of the needed theories, modulo the definition and elementary properties of ultrafilters, is provided.

http://arxiv.org/abs/407.7437
Boaz Tsaban

2.14. CH and the Moore–Mrowka Problem. We show that the Continuum Hypothesis is consistent with all regular spaces of hereditarily countable π-character being C-closed. This gives us a model of ZFC in which the Continuum Hypothesis holds and compact Hausdorff spaces of countable tightness are sequential.

http://arxiv.org/abs/1409.0579
Alan Dow and Todd Eisworth

2.15. On ℙ-spaces and related concepts. The concept of the strong Pytkeev property, recently introduced by Tsaban and Zdomskyy in [32], was successfully applied to the study of the space \( C_c(X) \) of all continuous real-valued functions with the compact-open topology on some classes of topological spaces \( X \) including Čech-complete Lindelöf spaces. Being motivated also by several results providing various concepts of networks we introduce the class of ℙ-spaces strictly included in the class of ℵ₀-spaces. This class of generalized metric spaces is closed under taking subspaces, topological sums and countable products and any space from this class has countable tightness. Every ℙ-space \( X \) has the strong Pytkeev property. The main result of the present paper states that if \( X \) is an ℵ₀-space and \( Y \) is a ℙ-space, then the function space \( C_c(X,Y) \) has the strong Pytkeev property. This implies that for a separable metrizable space \( X \) and a metrizable topological group \( G \) the space \( C_c(X,G) \) is metrizable if and only if it is Fréchet-Urysohn. We show that a locally precompact group \( G \) is a ℙ-space if and only if \( G \) is metrizable.

http://arxiv.org/abs/1412.1494
S. S. Gabriyelyan, J. Kakol

2.16. The strong Pytkeev property in topological spaces. A topological space \( X \) has the strong Pytkeev property at a point \( x \in X \) if there exists a countable family \( \mathcal{N} \) of subsets of \( X \) such that for each neighborhood \( O_x \subset X \) and subset \( A \subset X \) accumulating at \( x \), there is a set \( N \in \mathcal{N} \) such that \( N \subset O_x \) and \( N \cap A \) is infinite. We prove that for any ℵ₀-space \( X \) and any space \( Y \) with the strong Pytkeev property at a point \( y \in Y \) the function space \( C_k(X,Y) \) has the strong Pytkeev property at the constant function \( X \to \{y\} \subset Y \). If the space \( Y \) is rectifiable, then the function space \( C_k(X,Y) \) is rectifiable and has the strong Pytkeev property at each point. We also prove that for any pointed spaces \( (X_n, *_n), n \in \omega \), with the strong Pytkeev property their Tychonoff product and their small box-product both have the strong Pytkeev property at the distinguished point. We prove that a sequential rectifiable space \( X \) has the strong Pytkeev property if and only if \( X \) is metrizable or contains a clopen submetrizable ℵ₀-subspace. A locally precompact topological group is metrizable if and only if it contains a dense subgroup with the strong Pytkeev property.

http://arxiv.org/abs/1412.4268
Taras Banakh and Arkady Leiderman

3. Short announcements

3.1. Ultrafilter convergence in ordered topological spaces.

http://arxiv.org/abs/1311.2285
3.2. Cardinal invariants for $\kappa$-box products.  

http://arxiv.org/abs/1311.2330  
W. W. Comfort and Ivan S. Gotchev

3.3. The non-Urysohn number of a topological space.  

http://arxiv.org/abs/1311.6544  
Ivan S. Gotchev

3.4. Scattered Subsets of Groups.  

http://arxiv.org/abs/1312.6946  
T.O. Banakh, I.V. Protasov, S.V. Slobodianiuk

3.5. $I^\kappa$-Cauchy functions.  

http://arxiv.org/abs/1312.7527  
Pratulananda Das, Martin Sleziak and Vladimír Toma

3.6. Metrizable images of the Sorgenfrey line.  

http://arxiv.org/abs/1401.2289  
Mikhail Patrakeev

3.7. On subcontinua and continuous images of $\beta\mathbb{R}\setminus\mathbb{R}$.  

http://arxiv.org/abs/1401.3132  
Alan Dow and Klaas Pieter Hart

3.8. Compact spaces, lattices, and absoluteness: a survey.  

http://arxiv.org/abs/1402.1589  
Wiesław Kubiś

3.9. On Haar meager sets.  

http://arxiv.org/abs/1403.1909  
U. B. Darji

3.10. Coherent ultrafilters and nonhomogeneity.  

http://arxiv.org/abs/1404.3703  
Jan Starý

3.11. The covering number of the difference sets in partitions of $G$-spaces and groups.  

http://arxiv.org/abs/1405.2151  
Taras Banakh and Mikolaj Fraczyk

3.12. Between Polish and completely Baire.  

http://arxiv.org/abs/1405.7899  
Andrea Medini, Lyubomyr Zdomskyy

3.13. Partitions of $2^\omega$ and completely ultrametrizable spaces.  

http://arxiv.org/abs/1406.1405  
William R. Brian and Arnold W. Miller
3.14. Metrization conditions for topological vector spaces with Baire type properties.

DOI: 10.1016/j.topol.2014.05.007
S. S. Gabriyelyan, J. Kąkol

3.15. Classifying invariant σ-ideals with analytic base on good Cantor measure spaces.

http://arxiv.org/abs/1409.3922
Taras Banakh, Robert Ralowski, Szymon Zeberski

3.16. A homogeneous space whose complement is rigid.

http://arxiv.org/abs/1410.0559
Andrea Medini, Jan van Mill, Lyubomyr Zdomskyy

3.17. P-domination and Borel sets.

http://arxiv.org/abs/1409.7902
D. Basile, U. B. Darji

3.18. A characterization of Tychonoff spaces with applications to paratopological groups.

http://arxiv.org/abs/1410.1504
Taras Banakh and Alex Ravsky

3.19. Discontinuity of multiplication and left translations in βG.

www.ams.org/journal-getitem?pii=S0002-9939-2014-12267-2
Yevhen Zelenyuk

3.20. P-sets and minimal right ideals in N∗.

http://arxiv.org/abs/1410.6081
William R. Brian

3.21. Measure of compactness for filters in product spaces: Kuratowski–Mrówka in CAP revisited.

http://arxiv.org/abs/1411.0633
Frédéric Mynard and William Trott

3.22. On the Ck-stable closure of the class of (separable) metrizable spaces.

http://arxiv.org/abs/1412.2216
T. Banakh, S. Gabriyelyan

3.23. The Cp-stable closure of the class of separable metrizable spaces.

http://arxiv.org/abs/1412.2240
T. Banakh, S. Gabriyelyan

3.24. A survey on structural Ramsey theory and topological dynamics with the Kechris–Pestov–Todorcevic correspondence in mind.

http://arxiv.org/abs/1412.3254
Lionel Nguyen Van Thé
3.25. A new class of Ramsey-classification theorems and their applications in the Tukey theory of ultrafilters, Part 2.

http://www.ams.org/journal-getitem?pii=S0002-9947-2014-06122-9

Natasha Dobrinen; Stevo Todorcevic

3.26. On the concept of analytic hardness.

http://www.ams.org/journal-getitem?pii=S0002-9939-2014-12422-1

Janusz Pawlikowski

Previous issues. http://front.math.ucdavis.edu/search?&t=%22SPM+BULLETIN%22

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