אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics
2015–16–B term

Course Name Introduction to symbolic dynamics

Course Number 201.2.0381

Course web page
https://www.math.bgu.ac.il/~mtom/symbolic_2016/symbolic_spring_2016.html

Lecturer Prof. Tom Meyerovitch, <mtom@bgu.ac.il>, Office 313

Office Hours https://www.math.bgu.ac.il/en/teaching/hours

Abstract

Requirements and grading[1]

Symbolic dynamics is a branch of mathematics that deals with sequences of characters letters or "symbols" form the point of view of dynamical systems. The basic guiding philosophy is that sometimes it is possible to code and understand complicated systems by a sequence of discrete samples. The decimal expansion of real numbers is a simple example of this kind of procedure. Techniques and ideas from symbolic dynamics have found signfiicant applications in data storage and transmission as well as other parts of mathematics. In this course we will introduce basic notions and results in symbolic dynamics, via interesting examples. We will illustrate relations to other fields and relate to the more general frameworks of topological dynamics and ergodic theory. Basic topics to be covered: A brief introduction to topological dynamics Shfit spaces and Languages Shfits of finite type and sofic shfits Cellular automata and sliding block codes, endomorphisms and automorphisms of shfit spaces. Topological entropy Possible additional topics (subject to time, participants background and participants preferences): Krieger's topological embedding theorem On the isomorphism problem for shfits of finite type (strong shfit equivalence and shfit equivalence) Multidimensional shfit spaces and shfit spaces over countable groups. We will introduce

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[1]Information may change during the first two weeks of the term. Please consult the webpage for updates

and study the notions of Measure-preserving transformations, Ergodicity, Recurrence The formal prerequisite is basic knowledge of measure theory. The background in other fields (such as functional and harmonic analysis and probability) is not a prerequisite, but will be introduced as needed.

Course topics