
Potential kernel, hitting probabilities and limit theorems for Abelian extensions of dynamical systems

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Abstract

For well-behaved recurrent random walks, there is a general relation between the potential kernel and the probability that an excursion starting from the origin hits a given point before going back to the origin. I will present a way to recover this relation for recurrent, ergodic Abelian extensions of a well-behaved family (ergodic Gibbs-Markov maps) of hyperbolic dynamical systems.

We compute the limit distribution of the Birkhoff sums of well-chosen observables with two different methods: the method of moments, and a method involving the excursions from the origin. The equality of the limits yields the aforementioned relation, among other results of interest. Applications include for instance the geodesic flow on Abelian covers of compact hyperbolic manifolds.

This is a work in progress, joint with Françoise Pène (Université de Brest).

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