Theoretical Statistics and Mathematics Unit, Kolkata
INDIAN STATISTICAL INSTITUTE

SEMINAR

Date: June 16, 2025
Time: 04:15 PM

VENUE:

L- Infinity
(5th Floor, A.N. Kolmogorov Bhavan), ISI Kolkata

TITLE:

Spectrum of Lévy-Ornstein-Uhlenbeck semigroups on $\mathbb{R}^d$

SPEAKER:

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ABSTRACT:

We investigate spectral properties of Markov semigroups associated with Ornstein-Uhlenbeck (OU) processes driven by Lévy processes. These semigroups are generated by non-local, non-self-adjoint operators. In the special case where the driving Lévy process is Brownian motion, one recovers the classical diffusion OU semigroup, whose spectral properties have been extensively studied over past few decades. Our main results show that, under suitable conditions on the Lévy process, the spectrum of the Lévy-OU semigroup in the L^p-space weighted with the invariant distribution coincides with that of the diffusion OU semigroup. Furthermore, when the drift matrix B is diagonalizable with real eigenvalues, we derive explicit formulas for eigenfunctions and co-eigenfunctions. A key ingredient in our approach is intertwining relationship: we prove that every Lévy-OU semigroup is intertwined with a diffusion OU semigroup, thereby preserving the spectral properties.

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