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ABSTRACTS

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Weighted shifts on directed trees generating Stieltjes moment sequences

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Let $\mathcal{H}$ be an infinite dimensional complex Hilbert space and let $\mathcal{L}(\mathcal{H})$ be the algebra of all bounded linear operators on $\mathcal{H}$. It is well-known that $S \in \mathcal{L}(\mathcal{H})$ is subnormal if and only if $\{\|S^n h\|^2\}_{n=0}^{\infty}$ is a Stieltjes moment sequence for all $h \in \mathcal{H}$, but this fact does not hold in the case of unbounded subnormal operators in $\mathcal{H}$. Recall that if $W_\alpha : l^2(\mathbb{C}) \supset \mathcal{D}(W) \to l^2(\mathbb{C})$ is a classical weighted shift with a wight sequence $\alpha = \{\alpha_j\}_{j=0}^{\infty}$, then W_α is subnormal if and only if $\{\|W_\alpha^n e_0\|^2\}_{n=0}^{\infty}$ is a Stieltjes moment sequence, where $\{e_j\}_{j=0}^{\infty}$ is the standard basis of $l^2(\mathbb{C})$. This raises a question: "does the above characterization hold in the case of subnormal weighted shifts S_λ on directed trees $\mathcal{T} = (V, E)$, where V is vertex set, E is edge set and $\lambda = \{\lambda_v\}_{v \in V \setminus \{\text{root}\}}$?" In this talk, we strive some fundamental properties of weighted shifts S_λ on directed trees $\mathcal{T}$, and give a negative solution of this question.

A linear operator S in a complex Hilbert space $\mathcal{H}$ for which the set $\mathcal{D}^\infty(S)$ of its C^∞-vectors is dense in $\mathcal{H}$ and $\{\|S^n h\|^2\}_{n=0}^{\infty}$ is a Stieltjes moment sequence for every $h \in \mathcal{D}^\infty(S)$ is said to *generate Stieltjes moment sequences*. It is shown that there exists a non-hyponormal weighted shift S_λ on a directed tree $\mathcal{T}$ which generates Stieltjes moment sequences. What is more, $\mathcal{D}^\infty(S_\lambda)$ is a core of any power S_λ^n of S_λ. This is established with the help of a weighted shift on a directed tree with one branching vertex. The main tool in the construction comes from the theory of indeterminate Stieltjes moment sequences.

(This is a joint work with Z. Jablonski and J. Stochel.)

Adelic Banach-space operators

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In this talk, we consider Banach-space operators on non-Archimedean normed space settings. In particular, we study infinite matrices acting on p-adic number fields and those acting on the Adele ring. It may provide another bridge between number theory and operator theory.

Algebras of complex symmetric operators

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In this paper, we consider the spectral radius algebras for complex symmetric operators. In particular, we prove that if A is a complex symmetric operator, then the spectral radius algebra $\mathcal{B}_A$ associated to A has a nontrivial invariant subspace under some conditions. Finally, we investigate some relations between $P_{\widetilde{A}}$ and $P_{\widetilde{A^*}}$ (defined below) when A is complex symmetric.

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On the invertibility of Toeplitz-plus-Hankel operators

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I will present old and new results about the invertibility of Toeplitz+plus-Hankel operators $T(a) + H(b)$ defined on Hardy spaces $H^p(T)$. Connections are being made with Wiener-Hopf factorization theory, and particular results are obtained for piecewise continuous symbols a and b.

The subnormality for the Schur product of two variable subnormal weighted shifts and its Berger measure

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In this talk, I will talk about two variable weighted shifts. First, Hyoponormality and subnoramlity for them are considered. and their relationship. Second, the Schur product of two variable weighted shifts are introduced. Finally, the Schur product of subnormal two variable weighted shifts and its Berger measure are considered.

Similarity of Cowen-Douglas operators and operator models

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I will discuss how models theorems play an important role in characterizing Cowen-Douglas operators up to similarity and generalize our previous results to describe Cowen-Douglas operators satisfying certain positivity conditions that are similar to the adjoints of the operator of multiplication on reproducing kernel Hilbert spaces.

Generalized Cauchy-Hankel matrices and their applications

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In this talk we introduce new formulas for the determinants of generalized Cauchy-Hankel matrices and criteria for their positive semi-definiteness. As the applications of the formulas, we can show that the k-hyponormality of all powers may not guarantee the k-hyponormality of the initial operator.