Seminar/Talk

Wiener-type Theorems for the Laplace Transform

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Host: Robert Seiringer

Wieners theorem connects the discrete part of a finite measure to the time-averaged squared modulus of its Fourier transform. It has a variety of applications, for example, in the proof of the famous RAGE theorem which connects the different spectral parts of a Hamiltonian H to the long-time behaviour of states under time evolution by the unitary group generated by H.In order to study the bottom of the spectrum of the Hamiltonian, it is natural to shift the focus from the unitary group to the semigroup generated by H, and hence to study the Laplace (rather than the Fourier) transform of its spectral measures. This approach is particularly appealing in the context of Feynman-Kac formulas, which allow us to apply probabilistic techniques to the study of semigroups.I will present two "Wiener-type" theorems that express the behaviour of a finite measure near the bottom of its support in terms of time averaged quotients of its Laplace transform. Connecting these results to perturbation theory as well as to renewal theory yields natural interpretations both in functional analytic as well as in probabilistic terms. As an application, I will present criteria for the existence and non-existence of ground states of a finite-dimensional quantum system coupled to a bosonic field.Based on joint work with Benjamin Hinrichs

Tuesday, November 11, 2025 04:15pm - 05:15pm
Office Bldg West / Ground floor / Heinzel Seminar Room (I21.EG.101)

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