Stability index, uncertainty exponent and thermodynamic formalism for intermingled basins of chaotic attractors

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Abstract

I will discuss simple discrete time dynamical systems with two chaotic attractors that have intermingled basins of attraction. The "degree of intermingledness" of the basins can be described by (at least) two local scaling quantities: the uncertainty exponent introduced by the Maryland group already in 1985, and the stability index introduced by Podvigina and Ashwin in 2011. Using random walk and diffusion approximation arguments approximate formulas for the uncertainty exponent were derived by Ott et al. in 1993. Here we present precise formulae for both exponents, derived from thermodynamic formalism, for a class of two-dimensional model systems including in particular the maps studied by Bonifant and Milnor in 2008. The key words for the proofs are telescoping, pressure function, and large deviations.

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