

INSTYTUT MATEMATYKI

zaprasza na wykład :

CHAIN UNION CLOSURES AND CONVEXITY

który wygłosi:

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A theory of ball spaces has been developed (see, e.g. [2]) in order to provide a general framework for fixed point theorems that in some way or the other work with contractive functions. They constitute a minimal setting in which the notion of spherical completeness can be introduced. A ball space is a nonempty set X together with any collection of nonempty subsets of X . The basic example is to take the balls to be the closed ultrametric balls in an ultrametric space. This has been a classical tool in algebraic number theory and has for instance appeared in the work of Marc Krasner, who also introduced the hyperfields that two of our doctoral students, Hanna Stojłowska and Alessandro Linzi, have worked on.

However, the flexibility of the notion of ball spaces allows us to apply the concept of spherical completeness also in settings where no ultrametric is around. For example, in totally ordered sets (or abelian groups, or fields) we can take the balls to be the closed bounded intervals (see [1]).

Recently it has been observed that one can give a unified definition of convexity in these ball spaces. Then one can ask whether and how all convex sets can be generated from the balls by repeatedly taking unions of increasing chains. Paper [3] will contain various results and examples on this topic.

The slides of an online talk recently given at a conference in the US can be found at

https://fvkuhlmann.de/Talk_OAL-RAG_2026_extended.

However, the present talk will address a broader audience.

References

- [1] F.-V. Kuhlmann, K. Kuhlmann, S. Shelah, Symmetrically complete ordered sets, abelian groups and fields, *Israel J. Math.* 208 (2015), 261-290
- [2] H. Cmiel, F.-V. Kuhlmann, K. Kuhlmann, A generic approach to measuring the strength of completeness/compactness of various types of spaces and ordered structures, *RACSAM* 115 (2021), Article No. 156
- [3] W. Kubis, F.-V. Kuhlmann, Chain union closures, in preparation

Wykład odbędzie się 19 czerwca 2026 r. (piątek)
o godz. 12.00 w sali 212
w budynku Wydziału Nauk Ścisłych i Przyrodniczych.