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Robust existence of nonhyperbolic ergodic measures with positive entropy and full support

CHRISTIAN BONATTI, LORENZO J. DÍAZ AND DOMINIK KWIETNIAK

Abstract. Consider a continuous map f on a compact metric space X and any continuous real-valued potential φ on X with positive and negative values. We state a new condition on the coding of an orbit of f with respect to a partition implying that every f-invariant measure generated by that orbit has positive entropy. We show that this criterion can be combined with the recent *control at any scale with a long and sparse tail*-technique. Together these two methods allow us to construct an f-invariant, ergodic, fully supported measure μ with positive entropy and vanishing integral $\int \varphi \, d\mu$. We introduce these tools to show that, for a large family of manifolds M, the set of robustly transitive partially hyperbolic diffeomorphisms of M with one-dimensional nonhyperbolic centre direction contains a C^1-open and dense subset of maps with nonhyperbolic measures which are ergodic, fully supported, and have positive entropy. This strengthens previous results on the existence of nonhyperbolic ergodic measures for those systems.

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