

A graph discretized approximation of diffusions with drift and killing on a complete Riemannian manifold

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In this talk, we present a graph discretized approximation scheme for diffusions with drift and killing on a complete Riemannian manifold M . More precisely, for a given Schrödinger operator with drift on M having the form $\mathcal{A} = -\Delta - b + V$, we introduce a family of discrete time random walks in the flow generated by the drift b with killing on a sequence of proximity graphs, which are constructed by partitions cutting M into small pieces. As a main result, we prove that the drifted Schrödinger semigroup $\{e^{-t\mathcal{A}}\}_{t \geq 0}$ is approximated by discrete semigroups generated by the family of random walks with a suitable scale change. This result gives a finite dimensional summation approximation of a Feynman-Kac type functional integral over M . Furthermore, when M is compact, we also obtain a quantitative error estimate of the convergence. This talk is based on a joint work (arXiv:2211.14472) with Satoshi Ishiwata (Yamagata University).