

SEMINÁŘ OTF ÚJF, ŘEŽ

UWE GÜNTHER

(Helmholtz-Zentrum Dresden-Rossendorf)

Krein space related physics II.

Abstrakt

Building on discussions in the previous talk (a week ago), the present talk comprises the following three main subjects:

1) the eigenvector isotropization in the vicinity of exceptional points (algebraic branch points) of the spectra of parameter dependent operators and matrices, and underlying Lie group structures of such isotropizations. For simple toy model matrix Hamiltonians we demonstrate the structural analogy to Lorentz boost transformations of chiral spinors and the naturally emerging $SO(N, \mathbb{C})$ group structure of these boosts. It will be shown that normalization divergencies of the eigenvectors can be simply resolved via projective extensions and the use of different affine charts of the corresponding projective spaces. For gauged \mathcal{PT} -symmetric systems we demonstrate the occurrence of Lie triple systems (ternary Lie algebraic structures) as well as of a hidden Clifford algebra.

2) 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.

3) 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 15. 2. 2013 v 10:30 hod.
v zasedací místnosti ÚJF Řež**

A. Cieplý/otf