

The Ergodic Theory Of Cellular Automata

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The Ergodic Theory Of Cellular

The Ergodic Theory of Cellular Automata Marcus Pivato Department of Mathematics, Trent University March 6, 2007 Contents 1 Introduction 4 2 Invariant measures for CA 5

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Ergodic Theory Dynam Syst 26(4):1203-1224 Google Scholar 90. Maass A, Martínez S, Pivato M, Yassawi R (2006) Attractiveness of the Haar measure for the action of linear cellular automata in abelian topological Markov chains.

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Ergodic Theory of Cellular Automata

(PDF) Ergodic Theory of Cellular Automata | Marcus Pivato ...

Ergodic theory is the study of how a dynamical system transforms the information encoded in an invariant probability measure. This article reviews the major recent results in the ergodic theory of cellular automata.

The ergodic theory of cellular automata - NASA/ADS

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When properly viewed, the transition rule of a cellular automaton becomes a map F from a set to itself. The set may be made a probability space. Sufficient conditions are given to ensure that F be measure-preserving and ergodic. Some geometric consequences of ergodicity are noted.

On the ergodic theory of cellular automata | SpringerLink

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Some more results about ergodic properties of surjective cellular automata are obtained. Let X be a closed translationally invariant subset of the d -dimensional full shift $P^{\mathbb{Z}^d}$, where P is a finite set, and suppose that the \mathbb{Z}^d -action on X by translations has positive topological entropy. Let G be a finitely generated group of polynomial growth.

On the ergodic theory of cellular automata and two ...

Ergodic theory is often concerned with ergodic transformations. The intuition behind such transformations, which act on a given set, is that they do a thorough job "stirring" the elements of that set (e.g., if the set is a quantity of hot oatmeal in a bowl, and if a spoonful of syrup is dropped into the bowl, then iterations of the inverse of an ergodic transformation of the oatmeal will not ...

Ergodic theory - Wikipedia

Ergodic theory. In a series of papers published in 1932, von Neumann made foundational contributions to ergodic theory, a branch of mathematics that involves the states of dynamical systems with an invariant measure. Of the ... Cellular automata, DNA and the universal constructor The first ...

John von Neumann - Wikipedia

An Introduction to Ergodic Theory (Springer: Berlin, 1982). [14] Wang, H. . Proving theorems by pattern recognition II Bell System Tech. J. 40 (1961), 1 - 41 .

The topological entropy of cellular automata is ...

to be ergodic and topologically transitive. As a byproduct, we get that for linear cellular automata ergodicity is equivalent to topological transitivity. Finally, we prove that for 1-dimensional linear cellular automata over, regularity (denseness of periodic orbits) is equivalent to surjectivity.

Ergodicity, transitivity, and regularity for linear ...

The application of formal language theory to the dynamical behaviour of cellular automata. A dissertation presented to the faculty of Princeton University in Candidacy for the degree of Doctor of Philosophy (1988).

On the sofic limit sets of cellular automata | Ergodic ...

Ergodic theory has been developed essentially as a purely mathematical theory in the framework of the general theory of dynamic systems. The results obtained in ergodic theory have not led to a complete solution of the problem of substantiating statistical mechanics.

Ergodic Theory | Article about Ergodic Theory by The Free ...

The topological entropy of a dynamical system (X, F) is a measure of the complexity of the dynamics of F over the space X . The problem of computing (or even approximating) the topological entropy of a given cellular automata is algorithmically undecidable (Ergodic Theory Dynamical Systems 12 (1992) 255). In this paper, we show how to compute the entropy of two important classes of cellular automata namely, linear and positively expansive cellular automata.

On computing the entropy of cellular automata - ScienceDirect

[27] B. Hellouin de Menibus and M. Sablik, Characterization of sets of limit measures of a cellular automaton iterated on a random configuration, Ergodic Theory and Dynamical Systems 38 (2018), no. 2, 601–650.

Marcovici , Sablik , Taati : Ergodicity of some classes of ...

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[CA] The ergodic theory of cellular automata, M. Pivato, International Journal of General Systems, 41 #6 (2012). [CA] The ergodic theory of cellular automata, in the Encyclopedia of Complexity...

Publications - Marcus Pivato

In ergodic theory the choice is assumed made, but if the dynamical system is given by a system of differential equations the appropriate measure must be determined. Some systems have a natural measure, such as the Liouville measure in Hamiltonian systems , chosen over other invariant measures, such as the measures supported on periodic orbits of the Hamiltonian system.

Dynamical system (definition) - Wikipedia

The rst axe is the ergodic theory approach where we impose some natural conditions on the entropy and ergodicity of the system to get the result. This ap- proach follows ideas by Rudolph and Host in the classical problem called (2; 3) in the circle posed by Hillel Furstenberg at the end of the 60'.

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