

2022年苏州大学研究生国际学术创新论坛

动力系统及相关研究

会议日程

时间：2022年8月26-30日

地点：腾讯会议 877-7065-5162 密码：822831

时间	报告人	题目
8月26日		
上午	8:50-9:00	开幕致辞：王志国
		主持人： 文兰
	9:00-9:55	夏志宏 A reformulated KAM theorem and its applications
	10:00-10:55	张宏坤 Quantum stadium and its spectral rigidity
主持人：田学廷		
下午	14:00-14:55	朱玉峻 Stability and entropy for the natural extension of certain systems
	15:00-15:55	周云华 Symbolic dynamics for pointwise hyperbolic systems on open regions
	16:00-16:55	任宪坤 Shadowing and periodic orbits for nonuniformly hyperbolic maps in Hilbert spaces
主持人：臧运涛		
晚上	20:00-20:55	Jerome Buzzi Viana's conjecture for smooth surface diffeomorphisms
8月27日		
主持人：杨云		
上午	9:00-9:55	杨帆 Uniqueness of equilibrium states for sectional-hyperbolic flows in any dimension
	10:00-10:55	吴伟胜 Closed geodesics, Volume asymptotics and Measure of maximal entropy for geodesic flows
	11:00-11:55	杨佳刚 Measures of maximal u -entropy for maps that factor over Anosov
主持人：王方		
	13:00-13:55	厉智明 Local Conditional Entropy for Random Bundle Transformations

下午	14:00-14:55	王娟	Dimension approximation in nonuniformly hyperbolic diffeomorphism
	主持人: 糜泽亚		
	15:00-15:55	邹瑞	Lyapunov exponents for Banach cocycles
	16:00-16:55	吴万楼	Approximation Property on entropies for surface diffeomorphisms

8月28日

主持人: 文晓			
上午	8:30-9:25	孙文博	Equidistribution for nilsequences along spheres
	9:30-10:25	孙鹏	Invariant Measures for Systems with the Approximate Product Property
	10:30-11:25	王广瓦	Lasota方程解半群的混沌性质

主持人: 何宝林			
下午	13:00-13:55	王晓东	Multifractal analysis for singular hyperbolic attractors
	14:00-14:55	王式柔	Synchronization in Markov random network

8月29日

主持人: 刘思序			
上午	8:30-9:25	梁超	Shub's example revisit
	9:30-10:25	糜泽亚	Recent results on SRB measures and physical measures
	10:30-11:25	臧运涛	An upper bound of the measure-theoretical entropy

主持人: 赵云			
下午	13:00-13:55	史逸	Spectral rigidity and integrability for Anosov systems on tori
	14:00-14:55	辜睿皓	Topological and smooth classification of Anosov maps on torus

8月30日

主持人: 吴伟胜			
上午	8:30-9:25	王贞琦	Smooth local rigidity for hyperbolic toral automorphisms
	9:30-10:25	周晶	A resonant switching billiard
	10:30-11:25	瞿聪聪	Dimension approximation for diffeomorphisms preserving hyperbolic SRB measures

报告摘要

8 月 26 日

报告人：夏志宏 (Northwestern University)

题目：A reformulated KAM theorem and its applications

摘要：We show a simple reformulated KAM theorem on existence of invariant torus for Hamiltonian system and symplectic diffeomorphisms. This new formulation has many applications to systems with degeneracies, including simple proofs to many classical results.

报告人：张宏坤 (University of Massachusetts Amherst)

题目：Quantum stadium and its spectral rigidity

摘要：In this talk I will discuss recent work with Jianyu Chen and Vadim Kaloshin, about dynamical spectral rigidity of Bunimovich stadium. I will also explain the quantum unique ergodicity for quantum billiards, as well as a main tool that we propose to use, based on the Markov Tower constructed by collaborated work with Fang Wang and Jianyu Chen.

报告人：朱玉峻 (厦门大学)

题目：Stability and entropy for the natural extension of certain systems

摘要：In this talk, the dynamics (including shadowing property, expansiveness, topological stability and entropy) of the natural extension of certain systems, especially the upper semi-continuous set-valued maps, are considered from differentiable dynamical systems points of view.

