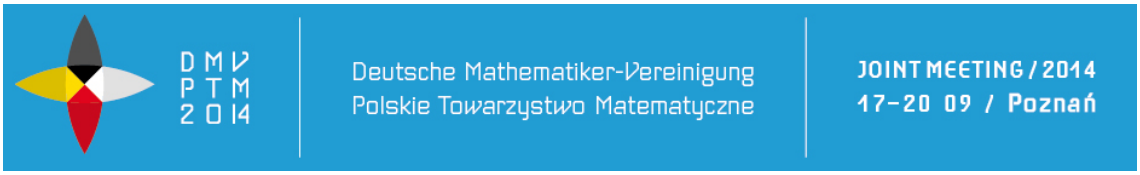

Thematic Session

Session title: General forms of self-similarity in algebra and topology

Organizers:

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Description of the topic:

Classical fractals were introduced by means of similarity, conformal and affine maps. In recent years, more general phenomena of self-similarity have been investigated in different fields of mathematics, connected with projective and topological maps, as well as various maps arising from algebraic structures.
Recent work of K. and F.-V. Kuhlmann exhibits the common principles of fixed point theorems in metric, ultrametric and topological spaces, ordered fields, complete lattices and Scott Ershov domains. It shows how crossing the borders between various areas can lead to new insights and results, as well as simpler proofs of known facts. The origin of this work was the observation that spaces of real places, whose topology is not yet understood, "look fractal". Similar observations are recently made by researchers in areas that have not typically dealt with fractals so far. The question has been raised how phenomena like self-similarity and self-homeomorphisms can be used to study various kinds of spaces. For example, self-similarity has been observed in Berkovich spaces. Bernard Teissier (http://www.math.jussieu.fr/ teissier) is considering to characterize non-singular algebraic varieties via such phenomena. The problem is that on the one hand, such spaces are often non-metrizable, and on the other hand, there is no simple definition of "fractal" that fits everyone and every situation. Therefore, it is very beneficial for researchers working with "fractal-looking" structures to get together with the experts in the classical theory of fractals and its applications in order to cross borders.
The Kuhlmanns have already forged collaboration with Kubis, Banakh and Szarek, who have worked on topological iterated function systems (see, e.g., `http://math.usask.ca/fvk/Cieszyn2013.htm`). Fractal structures in valuation theory have been studied, as well as the question what ultrametric principles could contribute to (generalized) notions of iterated function systems. (A similar contribution can be observed in fixed point theory.)
The aim of the session we are applying for is to widen the horizon and develop new connections with researchers in the theory of fractals in Germany and Poland. This would complement the project of initiating a PIMS Collaborative Research Group aiming at foundational research in fixed point theory and the theory of fractals. While being

founded by a core of researchers from PIMS universities, such a group can have an arbitrary number of members worldwide. A PIMS-supported meeting is upcoming; see http://math.usask.ca/fvk/CF14.HTM.
In our session, we will also aim to give young mathematicians an opportunity to talk, in particular the Ph.D. students of some of the listed speakers and organizers.

2011 Mathematic Subject Classification:

37B, 28A, 12J