Speaker: Michał Rams (IMPAN)

Title: Lyapunov spectrum for affine iterated function systems on the plane

Abstract: We will present the Lyapunov spectrum (both entropy and Hausdorff dimension) for strongly regular affine iterated function systems on the plane, satisfying the strong separation condition.

The affine iterated function system on the plane is a set of k contracting maps of the form $f_i(x) = A_i x + a_i$, where $A_i \in GL(2, R)$ are the linear parts and $a_i \in R^2$ are the translations. Strong regularity means that there doesn't exist a finite set of directions which is preserved by all the linear parts A_i. Strong separation condition means existence of an open set $U \subset R^2$ such that the sets $\overline{f_i(U)}$ are contained in U and pairwise disjoint. Given $\omega \in \{1, \ldots, k\}^N$ we denote $\pi(\omega) = \lim_{n\to\infty} f_{\omega_n} \circ \ldots \circ f_{\omega_1}(0)$. We also denote by $\lambda_1(\omega), \lambda_2(\omega)$ the Lyapunov exponents (in the Oseledets sense) of the infinite product of matrices $A_{\omega_1} \circ \ldots \circ A_{\omega_n} \ldots$. For the set $L_{\alpha_1,\alpha_2} = \{\omega; \lambda_1(\omega) = \alpha_1, \lambda_2(\omega) = \alpha_2\}$ our goal is to calculate the functions $(\alpha_1, \alpha_2) \to h_{\text{top}} L_{\alpha_1,\alpha_2}$ and $(\alpha_1, \alpha_2) \to \dim_H \pi(L_{\alpha_1,\alpha_2})$. This is a joint work with Balazs Barany, Thomas Jordan, and Antti Kaenmaki.