报告人：周云华 (重庆大学)

题目：Symbolic dynamics for pointwise hyperbolic systems on open regions

摘要：We construct Markov partitions for pointwise hyperbolic diffeomorphism $f : M \rightarrow M$ on an open invariant subset $O \subset M$, which allow the Lyapunov exponents of orbits to be zero. Under certain conditions on the expansion and contraction rates, we code a subset of O that carries the same finite f -invariant measures as O . An important tool we use is the shadowing theory of recurrent-pointwise-pseudo-orbit we introduced. As a canonical application of finite-to-one Markov extension, we estimate the number of closed orbits for pointwise hyperbolic diffeomorphism f .

报告人：任宪坤 (重庆大学)

题目：Shadowing and periodic orbits for nonuniformly hyperbolic maps in Hilbert spaces

摘要：In this talk, we will discuss a shadowing lemma for nonuniformly hyperbolic maps in Hilbert spaces. As applications, we will show positive Lyapunov exponents of a hyperbolic measure can be approximated by positive Lyapunov exponents of hyperbolic periodic measures and give a upper bound of the metric entropy using the exponential growth rate of those periodic orbits. This is a joint work with Yunhua Zhou.

报告人: Jerome Buzzi (Université Paris-Saclay)

题目: Viana's conjecture for smooth surface diffeomorphisms

摘要: Viana conjectured in 1998 that no zero Lyapunov exponent Lebesgue almost everywhere is a sufficient condition for the existence of a physical measure. In a joint work with Sylvain Crovisier and Omri Sarig, we apply our techniques controlling the exponents and entropy of limiting measures defined by unstable curves to prove this conjecture for C^∞ smooth surface diffeomorphisms (obtained by David Burguet in works that prompted ours).

8 月 27 日

报告人: 杨帆 (Michigan State University)

题目: Uniqueness of equilibrium states for sectional-hyperbolic flows in any dimension

摘要: Since its discovery in the 1960s, Lorenz attractor and Lorenz-like classes have played a central role in the study of continuous-time dynamical systems. In this talk, I will discuss a recent work, joint with Jiagang Yang and Maria Jose Pacifico, where we prove that C^1 open and densely, every sectional-hyperbolic attractor supports a unique equilibrium states for “most” Hölder continuous functions. In particular, there is a unique measure of maximal entropy. The main tool is an improved version of the Climenhaga-Thompson criterion, which is of independent interest.

报告人: 吴伟胜 (厦门大学)

题目: Closed geodesics, Volume asymptotics and Measure of maximal entropy for geodesic flows

摘要: For rank one manifolds of nonpositive curvature (and more generally, without focal points), we obtain asymptotic growth formulae for (1) the number of the homotopy classes of closed geodesics; (2) volume of balls in the universal cover. The main tool is the Patterson-Sullivan construction and the uniqueness of the measure of maximal entropy of the geodesic flow.

报告人: 杨佳刚 (Universidade Federal Fluminense)

题目: Measures of maximal u-entropy for maps that factor over Anosov

摘要: This is a joint work with Raul Ures, Marcelo Viana and Fan Yang. We construct measures of maximal u-entropy for any partially hyperbolic diffeomorphism that factors over an Anosov torus automorphism and has mostly contracting center direction. The space of such measures has a finite dimension, and its extreme points are ergodic measures with pairwise disjoint supports.

报告人: 厉智明 (西北大学)

题目: Local Conditional Entropy for Random Bundle Transformations

摘要: In this talk we introduce the local topological conditional entropy and two kinds of local measure-theoretical conditional entropy for finite measurable cover conditioned by a finite measurable partition for random bundle transformations. We find two local measure-theoretical conditional entropies coincide. As an application of such connection we establish a local conditional variational principle for bundle random dynamical systems.

报告人: 王娟 (上海工程技术大学)

题目: Dimension approximation in nonuniformly hyperbolic diffeomorphism

摘要: For a C^{1+r} diffeomorphism f preserving a hyperbolic ergodic measure μ of positive entropy, Katok proved that μ can be approximated by a sequence of hyperbolic sets. We investigate the dimensions of hyperbolic sets and μ .

