

## ON DICHOTOMY LAW FOR BETA-DYNAMICAL SYSTEM IN PARAMETER SPACE

**Speaker: Professor Jun Wu**

**Huazhong University of Science and Technology**

**Time: Thursday, December 3, 2020, 14:00-15:00**

**Tencent room: 441 147 512**

ABSTRACT. In this talk, we study the distribution properties of full cylinders in beta-dynamical system. We show that full cylinders take up a certain proportion among all cylinders. With the help of this fact, we obtain the measure theoretic properties of the following sets. Let  $\{x_n\}_{n \geq 1} \subseteq [0, 1]$  be a sequence of real numbers and let  $\varphi: \mathbb{N} \rightarrow (0, 1]$  be a positive function. We prove that for any  $x \in (0, 1]$ , the set

$$\{\beta > 1: |T_\beta^n x - x_n| < \varphi(n) \text{ for infinitely many } n \in \mathbb{N}\}$$

is of zero or full Lebesgue measure in  $(1, +\infty)$  according to  $\sum \varphi(n) < +\infty$  or not, where  $T_\beta$  is the beta-transformation. We also determine, for any  $x \in (0, 1]$ , the exact Lebesgue measure of the set

$$\{\beta > 1: |T_\beta^n x - x_n| < \beta^{-l_n} \text{ for infinitely many } n \in \mathbb{N}\},$$

where  $\{l_n\}_{n \geq 1}$  is a sequence of nonnegative real numbers.

## ***BOHR CHAOTICITY OF TOPOLOGICAL DYNAMICAL SYSTEMS***

**Speaker: Professor Shilei Fan**  
**Central China Normal University**

**Time: Thursday, December 3, 2020, 15:00-16:00**

**Tencent room: 441 147 512**

**Abstract:** We introduce the notion of Bohr chaoticity, which is a topological invariant, and is opposite to the property required by Sarnak's conjecture. Such a system is by definition never orthogonal to any non-trivial weight and it must be of positive entropy. But having positive entropy is not sufficient to ensure the Bohr chaoticity. We proved the Bohr chaoticity for all topological dynamical systems which have Horse-shoes, all toral affine dynamical systems of positive entropy. However, uniquely ergodic dynamical systems are not Bohr chaotic and there are many such dynamical systems of positive entropy. This is a joint work with Aihua FAN and Weixiao SHEN.