Estimates on transition densities for Markov processes with singular jumps

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Abstract

We consider a non-local operator with a singular kernel. Corresponding to the non-local operator, there exists a discontinuous Markov process with the operator as infinitesimal generator, and a heat kernel of the operator is a transition density of the Markov process. In this talk, we study the heat kernel bounds for the anisotropic discontinuous Markov process. Let L_i be identical and independent 1–dimensional symmetric Lévy processes whose characteristic functions satisfy the weakly scaling condition. Define a Markov process $M := (M_1, \ldots, M_d)$ whose jumping kernel is comparable to that of $L := (L_1, \ldots, L_d)$. Then M only has a jump parallel to the axes. We discuss the sharp two-sided heat kernel estimates on $\mathbb{R}^d$ and $C^{1,1}$–open set $D \subset \mathbb{R}^d$. This is the joint work with Lidan Wang.

1. Heat kernel bounds for a large class of Markov process with singular jump. (with Lidan Wang), *Stochastic processes and their applications.* **145**: 165–203, 2022.

2. Dirichlet Heat kernel estimates for a large class of anisotropic Markov process. (with Lidan Wang). *submitted.*