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Experts Committee

| Chair | |
|------------------------------------|-------------------------------------|
| Chang-Jiang Bu | Harbin Engineering University China |
| Chi-Kwong Li | College of William & Mary US |
| Committee Members | |
| Xiao-Min Tang | Heilongjiang University |
| Qing-Wen Wang | Shanghai University |
| Secretary | |
| Huan-Zhang Ling Tel:15904606024 | Harbin Engineering University |
| Shu-Juan Wang Tel:15114670520 | Harbin Engineering University |
| Li-Zhu Sun Tel:15945993589 | Harbin Engineering University |

Organizing Committee

| Chair | |
|-------------------|-------------------------------|
| Ji-Hong Shen | Harbin Engineering University |
| Xiao-Wei Zhang | Harbin Engineering University |
| Committee Members | |
| Meng Lin | Harbin Engineering University |
| Guo-Feng Feng | Harbin Engineering University |
| Shu-Juan Wang | Harbin Engineering University |
| Hong-Mei Yao | Harbin Engineering University |
| Huan-Zhang Ling | Harbin Engineering University |
| Li-Zhu Sun | Harbin Engineering University |

Invited Speakers

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| 1 | Zheng-Jian Bai | Xiamen University |
| 2 | Changjiang Bu | Harbin Engineering University (organizer) |
| 3 | Chongguang Cao | Heilongjiang University |
| 4 | Jianlong Chen | Southeast University |
| 5 | Mao-Ting Chien | Soochow University |
| 6 | Man-Duen Choi | University of Toronto |
| 7 | Wai-Leung Chooi | Univeresity of Malaya |
| 8 | Huaian Diao | Northeast Normal University |
| 9 | Chun Yuan Deng | South China Normal University |
| 10 | Hongke Du | Shaanxi Normal University |
| 11 | Hwa-Long Gau | National Central University |
| 12 | Yu Guo | Taiyuan University of Technology |
| 13 | Zejun Huang | Polytechnic University |
| 14 | Nathaniel Johnston | University of Guelph |
| 15 | Chi-Kwong Li | College ow William and Mary (organizer) |
| 16 | Shuchao Li | Central China Normal University |
| 17 | Zhongshan Li | Georgia State University |
| 18 | Ming Huat Lim | University of Malaya |
| 19 | Minghua Lin | University of Waterloo |
| 20 | Xiaoji Liu | Guangxi University of Nationalities |
| 21 | Fangyan Lu | Suzhou University |
| 22 | Linzhang Lu | Xiamen University |
| 23 | Chi-Keung Ng | Chern's Instititute of Mathematics, Nankai University |
| 24 | Yiu-Tung Poon | Iowa State University |
| 25 | Xiaofei Qi | Shanxi University |
| 26 | Nang-Sing Sze | Polytechnic University |
| 27 | Xiao-Min Tang | Heilongjiang University (organizer) |
| 28 | Tin-Yau Tam | Auburn University |
| 29 | Bit-Shun Tam | Department of Mathematics, Auburn University |
| 30 | Yongge Tian | Central University of Finance and Economics |
| 31 | Yimin Wei | Fudan University |
| 32 | Qingwen Wang | Shanghai University(organizer) |
| 33 | Ngai-Ching Wong | National Sun Yat-sen University |
| 34 | Pei Yuan Wu | National Chiao Tung Univesity |
| 35 | Changqing Xu | Zhejiang A&F University |
| 36 | Qing-Xiang Xu | Shanghai Normal University |

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| 38 | Xingzhi Zhan | Eastern China Normal University |
| 39 | Fuzhen Zhang | Nova Southeastern University |
| 40 | Karol Zyczkowski | Jagiellonian University |
| 41 | Yang Zhang | University of Manitoba |

