HEAT KERNEL ESTIMATES AND THEIR STABILITIES FOR SYMMETRIC JUMP PROCESSES WITH GENERAL MIXED POLYNOMIAL GROWTHS ON METRIC MEASURE SPACES

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In this talk, we consider a symmetric pure jump Markov process X on a general metric measure space that satisfies volume doubling conditions. We discuss estimates of the transition density $p(t, x, y)$ of X and their stabilities when the jumping kernel for X has general mixed polynomial growths. Unlike [3], the rate function which gives growth of jumps of X may not be comparable to the scale function which provides the borderline for $p(t, x, y)$ to have either near-diagonal estimates or off-diagonal estimates. Under the assumption that the lower scaling index of scale function is strictly bigger than 1, we establish stabilities of heat kernel estimates. If underlying metric measure space admits a conservative diffusion process which has a transition density satisfying a general sub-Gaussian bounds, we obtain heat kernel estimates which generalize [1, Theorems 1.2 and 1.4]. In this case, scale function is explicitly given by the rate function and the function F related to walk dimension of underlying space. As an application, we have that the finite moment condition in terms of F on such symmetric Markov process is equivalent to a generalized version of Khintchine-type law of iterated logarithm at the infinity. This talk is based on joint works [1, 2] with Joohak Bae, Jaehoon Kang and Jaehun Lee.

References

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[3] Z.-Q. Chen, T. Kumagai and J. Wang. Stability of heat kernel estimates for symmetric jump processes on metric measure spaces. To appear in *Memoirs of the AMS*.

[4] Z.-Q. Chen, T. Kumagai and J. Wang. Stability of parabolic Harnack inequalities for symmetric non-local Dirichlet forms. To appear in *J. Euro. Math. Soc.*