

The entropy of Lyapunov-optimizing measures of some matrix cocycles

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Abstract

We consider one-step cocycles of 2×2 matrices, and we are interested in their Lyapunov-optimizing measures, i.e., invariant probability measures that maximize or minimize a Lyapunov exponent. If the cocycle is dominated, that is, the two Lyapunov exponents are uniformly separated along all orbits, then Lyapunov-optimizing measures always exist and are characterized by their support. Under an additional hypothesis of nonoverlapping between the cones that characterize domination, we prove that the Lyapunov-optimizing measures have zero entropy. This conclusion certainly fails without the domination assumption, even for typical one-step $SL(2, \mathbb{R})$ -cocycles; indeed we show that in the latter case there are measures of positive entropy with zero Lyapunov exponent..

Keywords

Lyapunov exponents, Dominated splittings, Linear cocycles, Joint spectral subradius, Joint spectral radius, Entropy, Ergodic optimization.