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RESEARCH

My research interests include:

- (1) Extension theory of symmetric operators in Hilbert spaces,
- (2) Operators in indefinite inner product spaces
- (3) Perturbation theory
- (4) Interpolation problems of Pick-Nevanlinna type

The main results:

1) **The method of boundary triples and abstract Weyl functions.** The notion of abstract Weyl function of symmetric operators in a Hilbert space was introduced and applied to investigation of spectral properties of its selfadjoint extensions. In particular, for a symmetric operator A with several gaps Krein problem of description of generalized resolvents of A associated with selfadjoint extensions preserving these gaps was solved in a series of joint papers with M. Malamud. The concepts of boundary relation and the corresponding Weyl family are introduced. A geometric approach to Krein formula for generalized resolvents is elaborated in common papers with S.Hassi, M.M. Malamud and H.S.V. de Snoo. Various classes of generalized boundary triples were introduced and characterized in purely analytic terms via their Weyl function. Close interconnections between different classes of generalized boundary triples and the corresponding Weyl functions were investigated.

2) **Boundary triples approach to extension theory of symmetric operators in indefinite inner product spaces.** The method of boundary triples of a symmetric operator in a Krein space was elaborated. Generalized resolvents of a nonnegative symmetric operator with a finite number of negative squares are described. The results are applied to indefinite Hamburger and Stieltjes moment problems.

3) **Interpolation problems of Pick-Nevanlinna type.** The approach via the extension theory of symmetric operators in Pontryagin spaces was applied to Schur-Nevanlinna-Pick interpolation problems in generalized Nevanlinna, Stieltjes and Schur classes. In the case of the nondegenerate Pick matrix a description of all solutions of the problem was given. Indefinite Schur-Nevanlinna-Pick interpolation problems with degenerate Pick matrix were studied in a series of joint papers with H. Dym.

4) **Perturbation theory and operator models.** Operator models for singular finite rank perturbations of selfadjoint operators in Pontryagin spaces were constructed and investigated in a series of common papers with S.Hassi and H.S.V. de Snoo.

5) **Direct and inverse spectral problems for generalized Jacobi matrices.** The Schur algorithm for scalar indefinite Hamburger (resp. Stieltjes) moment problem was elaborated in common papers with M. Derevyagin (resp. I. Kovalev). Solutions of full and truncated indefinite Hamburger and Stieltjes moment problems were parametrized, factorization formulae for resolvent matrices are found. Convergence of diagonal and subdiagonal Padé approximants for a wide class of generalized Nevanlinna functions was studied. Direct and inverse spectral problems for generalized Jacobi matrices were investigated.

7) **Similarity problem for indefinite Sturm-Liouville operator.** The problem of similarity of indefinite Sturm-Liouville operator to a selfadjoint operator was studied by the

methods of extension theory. This problem is reduced to the study of critical points of a selfadjoint operator in a Krein space. Regularity conditions for critical points of indefinite Sturm-Liouville were found in a series of joint papers with B. Čurgus and C. Trunk.