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Lyapunov exponent calculation via reconstruction of the invariant density function from iterative Chebyshev maximum entropy approach[1]
NAGENDRA DHAKAL, HIRO SHIMOYAMA, PARTHAPRATIM BISWAS, The University of Southern Mississippi — We apply a maximum entropy approach (MaxEnt) to compute invariant density functions to obtain the Lyapunov exponents. The method gives the solution by iteratively calculating the Lagrange multipliers within the maximum entropy method from moment constraints. We illustrate our method by reproducing known invariant densities for several cases of discrete maps (in both chaotic and non-chaotic regime). The global convergence of invariant density function is studied with particular emphasis on Lynapunov exponent of the maps for varying number of moments. We demonstrate that Lyapunov exponent of a chaotic map can be computed with a high degree of precision from this approach.

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