Statistical properties of the maximum for non-uniformly hyperbolic dynamics

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Abstract

We consider discrete time non-uniformly hyperbolic dynamical systems and study extreme value laws, that is, the asymptotic distribution of the partial maximum of observable random variables evaluated along the orbits of the systems. We show that there is a close link between extreme value laws and the laws for the hitting time statistics. This enables us to use techniques from one context to obtain results in the other. In particular, we prove that any multimodal interval map with an absolutely continuous invariant measure must satisfy the classical extreme value laws, which generalizes the work of Collet (2001) on Gumbel's law for unimodal maps with exponentially decay of correlations.

Keywords: Return Time Statistics, Extreme Value Theory, Non-uniform hyperbolicity, Interval maps.

References

[1] P. Collet, Statistics of closest return for some non-uniformly hyperbolic systems, Ergodic Theory & Dynamical Systems, 21, 401-420 (2001)