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Invariant measures for Cantor dynamical systems. (English) Zbl 1447.37004


Let \((X, \varphi)\) be a topological dynamical system and \(\varphi\) be a homeomorphism of a compact metric space \(X\). A Borel positive measure \(\mu\) on \(X\) is called invariant if \(\mu(\varphi(A)) = \mu(A)\) for any Borel set \(A\). The set of all probability invariant measures for a given dynamical system \((X, \varphi)\) is denoted by \(M(X, \varphi)\).

In this paper, the authors deal with a classical problem of ergodic theory. They consider only aperiodic Cantor dynamical systems, i.e., aperiodic homeomorphisms \(\varphi\) of a Cantor set \(X\). The authors discuss the significant progress which was made during the last decade in this direction. They determine the number of ergodic measures for a given Cantor dynamical system and show that the set of all probability invariant measures on a Bratteli diagram corresponds to the inverse limit of a decreasing sequence of convex sets. Supports of ergodic invariant measures on arbitrary Bratteli diagrams in terms of subdiagrams are studied. A number of results about uniquely ergodic Cantor dynamical systems are presented. Relations between the complexity functions and the number of ergodic measures are discussed. Aperiodic Cantor dynamical systems which can be represented by Bratteli diagrams with uniformly bounded number of vertices on each level are studied.

The authors consider three classes of dynamical systems: uniquely ergodic, finitely ergodic, and infinitely ergodic systems. They study notions of Bratteli diagrams, subshifts, complexity functions and describe the simplex of invariant measures in terms of incidence matrices. The problem of measure extension from a subdiagram is discussed. The authors present results about uniquely ergodic dynamical systems. They formulate these results either in terms of complexity functions or in terms of Bratteli diagrams and present some results about dynamical systems that have finitely many ergodic measures. The most important sources of examples are stationary and finite rank Bratteli diagrams. Lastly, the authors investigate a class of Bratteli diagrams that have countably many ergodic invariant measures.

For the entire collection see [Zbl 1448.37001].

Reviewer: Hasan Akin (Gaziantep)

MSC:

37A05 Dynamical aspects of measure-preserving transformations
37B05 Dynamical systems involving transformations and group actions with special properties (minimality, distality, proximality, expansivity, etc.)
37B10 Symbolic dynamics
28D05 Measure-preserving transformations
28C15 Set functions and measures on topological spaces (regularity of measures, etc.)

Keywords:
ergodic invariant measure; aperiodic homeomorphism; Cantor dynamical system; Bratteli diagram; subshift

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References:


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