

Analytic zero-entropy diffeomorphism with weakly mixing derivative extension

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Abstract

We discuss combinatorial constructions in Ergodic Theory, briefly introducing a special technique known as the “Anosov Katok Method”. This method enables the construction of diffeomorphisms with prescribed topological and measure-theoretic properties. We find examples of diffeomorphisms with potentially extreme ergodic properties in both smooth and analytic categories. In this talk we focus on diffeomorphisms f on a manifold M that induce projectivized derivative extensions (f, df) on the projective tangent bundle $\mathbb{P}TM$ with intricate dynamics. We explore possible ergodic properties of the projectivized derivative extension with respect to a smooth measure on $\mathbb{P}TM$. For instance, we provide the first examples of weak mixing behavior for the projectivized derivative extension. This is based on joint work with Shilipak Banerjee and Philipp Kunde.

Consequently, this talk should interest a broad audience, including those interested in smooth ergodic theory, measure-preserving diffeomorphism, the existence of invariant measures, combinatorial construction on manifolds, the Anosov Katok Method and complex dynamics on the tangent bundle.