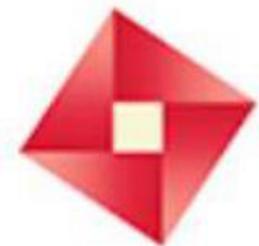




A bird's view of Shanghai

# 上海市数学会首届青年学者论坛 动力系统线上论坛



中国数学会

2021/01/02

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上海市数学会

组委会：杜荣(华东师范大学)，吴昊(同济大学)，谢春景(上海交通大学)，张国华(复旦大学)

开幕式 (2021/01/02 8:45 - 9:00)

Speaker	Time	Title
石荣刚	9:00-9:50	群作用中的刚性问题
苗俊杰	9:50-10:40	McMullen 集的性质
冀诸超	10:40-11:30	Julia sets of 2-dimensional post-critically finite maps
Speaker	Time	Title
马先锋	14:00-14:50	Mean dimension for random bundle transformations
王晓东	14:50-15:40	Characterizations of uniform hyperbolicity for homoclinic classes
高美娜	15:40-16:30	A degenerate KAM theorem for PDEs with periodic boundary conditions

### 1. 石荣刚 (上海数学中心)

**Title:** 群作用中的刚性问题

**Abstract:** 群作用的动力系统中主要未解决问题之一是 Furstenberg 关于环面上乘 2 乘 3 不变测度的分类问题。我们将回顾关于这个问题研究的发展历程和相关结果。受到这些结果的启发，人们在齐性空间上也提出了类似的猜想。我们也将介绍齐性空间上的相关结果和猜想。

### 2. 苗俊杰 (华东师范大学)

**Title:** McMullen 集的性质

**Abstract:** 在分形几何的研究中，分形集的维数理论，几何结构及拓扑性质是很大家比较关心的问题。由于 McMullen 集是一类最简单的自仿集，所以研究者经常以这类集合为试金石来研究或展示分形集的各种性质。此次报告，我们首先回顾 McMullen 集的一些性质，然后介绍 McMullen 集上的 Gap 序列，我们通过对此集合 Gap 序列的刻画来展示它们的维数，几何结构和拓扑性质的关系。

### 3. 冀诸超 (上海数学中心)

**Title:** Julia sets of 2-dimensional post-critically finite maps

**Abstract:** Let  $f$  be a holomorphic endomorphism on  $\mathbb{P}^2$ . The first Julia set  $J_1$  is classically defined as the maximal locus such that  $\{f^n\}$  locally do not form a normal family. The second Julia set  $J_2 \subset J_1$  is defined as the support of the measure of maximal entropy. In this talk we will study these two Julia sets for post-critically finite (PCF for short) maps. Here are two main results: 1.  $J_1 \setminus J_2$  is contained in the union of attracting basins of critical component cycles and stable manifolds of sporadic super-saddle points. 2. If  $x \in J_2$  is not contained in the stable manifold of a sporadic super-saddle point, then there is no Fatou disk containing  $x$ . As corollaries of our results, 1. We answer some questions of Fornæss-Sibony about the non-wandering set for PCF maps. 2. We give a new proof of de Thelin's laminarity of the Green current on  $J_1 \setminus J_2$ . 3. We obtain characterizations of PCF maps which are expanding on  $J_2$  or satisfy Axiom A.

#### 4. 马先锋 (华东理工大学)

**Title:** Mean dimension for random bundle transformations

**Abstract:** In this talk we consider the mean topological dimension for random bundle transformations. Continuous bundle random dynamical systems with finite entropy or satisfying the small boundary property is shown to have zero mean topological dimensions. We also discuss the connection between the conditional rate distortion functions and the random metric mean dimension, and show that the latter could dominate the former. This talk is based on joint works with Junqi Yang and Ercai Chen.

#### 5. 王晓东 (上海交通大学)

**Title:** Characterizations of uniform hyperbolicity for homoclinic classes

**Abstract:** In this talk, we give two characterizations of uniform hyperbolicity for homoclinic classes of generic diffeomorphisms. First, we prove that for generic  $f \in \text{Diff}^1(M)$ , a homoclinic class  $H(p)$  is uniformly hyperbolic if and only if  $H(p)$  admits no “weak” periodic orbits, i.e. all periodic orbits in  $H(p)$  have all their Lyapunov exponents bounded away from 0. This is the “star” conjecture restricted on homoclinic classes. Second, we prove that for generic  $f \in \text{Diff}^1(M)$ , a homoclinic class  $H(p)$  is uniformly hyperbolic if and only if  $H(p)$  supports no non-hyperbolic ergodic measures. This proves a conjecture raised by Diaz-Gorodetski. More properties of non-hyperbolic ergodic measures supported on  $H(p)$  will be investigated.

#### 6. 高美娜 (上海第二工业大学)

**Title:** A degenerate KAM theorem for PDEs with periodic boundary conditions

**Abstract:** In this talk, an infinite dimensional KAM theorem with double normal frequencies is established under qualitative non-degenerate conditions. As applications, for nonlinear wave equation and nonlinear Schrodinger equation with periodic boundary conditions, quasi-periodic solutions of small amplitude and quasi-periodic solutions around plane wave are obtained respectively.