Recent Progress in Operator Theory

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This volume makes the second volume of the *Operator Theory* series of the Proceedings of *International Workshop on Operator Theory and Applications, IWOTA '95* which was held at the University of Regensburg, Germany, from July 31 to August 4, 1995.

The volume contains 15 papers on abstract operator theory.

A brief description of the papers follows.

1. *Inversion formulas for compressions of block-Toeplitz operators,* by D. Z. Arov, obtains inversion formulas for invertible compressions of block - Toeplitz matrices, block - Pickmatrices and for Toeplitz integral operators in $L_n^2(0,a)$.

2. *Contractive linear relations in Pontryagin spaces,* by T.Ya. Azizov and A. Dijksma, studies linear relations in spaces with an indefinite metrics. The authors prove some criteria for a contractive closed linear relation to be maximal contractive.

3. *On a new algorithm for almost periodic factorization,* by M. A. Bastos, Yu. I. Karlovich, I. M. Spitkovsky and P. M. Tishin, proposes an algorithm allowing to find necessary and sufficient conditions for the existence of an almost periodic factorization for several new classes of triangular and block triangular matrix functions.

4. *On the normal solvability of cohomological equations on compact topological spaces,* by G. Belitskii and Yu. Lyubich, proves that the equation $\varphi(Fx)-\varphi(x)=\gamma(x)$ is normally solvable in $C(x)$ if and only if F is preperiodic. The solvability problem in measurable functions is also investigated.

5. *On nonnegative realizations of rational matrix functions and nonnegative input-output systems,* by K.-H. Förster and B. Nagy, provides existence conditions for the minimal realizations of some function matrices.

6. *On the geometric structure of regular dilations,* by D. Gaspar and N. Suciu, provides structure results for Hilbert space multicontractions having a regular (or * - regular) isometric dilation.

7. *On generalized interpolation and shift invariant maximal semidefinite subspaces,* by A. Gheondea, uses a generalization of a theorem of I. S. Iokhvidov's on the existence of invariant maximal semi - definite subspaces to solve the meromorphic case of the generalized interpolation problem. It is shown that this contains the bitangential Nevanlinna - Pick problem with poles.

8. *The sum of matrix Nevanlinna functions and self-adjoint extensions in exit spaces,* by S. Hassi, M. Kaltenbäck and H. S. V. De Snoo, describes minimal self - adjoint extensions in a fixed exit space.

9. *Properties of "derived" Hankel matrices,* by G. Heinig, studies the derived Hankel matrices. The main results are a generalization of Kronecker's Theorem, Vandermonde factorization of infinite finite - rank derived Hankel matrices, the description of their range, rank and signature and inversion of finite triangular derived Hankel matrices.

10. *The probability that a partial matrix is positive semidefinite,* by C. R. Johnson and G. Nævdal, computes the probability that a symmetric matrix $A=(a_{ij})$ is positive semidefinite.

11. *Factorization of lower triangular unitary operators with finite Kronecker index into elementary factors,* by M. A. Kaashoek and D. R. Pik, proves that a block lower triangular unitary operator with Kronecker index $N<+\infty$ admits a factorization in a product of N block lower triangular unitary operators with Kronecker index equal to 1.

12. *Fredholm theory of interpolation morphisms,* by M. Krause, studies the abstract Fredholm theory of a bounded linear operator T as an interpolation

morphism. The results are applied to the real interpolation method.

13. *Resolvents of symmetric operators and the degenerated Nevanlinna-Pick problem*, by H. Langer and H. Woracek, gives a parameterization of the Štraus extension of a symmetric operator S acting in an Pontryagin space of dimension n+1 and of negative index 1.

14. *Perturbation of linear semigroups*, by G. Schlüchtermann, presents an extension of a result on the essential spectral radius of a perturbed semigroup obtained by L. Weis.

15. *On the approximation of operators and the convergence of the spectra of the approximants*, by M. P. H. Wolff, shows that a modification of a convergence theorem does even hold in the case of discrete convergence.

The contributions to different aspects of operator theory and its applications contained in this volume are of interest for the research workers in the domain.

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