Stationary optimal transport plans and the thermodynamic formalism

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Abstract

Optimal Transport (OT) and Thermodynamic Formalism are two famous linear optimization problems. In optimal transport problems, researchers are curious about the minimization of transportation cost and in thermodynamic formalism, problems are centered on the minimization of "free energy" in thermodynamic physics systems. In this Ph.D. project, we consider constrained versions of these two problems. That is, given $Z \subset C(X)$ a closed subset and denote by $M_Z(X,T)$ the set of invariant measures which equals 0 on Z, when probability measure μ ranges over $M_Z(X,T)$, we explored the properties of optimal plan such as existence, convexity and ergodicity in the framework of optimal transport and thermodynamic formalism respectively. In addition, other topics including uniqueness of optimal plan, Lagrangian approach to optimization, optimization as zero temperature, realization and duality problem also have been studied.

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