2018 拓扑动力系统及遍历理论研讨会（汕头）

会议手册

汕頭大學

SHANTOU UNIVERSITY

汕头大学数学系

2018 年 10 月 12 日至 15 日

学术报告安排表

10 月 13 日 汕头大学图书馆报告厅	
8:30-9:00	开幕式
	主持人：熊金城教授
9:00-9:30	吴敏教授(华南理工大学)：一致维数与分形的齐性
9:30-10:00	陈二才教授(南京师范大学)：关于测度熵的 Katok 公式
10:00-10:30	休息
10:30-11:00	代雄平教授(南京大学): Regional multiple recurrence vs Grünwald version of van der Waerden' s theorem for semi-modules
11:00-11:30	史恩惠教授(苏州大学): Topological conjugation classes of topologically transitive group actions on the circle
11:40	午餐
	主持人：吴敏教授
14:30-15:00	杨忠强教授(汕头大学): The topological structure of function space of transitive maps
15:00-15:30	马东魁教授(华南理工大学): Topological r-entropy and topological entropy of free semigroup actions
15:30-16:00	武文副教授(华南理工大学): Rudin-Shapiro 序列的阿贝尔复杂度
16:00-16:30	休息
16:30-17:00	周效尧副教授(南京师范大学): Mean Li-Yorke chaos in random dynamical systems
17:00-17:30	袁大琏讲师(广东第二师范学院): Some sufficient conditions for existence of dependent set with given cardinal
17:30-18:00	汪火云教授(广州大学): Periodicity and Li-Yorke chaos
18:10	晚餐

10 月 14 日 汕头大学图书馆报告厅	
	主持人: 陈二才教授
8:30-8:50	许雷叶博士(中国科学技术大学): Complexity functions and Mobius disjointness conjecture
8:50-9:10	于涛博士(复旦大学): Measure-theoretic mean equicontinuity and bounded complexity
9:10-9:30	周小敏(华中科技大学): Ergodic optimization
9:30-10:00	休息
10:00-10:20	钟兴富博士(广东外语外贸大学): 控制系统的不变压
10:20-10:40	徐辉博士(苏州大学): Strongly Independent Matrices and Applications on the Rigidity of A-Invariant Measures on n-Torus
10:40-11:00	曾眺英讲师(嘉应学院): Multiple recurrent theorem for directed partial semigroup actions
11:30	午餐
下午	自由讨论
18:00	晚餐

报告摘要

关于测度熵的 Katok 公式

陈二才 (南京师范大学)
Email: ecchen@njnu.edu.cn

摘要： TBA

Regional multiple recurrence *vs* Grünwald version of van der Waerden's theorem for semi-modules

代雄平 (南京大学)
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摘要： Let $(M, \mathbf{+})$ be any semi-module over a semi-ring $(R, +, \cdot)$ with a finite coloring $M = B_1 \cup \cdots \cup B_q$. By first establishing a Regional Multiple Recurrence Theorem of semi-modules, we prove that one of the colors j has the property that if $F \subseteq M$ is any finite set, then one can find some "syndetic" subset D_F of $(R, +)$ such that for each $d \in D_F$ there is some $a \in B_j$ with $a \mathbf{+} dF \subseteq B_j$. This in turn implies that each uniformly almost periodic point is multiply almost periodic.

Topological r-entropy and topological entropy of free semigroup actions

马东魁 (华南理工大学)
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摘要： We introduce the notion of topological r-entropy for free semigroup actions on a compact metric space and provide some properties of it. By using the skew-product transformation as bridge, we get the following two main results. 1. We extend the result that the topological entropy is the limit of topological r-entropy to free semigroup actions ($r \to 0$). 2. Let f_i, $i = 0, 1, \ldots, m-1$ be homeomorphisms on a compact metric space. We verify that the topological entropy of $(f_0, f_1, \ldots, f_{m-1})$ equals the topological entropy of these inverse mappings.

Topological conjugation classes of topologically transitive group actions on the circle

史恩惠 (苏州大学)
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摘要: We introduce some results and questions on the classification of topologically transitive group actions on the circle.

Periodicity and Li-Yorke chaos

汪火云 (广州大学)
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摘要: In this paper, the notions of periodic point are compared. We point out that if a continuous action of an Abelian group on a compact metric space is chaotic in the sense of Devaney and has a fixed point, then for every positive integer ≥ 2, it is Li-Yorke n-ϵ-chaotic for some $\epsilon > 0$.

