S. Kuzhel (Institute of Mathematics of NAS of Ukraine, Kiev)

On symmetries in the theory of finite rank singular perturbations.

joint work with S. Hassi

For a nonnegative self-adjoint operator A_0 acting on a Hilbert space $\mathfrak{H}$ singular perturbations of the form $A_0 + V$, $V = \sum_1^n b_{ij} < \psi_j, \cdot > \psi_i$ are studied under some additional requirements of symmetry imposed on the initial operator A_0 and the singular elements ψ_j. A concept of symmetry is defined by means of a one-parameter family of unitary operators $\mathfrak{U}$ that is motivated by results due to R. S. Phillips. The abstract framework to study singular perturbations with symmetries developed in the paper allows one to incorporate physically meaningful connections between singular potentials V and the corresponding self-adjoint realizations of $A_0 + V$. The results are applied for the investigation of singular perturbations of the Schrödinger operator in $L_2(\mathbb{R}^3)$ and for the study of a (fractional) p-adic Schrödinger type operator with point interactions.