

SEMINÁŘ OTF ÚJF, ŘEŽ

UWE GÜNTHER

(Helmholtz-Zentrum Dresden-Rossendorf)

Krein space related physics

Abstrakt

Physical models with anti-linear symmetries can often be described by differential operators self-adjoint in suitably chosen Krein spaces. We briefly comment on the spectral properties of some specific operators self-adjoint in Krein spaces and related effects:

- the operator of the hydrodynamic Squire equation, its scaling behavior and mapping to the operator of the Bender-Boettcher model of \mathcal{PT} Quantum Mechanics,

- the cusp-type spectral properties in the vicinity of third-order exceptional points (algebraic branch points),

- the unfolding of higher-order exceptional points of the spectrum of Hamiltonians in \mathcal{PT} -symmetric Bose-Hubbard models described with the help of Puiseux series expansions and Newton polygon techniques.

We briefly explain the basic features of the so-called quantum brachistochrone problem for Hamiltonians self-adjoint in Hilbert spaces and in Krein spaces and demonstrate their interrelation geometrically in terms of contraction-dilation maps in projective Hilbert spaces and via positive operator-valued measures (POVMs) and Naimark dilation. Finally, we briefly comment on recent experimental findings in \mathcal{PT} -symmetric (i.e. Krein-space related) physics, especially in optical wave-guide systems and microwave cavities.

**Seminář se koná v pátek 8. 2. 2013 v 10:30 hod.
v zasedací místnosti ÚJF Řež**

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