Graduate

PROBABILITY SEMINAR

A first look at the calculus of thermodynamical formalism

Leonardo Cavalcanti de Melo
University of Brasília

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Abstract. Sequences of random variables described by the thermodynamical formalism can somehow be seen as an extension to the idea of Markov Chains. It is natural, then, to ask when these stochastic processes will be well behaved in terms of convergence, following the Law of Large Numbers and the Central Limit Theorem, for example.

In this seminary, we intend to present our understanding of a recently published work on the thermodynamical formalism. The authors of [1] developed a method to link the existence of an isolated maximum eigenvalue of the transfer operator (spectral gap) to a good convergence behavior of stochastic processes defined on its eigenmeasure. Despite such link has been known for some classes of potentials, the method developed in [1] is more general, imposing minimal hypotheses over the structure of the space and focusing solely on the cited spectral gap.

They also show the smoothness of some mappings, allowing them to give a geometrical interpretation of their theory.

References

[1] Paolo Giulietti, Benoît R. Kloeckner, Artur O. Lopes and Diego Marcon *The calculus of thermodinamical formalism*. Journal of the European Mathematical Society, 2019.

[2] William Parry and Mark Pollicott. *Zeta Functions and the Periodic Orbit Structure of Hyperbolic Dynamics*. Paris : Societé mathématique de France, 1990.