

## SET-THEORETIC ASPECTS OF TOPOLOGICAL SELECTIONS

Defining a mathematical property, concrete examples of objects with this property are needed. **How to construct objects with a given property?** Relativity in mathematics. **Could it be that two properties are different in one world, but they are the same in another one?** In mathematics, any statement seems to be true or not, but sometimes it is undecidable and this fact can be proved. **Do there exist objects with a given property whose combination does not have this property?** A mathematical world can be extended to a bigger one. **Could it be that objects with a certain property from the basic world, lose this property with respect to the bigger world?** There are many infinities, and properties related to the smallest one, have been already defined. **How to go to higher infinities?**

The project deals with objects that are subsets of the real line, and combinatorial covering properties, i.e., some properties following from different disciplines of mathematics. It is now one of the most active streams of research within pure mathematics and their foundations. Our goals are to answer the above questions whose professional reformulations are central problems of the field.

Some methods that are planned to be used to attack the above problems are very far from being exhausted, and we want to use them in a comprehensive manner. For instance, forcing is a method for proving undecidability of statements, and it extends mathematical worlds to bigger ones. The powerful tools of this modern topic, have not been applied widely to the considered field. Any new technique of constructions of sets with considered properties would be a remarkable input into the theory - thus far, a very few methods are available. The final problem about higher infinities, is completely new. It should be checked what are possible generalizations of classic properties, and what is the relation between this higher context and the classic one.

Expected output of the project will develop the combinatorial covering properties theory in itself. Since this theory connects various mathematical branches and makes it possible to transport and apply methods from each of these fields to the other ones, the influence and importance of achieved goals can be even greater than suggested in the project description.