报告人: 邹瑞 (南京信息工程大学)

题目: Lyapunov exponents for Banach cocycles

摘要: In this talk, we will report some results about the approximation of Lyapunov exponents for Banach cocycles and its applications. We also discuss the abundance of Lyapunov-irregular points for Banach cocycles.

报告人: 吴万楼 (江苏师范大学)

题目: Approximation Property on entropies for surface diffeomorphisms

摘要: In this talk, we prove that for any C^1 surface diffeomorphism f with positive topological entropy, there exists a diffeomorphism g arbitrarily close (in the C^1 topology) to f exhibiting a horseshoe, such that the topological entropy of g restricted on can arbitrarily approximate the topological entropy of f . This extends a classical result of Katok for $C^{1+\alpha}$ ($\alpha > 0$) surface diffeomorphisms

8 月 28 日

报告人: 孙文博 (Virginia Tech)

题目: Equidistribution for nilsequences along spheres

摘要: The nilsequence is a generalization for exponential sums which has a wide range of applications in analysis and combinatorics. A well known result of Green and Tao in 2010 states that the equidistribution property of a nilsequence is determined by its projection on the horizontal torus. While the average behavior of nilsequences along intervals has been widely studied in the last decade, in this talk, we will focus on some recent results on the average behavior of nilsequences along spheres, as well as their applications.

报告人: 孙鹏 (中央财经大学)

题目: Invariant Measures for Systems with the Approximate Product Property

摘要: In this talk we focus on the space $M(X, f)$ of the invariant measures for a system with the approximate product property. We show that there is a dichotomy: $M(X, f)$ is a singleton (the system is uniquely ergodic) if and only if $h(f) = 0$; $M(X, f)$ is a Poulsen simplex if and only if $h(f) > 0$. In the latter case, we can show that every invariant measure can be approximated by compact invariant sets with intermediate entropies. If in addition the system is asymptotically entropy expansive, then ergodic measures of intermediate entropies are actually generic in certain compact subsets.

报告人: 王广瓦 (江苏师范大学)

题目: Lasota 方程解半群的混沌性质

摘要: Lasota 方程是一类特殊的一阶偏微分方程, 由于其有着较强的生物学背景, 近几十年来一直被数学家们研究, 这些研究包括线性和非线性的情形。我们将在本报告里汇报 Lasota 方程解半群的混沌性质的相关研究进展。

报告人: 王晓东 (上海交通大学)

题目: Multifractal analysis for singular hyperbolic attractors

摘要: We study the multifractal analysis for singular hyperbolic attractors, including the geometric Lorenz attractors. For each singular hyperbolic homoclinic class whose periodic orbits are all homoclinically related and such that the space of ergodic probability measures is connected, we prove that: (i) level sets associated to continuous observables are dense in the homoclinic class and satisfy a variational principle; (ii) irregular sets are either empty or are Baire generic and carry full topological entropy. The assumptions are satisfied by C^1 -generic singular hyperbolic attractors and C^r -generic geometric Lorenz attractors ($r \geq 2$). The main technique we apply is the horseshoe approximation property.

报告人：王式柔 (吉林大学)

题目：Synchronization in Markov random network

摘要：Many complex biological and physical networks are naturally subject to both random influences, i.e., extrinsic randomness, from their surrounding environment, and uncertainties, i.e., intrinsic noise, from their individuals. Among many interesting network dynamics, of particular importance is the synchronization property which is closely related to the network reliability especially in cellular bio-networks. This talk presents an appropriate framework of (discrete-state and discrete time) Markov random networks to incorporate both extrinsic randomness and intrinsic noise into the rigorous study of such synchronization and desynchronization scenario. It is shown that if a random network without intrinsic noise perturbation is synchronized, then both high-probability synchronization and low-probability desynchronization can occur intermittently and alternatively in time by intrinsic noise perturbation. Moreover, both the probability of (de)synchronization and the proportion of time spent in (de)synchrony can be explicitly estimated. Further problems related to this topic will also be discussed.

8 月 29 日

报告人：梁超 (中央财经大学)

题目：Shub's example revisit

摘要：Shub's example is a class of C^1 open set of partially hyperbolic diffeomorphism on T^4 with 2 dimensional center, which are robustly transitive but not uniformly hyperbolic. In this talk, we show such a C^1 open set U such that for every C^2 diffeomorphism g in this open set, the center bundle admits no domination, and any two hyperbolic points of g with stable index 2 are homoclinic related. As a consequence, we discuss the existence and uniqueness of maximal entropy measure for C^2 diffeomorphism $g \in U$.

