

Intrinsic Ultracontractivity and Heat Kernel Estimates of Non-local Dirichlet Forms on Horn-Shaped Domains

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Abstract

We consider a large class of symmetric Markov processes $X = (X_t)_{t \geq 0}$ on R^d generated by non-local Dirichlet forms, which include jump processes with small jumps of α -stable-like type and with large jumps of super-exponential decay. Let $D \subset R^d$ be an open (not necessarily bounded and connected) set, and $X^D = (X_t^D)_{t \geq 0}$ be the killed process of X on exiting D . We obtain explicit criterion for the compactness and the intrinsic ultracontractivity of the Dirichlet Markov semigroup $(P_t^D)_{t \geq 0}$ of X^D . When D is a horn-shaped region, we further obtain two-sided estimates of ground state in terms of jumping kernel of X and the reference function of the horn-shaped region D . Two-sided heat kernel estimates for α -stable-like processes on the horn-shaped region D are also established.