

A (Graduate) course on Algebraic and Combinatorial Aspects of Symbolic Dynamics





Instructors:

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 Lectures will be held virtually and start on 09-21-2020, 1399-06-31 
Mondays, 14:00 Tehran (11.30 France)
Wednesdays, 14:00 Tehran (11:30 France)

Description of the Course:

In this course, we firstly study the fundamentals of topological dynamical systems on Cantor sets. As the Cantor space is homeomorphic with any compact space arisen from countable (infinite) product of a finite alphabet, there are rich sources of combinatorics supporting various properties of the dynamical systems on them, that we are intending to introduce and study some of them. Besides, some algebraic tools associated to dynamics on the Cantor set as well as applications of minimal Cantor systems in the theory of growth of groups will be presented.

Syllabus:

We will tentatively cover the following topics

- Topological dynamical systems on Cantor Spaces, Subshifts
- Return words, Rauzy Graphs, Primitive Substitutions and S-adic subshifts, Recognizability
- Some Motivations for Studying Minimal Dynamics (interval exchange transformations)
- Examples (Substitutions, Toeplitz Shifts)
- Partitions in Towers
- Ordered Groups and Direct limits associated to a sequence of K-R Partitions
- Dimension Group and Measures
- Ordered Cohomology Group of Cantor Minimal systems
- Full Groups and Topological Full Groups of Cantor Minimal Systems
- Simplicity of the derived subgroup of the topological full group.
- Algebraic structure of the full group : amenability and LEF property.

Prerequisite:

- An introductory course in topological dynamics and ergodic theory.

References:

- F. Durand, D. Perrin, Dimension Groups and Dynamical Systems, Preprint.
- E.G. Effros, Dimensions and C*-algebras, Conference Board Math. Sci. 46, Amer. Math. Soc., Providence, R.I., 1981.
- P. Kůrka, Topological and Symbolic Dynamics, Societe Mathematique de France, 2003.
- D. Lind and B. Marcus, An introduction to symbolic dynamics and coding.
- K. Juschenko, A companion to the mini-course on full topological groups of Cantor minimal. <http://www.math.northwestern.edu/~juschenk/files/Juschenko-Course.pdf>
- M. Queffelec, Substitution Dynamical systems-Spectral Analysis, 2010.