报告人：糜泽亚 (南京信息工程大学)

题目：Recent results on SRB measures and physical measures

摘要：SRB and physical measures are important invariant measures that can reflect chaotic behaviors of dynamical systems with different viewpoints. In this talk, we report some recent results on the existence and stability of SRB/physical measures.

报告人：臧运涛 (苏州大学)

题目：An upper bound of the measure-theoretical entropy

摘要：We consider a $C^{1+\alpha}$ diffeomorphism on a compact manifold. We use a special family of fake center-stable manifolds to bound the entropy of an ergodic measure in terms of positive Lyapunov exponents and the so called 'dimensional entropy', a notion related to the topological entropy of submanifolds. We do not assume uniform structures such as dominated splittings and we directly use Pesin theory instead of Ledrappier and Young's theory.

报告人：史逸 (北京大学)

题目：Spectral rigidity and integrability for Anosov systems on tori

摘要：In this talk, we address on the strong rigidity properties from joint integrability in the setting of Anosov diffeomorphisms on tori. More specifically, for an irreducible Anosov diffeomorphism with splitted stable bundle, the joint integrability of the strong stable and full unstable subbundles implies existence of fine dominated splitting along the weak stable subbundle as well as Lyapunov exponents rigidity. This builds an equivalence bridge between the geometric rigidity (joint integrability) and dynamical spectral rigidity (Lyapunov exponents rigidity) for Anosov diffeomorphisms on tori. This talk is based on a joint work with A. Gogolev.

报告人：辜睿皓 (北京大学)

题目：Topological and smooth classification of Anosov maps on torus

摘要：We give the topological and smooth classification of non-invertible Anosov maps on torus. We show that two non-invertible Anosov maps on torus are topologically conjugate if and only if they have the same Lyapunov exponents on the stable bundles of their corresponding periodic points. Moreover, if two non-invertible Anosov maps on torus are topologically conjugate, then the conjugacy is smooth along the stable foliation.

8 月 30 日

报告人：王贞琦 (Michigan State University)

题目：Smooth local rigidity for hyperbolic toral automorphisms

摘要：We study the regularity of a conjugacy H between a hyperbolic toral automorphism A and its smooth perturbation f . We show that if H is weakly differentiable then it is $C^{1+\text{Hölder}}$ and, if A is also weakly irreducible, then H is C^∞ . As a part of the proof, we establish results of independent interest on Hölder continuity of a measurable conjugacy between linear cocycles over a hyperbolic system. As a corollary, we improve regularity of the conjugacy to C^∞ in prior local rigidity results. This is a joint work with B. Kalinin and V. Sadovskaya.

报告人：周晶 (Pennsylvania State University)

题目：A resonant switching billiard

摘要：In this talk we show the existence of an infinite measure set of exponentially escaping orbits for a resonant Fermi accelerator, which is realized as a square billiard with a periodically oscillating platform. We use normal forms to describe the energy change in a period and employ techniques from the theory of hyperbolic systems with singularities to show the exponential drift given by these normal forms on a divided time-energy phase.

报告人：瞿聪聪 (浙江万里学院)

题目：Dimension approximation for diffeomorphisms preserving hyperbolic SRB measures

摘要：For a $C^{1+\alpha}$ diffeomorphism f preserving a hyperbolic ergodic SRB measure μ , Katok's remarkable results assert that μ can be approximated by a sequence of hyperbolic sets $\{\Lambda_n\}_{n \geq 1}$. In this paper, we prove that the Hausdorff dimension for Λ_n on the unstable manifold tends to the dimension of the unstable manifold. Furthermore, if the stable direction is one dimension, then the Hausdorff dimension of μ can be approximated by the Hausdorff dimension of Λ_n . To establish these results, we utilize the u-Gibbs property of the conditional measure of the equilibrium measure of $-\psi^s(\cdot, f^n)$ and the properties of the uniformly hyperbolic dynamical systems. This is a joint work with Juan Wang and Yongluo Cao.