Seminario de análisis matemático y aplicaciones
Analisi matematikoa eta aplikazioak mintegia

The Feynman Path Integral: Rigorous Formulation

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ABSTRACT: The Feynman Path Integral formulation of quantum mechanics is a well known concept for physicists but this integral is mathematically not generally well-defined even if there exists several approaches such as Albeverio-Hegh-Krohn-Itô (Fresnel integrals on Hilbert space), Hida-Streit (White noise distributions). In a recent paper, we constructed a path distribution representing the kinetic part of the Feynman path integral at discrete times similar to that defined by Erik Thomas, but on a Hilbert space of paths rather than a nuclear sequence space. We also considered different boundary conditions and show that the discrete-time Feynman path integral is well-defined for suitably smooth potentials. The aim of this talk is to present this new approach and to discuss the outlook for the continuous-time path integral. Before that, we will start the seminar with an introduction to the Feynman Path Integral including an overview of the rigorous results on this topic.

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