SEMINÁŘ OTF ÚJF, ŘEŽ

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The semiclassical fall of non-Hermitian quantum mechanics

Abstrakt

We give an account of a recent joint work with Petr Siegl in which we apply semiclassical methods to throw doubt on the concept of PT-symmetric quantum mechanics due to Bender et al. It is commonly accepted in that community that parity-time symmetric albeit non-Hermitian observables give rise to a consistent quantum mechanics through a similarity to self-adjoint operators. As a prominent example there is the imaginary cubic oscillator that stayed at the advent of PT-symmetric quantum mechanics in the turn of the millennium. We show that this example, as an element of a large class of non-self-adjoint Schroedinger operators, is not similar to a self-adjoint operator via physically relevant transformations. Our argument is based on known semiclassical results which involve a direct construction of a continuous family of approximate eigenstates of complex energies far from the spectrum.

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