一致维数与分形的齐性

吴敏 (华南理工大学)
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摘要: 在这个报告中，首先介绍一致维数的定义及等价定义；然后说说一致维数的性质，特别指出一致维数与 Hausdorff、Bouligand 等经典维数的差异，以及 Assouad 维数和一致维数与分形的齐性刻画；最后讲一个应用 Assouad 维数的小结果。

Rudin-Shapiro 序列的阿贝尔复杂度

武文 (华南理工大学)
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摘要: 在此，我们将讨论 Rudin-Shapiro 序列的阿贝尔复杂度，并研究其阿贝尔复杂度函数的正则性和渐进性质。

Strongly Independent Matrices and Applications on the Rigidity of A-Invariant Measures on n-Torus

徐辉 (苏州大学)
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摘要: We introduce the notion of strongly independent matrices and show the existence of n strongly independent matrices in $GL(n,\mathbb{Z})$ over $\mathbb{Z}\setminus\{0\}$ when $2n+1$ is a prime number. As an application of strong independence, we give a measure rigidity result for endomorphisms on n-torus $\mathbb{T}^n$.

Complexity functions and Mobius disjointness conjecture

许雷叶 (中国科学技术大学)
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摘要: The complexity functions play an important role on Mobius disjointness conjecture. In this talk, we mainly introduce the measure (or topological) complexity and the relationship between complexity and Mobius disjointness conjecture. We will give some examples that have bounded, sub-polynomial or sub- exponential complexity. We also give some criterion that satisfying the required Mobius disjointness condition.

传递映射的拓扑结构

杨忠强 (汕头大学)
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摘要: 探讨连续函数和可微函数的动力学性质是拓扑动力系统和微分动力系统的中心工作. Kolyda 等学者自 2015 年以来希望研究表现某类动力学性质的所有函数在某种自然拓扑下构成的函数空间的拓扑性质，他们称之为动力拓扑学（dynamical topology）. 众所周知，几乎所有函数空间都是无限维的. 所以，用无限维拓扑学的工具探讨有动力学背景的函数空间是自然. 我们在这个方面做了一些尝试. 在本报告中，我们主要给出传递映射构成的函数空间的拓扑结构.

对于紧度量空间 (X,d), 令 $C(X)$ 表示从 X 到自身的连续函数全体并赋予上确界度量:

$$d(f,g)=\max\{d(f(x),g(x)):x\in X\}.$$

设 $f \in C(X)$，如果对任意的非空开集 $U, V \subset X$, 存在 n 使得 $U \cap f^{-n}(V) \neq \emptyset$, 那么，我们称 f 是 X 上的一个传递映射. 用 $T(X)$ 和 $\overline{T(X)}$ 表示 X 上的所有传递映射及其在 $C(X)$ 中的闭包. 令 $\mathbf{I} = [0, 1]$ 是闭区间. 本报告我们将给出下面结果的证明框架:

定理: $T(\mathbf{I})$ 和 $\overline{T(\mathbf{I})}$ 都同胚于可分 Hilbert 空间 l_2.

同时，我们还将给出了一些问题.

注: 该工作是与李健等人合作完成.

Measure-theoretic mean equicontinuity and bounded complexity

于涛 (复旦大学)
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摘要: Ferenczi studied measure-theoretic complexity using α-names of a partition and the Hamming distance. He proved that if a measure preserving system is ergodic, then the complexity function is bounded if and only if the system has discrete spectrum. We show that this result holds without the assumption of ergodicity. Measure complexity with respect to a function is also introduced. For a function f, it is shown that f is an almost periodic function if and only if f is measure-theoretic mean equicontinuous if and only if the measure-theoretic complexity with respect to f is bounded.

Multiple recurrent theorem for directed partial semigroup actions

曾眺英 (嘉应学院, 汕头大学)
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摘要: In this report, we give a multiple recurrent theorem for topological systems with directed partial semigroup actions, which does not require the condition of equicontinuity, and it generalizes the well-known IP-version of multiple recurrent theorem by Furstenberg and Weiss.

Some sufficient conditions for existence of dependent set with given cardinal

袁大琏 (广东第二师范学院)
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摘要: For a relation $R \subset X \times X$, a set $D \subset X$ is said to be a dependent set of R, if $D \times D \triangle X \subset R$. In this work, dependent sets on finite sets and dependent sets on probability measure spaces are investigated respectively, and some sufficient conditions for existence of dependent set with given cardinal are discussed.

控制系统的不变压

钟兴富 (广东外语外贸大学)
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摘要: 为了刻画网络控制系统在完成控制不变任务时需要的最小数据率，近年来人们借助经典动力系统的拓扑熵的定义引入了拓扑反馈熵和不变熵。本报告将回顾拓扑反馈熵和不变熵的发展。之后将介绍不变熵的一些新进展：不变熵和不变压的维数理论。

Ergodic optimization

周小敏 (华中科技大学)
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摘要: The field is a relatively recently established subfield of ergodic theory. The large-scale picture of the field is that one is interested in optimizing potential functions over the (typically highly complex) class of invariant measures for a dynamical system. The field also has both general aspects (in which the optimization is considered in the large on whole Banach spaces) and local aspects (in which the optimization is studied on individual functions).

Mean Li-Yorke chaos in random dynamical systems

周效尧 (南京师范大学)
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摘要: In this talk, we will introduce the notion of mean Li-Yorke chaos in random dynamical systems. We will also show that positive entropy implies the mean Li-Yorke chaos in random dynamical systems.