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A Construction of Transversal Flows for Maximal Markov Automorphisms

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Introduction.

For a strongly mixing transformation defined on a Lebesgue measure space, it is quite frequently the case that each point of the space possesses a neighborhood which can be decomposed into two kinds of fibres (expansive and contractive) and that each fibre is left fixed by the strongly mixing transformation. It was Y. G. Sinai who formulated the concept of transversal fields (transversal fibres) for a transformation and tried to describe this type of phenomenon precisely. Using this behavior of transversal fields, Sinai succeeded in giving a useful sufficient condition for a transformation to be a K-automorphism [1].

Subsequently, generalizing the above results of Sinai I. Kubo gave a useful formulation which could be applied to many concrete situations [2]. M. Kowada pointed out the importance of considering the pair of a transformation and its transversal fields, and investigated a number of properties of such pairs [3], [4].

Most basic examples of transformations possessing transversal fields are ergodic group automorphisms on an n-dimensional torus and Bernoulli shifts. These examples share the following characteristic features. First of all, every such transformation is known to be isomorphic to a Markov automorphism [5]. Secondly, the metric entropy for each of these transformations coincides with the topological entropy. Thirdly, the transversal fields for each of these automorphisms are flows which are ergodic and have the discrete spectrum.

In this paper, we shall show that ergodic Markov automorphisms for which the metric entropy coincides with the topological entropy always possess transversal flows. In § 1, we shall define Markov subshifts [6], maximal Markov automorphisms and transversal flows, and discuss some basic properties. In § 2, we shall prove a representation

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