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On the Path Integral Approach to Wigner-Dunkl Quantum Mechanics

Prof. Georg Junker

University Erlangen-Nürnberg (Germany)
European Southern Observatory (Germany)

Abstract: In this talk we will revisit Feynman's path-integral approach to non-relativistic quantum mechanics. Passing to Euclidean time, its close relation to the Feynman-Kac formula is emphasized and the related stochastic Wiener and Bessel processes are briefly reviewed. We then consider the so-called Wigner-Dunkl quantum mechanics, which is a deformation of standard Heisenberg-Schrödinger approach. Whereas in Heisenberg-Schrödinger framework the Euclidean path integral is based on the Wiener measure associated with the Wiener process of Brownian motion, in Wigner-Dunkl quantum mechanics the Feynman-Kac formula is based on the Dunkl process, a càdlàg modification of a Wiener process with jumps. We then show that the Dunkl process can be viewed as a combination of two Bessel processes being again continuous Markov processes.

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