

COLLOQUIUM

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Ergodic Properties of Stable Random Fields

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A405 Wells Hall

10:20 a.m. - 11:10 a.m.

Refreshments: 10:00 a.m.

Abstract

A random variable X is said to follow symmetric α -stable ($0 < \alpha \leq 2$) distribution with scale parameter $\sigma > 0$ if its characteristic function is given by $E(e^{i\theta X}) = e^{-\sigma^\alpha |\theta|^\alpha}$ for all $\theta \in \mathbb{R}$. For $T = \mathbb{Z}$ or \mathbb{R} , $\{X_t\}_{t \in T^d}$ is called a stationary symmetric α -stable random field if for all $c_1, c_2, \dots, c_k \in \mathbb{R}$, and, $t_1, t_2, \dots, t_k, u \in T^d$, $\sum_{j=1}^k c_j X_{t_j+u}$ follows a symmetric α -stable distribution, which does not depend on u .

In this talk, we establish characterization results for the ergodicity of S α S stationary random fields. We first show that the result of Samorodnitsky(2005) remains valid in the multiparameter setting, i.e., a stationary S α S ($0 < \alpha < 2$) random field is ergodic (or equivalently, weakly mixing) if and only if it is generated by a null group action. By establishing multiparameter versions of Stochastic and Birkhoff Ergodic Theorems, we give a criterion for ergodicity of these random fields which is valid for all dimensions and new even in the one-dimensional case. (This talk is based on a joint work with Yizao Wang and Stilian A. Stoev.)

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