Contribution ID: **7** Type: **not specified**

Generic Birkhoff Spectra

Friday 6 December 2019 11:30 (30 minutes)

This is a joint work with Zolt\'an Buczolich and Bal\'azs Maga. Let (Ω, σ) be the full-shift of two alphabets, and f be a continuous, real-valued function on it. Let L_f be the set of all of the possible limiting values of the Birkhoff averages of f, i.e.
$\mathrm{L}_f := \left\{\alpha \in \mathbb{R} : \exists\, \omega \in \Omega \text{ such that } \lim_{N\to\infty} \frac{1}{N}\sum_{n=0}^{N-1} f(\sigma^n\omega) = \alpha\right\}. For each \alpha \in L_f$, we define the level set $\mathrm{E}_f(\alpha) := \left\{\omega \in \Omega : \lim_{N\to\infty} \frac{1}{N}\sum_{n=0}^{N-1} f(\sigma^n\omega) = \alpha\right\}, and we define a function \mathrm{S}_f : \mathbb{R} \to \mathbb{R}$, which we refer to as the Birkhoff spectra, as follows: $\mathrm{S}_f(\alpha) := \begin{cases} \dim_H(E_f(\alpha)) & \alpha \in L_f, \\ 0 & \alpha \notin L_f, \end{cases}$ where $\dim_H$ is the Hausdorff dimension.

In this talk, we will discuss shapes and properties of the Birkhoff spectrum S_f for generic/typical continuous functions f in the sense of Baire category. In particular, we will be interested in the behavior of the spectrum near the boundary of L_f, such as the continuity and the values of one-sided derivatives.

For more information, please refer to: \href{https://arxiv.org/abs/1905.06001}{arXiv:1905.06001}.

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