Irregular sets and their dynamics in systems with shadowing property

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For a dynamical system (X, T), continuous function $\Phi : X \to \mathbb{R}$ and for every $x \in X$ we define the sum $\frac{1}{n} \sum_{i=0}^{n-1} \Phi(T^i x)$ as the Birkhoff average. That sum converges for a set of x with a full T-invariant measure - those points are called Φ-regular. The complementary set, denoted by $I_\Phi(T)$, is referred to as Φ-irregular, while the set:

$$I(T) = \bigcup_{\Phi \in \mathcal{C}(X, \mathbb{R})} I_\Phi(T)$$

is called irregular set.

Although irregular sets are of zero measure, it seems their dynamical structure may be quite complicated and interesting. In the talk we will focus on dynamical properties of irregular sets in dynamical systems with shadowing property. In particular we will show that in such dynamical systems the value of topological entropy of Φ-irregular set is bounded as follows:

$$h_{top}(T, I_\Phi(T)) \geq h_{top}(T, Y),$$

where $Y \subseteq X$ is a chain recurrent class in X.

Presented results are joint work with Jiri Kupka (University of Ostrava) and Piotr Oprocha (AGH University of Science and Technology).

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