Daily Schedule

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| July 13 8:00-22:00 Registration | | |
| July 14 | | |
| 8:10-9:20 Chair: Jihong Shen Opening ceremony Photo Location: Conference room of Yifu Building (逸夫楼 会议室) | | |
| Parallel session 1 Location: Room 231 of Science Building (理学楼 231 室) | | Parallel session 2 Location: Room 212 of Science Building (理学楼 212 室) |
| Chair: Tin-Yau Tam | | Chair: Yimin Wei |
| 9:20 - 9:50 | Man-Duen Choi Title: The Taming of the Shrew with Positive Linear Maps | Bit-Shun Tam Title: Every rational number is the sum of the entries of the inverse of the adjacency matrix of a nonsingular graph |
| 9:50 - 10:20 | Karol Zyczkowski Title: Almost Hadamard matrices | Zhengjian Bai Title: Applications of the Alternating Direction Method of Multipliers to the Semidefinite Inverse Quadratic Eigenvalue Problem with Partial Eigenstructure |
| 10:20 - 10:50 | Chi-Kwong Li Title: Physical transformation of quantum states | Huaian Diao Title: On Condition Numbers for Constrained Linear Least Squares Problems |
| 10:50 - 11:10 Coffee break | | |
| Chair: Chi-Kwong Li | | Chair: Bit-Shun Tam |
| 11:10 - 11:40 | Nathaniel Johnston Title: Right CP-Invariant Cones of Superoperators | Zejun Huang Title: Partial matrices all of whose completions have the same rank |
| 11:40 - 12:10 | Tin-Yau Tam Title: On Ky Fan's Result on Eigenvalues and Real Singular Values | Jiang Zhou Title: Graph spectra and quantum computing |
| 12:10 - 14:00 Lunch | | |

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| Chair: Man-Duen Choi | | Chair: Zhongshan Li |
| 14:00 -14:30 | Pei Yuan Wu Title: Numerical ranges of nilpotent operators | Changjiang Bu Title: Some research results on Drazin (group) inverse of matrices, sign pattern of generalized inverse and graph spectra in HEU |
| 14:30 -15:00 | Mao-Ting Chien Title: Numerical range and central force | Shuchao Li Title: Ordering trees by the minimum entry of their doubly stochastic graph matrices |
| 15:00 -15:30 | Hwa-Long Gau Title: Weighted Shift Matrices | Chunyuan Deng Title: On invertibility of combinations of k -potent operators |
| 15:30 - 15:50 Coffee break | | |
| Chair: Pei Yuan Wu | | Chair: Chunyuan Deng |
| 15:50 -16:20 | Minghua Lin Title: The generalized Wielandt inequality in inner product spaces | Zhongshan Li Title: Sign patterns with minimum rank 2 and upper bounds on minimum ranks |
| 16:20 -16:50 | Shigeru Furuichi Title: On some refinements of Young inequalities for positive operators | Xiaomin Tang Title: ROTA-BAXTER.OPERATORS ON 4-DIMENSIONAL SIMPLE COMPLEX ASSOCIATIVE ALGEBRAS |
| 16:50-17:20 | Jinchuan Hou Title: Convex combination preserving maps and quantum measurement | Lizhu Sun Title: Group inverse of graph Laplacian with applications |
| July 15 | | |
| Parallel session 1 Location: Room 231 of Science Building (理学楼 231 室) | | Parallel session 2 Location: Room 212 of Science Building (理学楼 212 室) |
| Chair: Chi-Kwong Li | | Chair: Qingwen Wang |
| 8:30 - 9:00 | Ngai-Ching Wong Title: Compact disjointness preserving operators | Chongguang Cao Title: Mapping preserve classical adjoint of product of two matrices |
| 9:00 - 9:30 | Fangyan Lu Title: Similarity-preserving linear maps on $B(X)$ | Yimin Wei Title: A sharp version of Bauer-Fike's theorem |
| 9:30 - 10:00 | Xiaofei Qi Title: Characterizations of Lie (ξ -Lie) derivations on some rings and algebras | Wenzhe Wang Title: Some results on graph spectra |
| 10:00 - 10:20 Coffee break | | |
| Chair: Ngai-Ching Wong | | Chair: Changjiang Bu |
| 10:20 -10:50 | Yu Guo Title: Local channel preserving quantum | Qingwen Wang Title: The new developments of matrix |

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| | correlations | equations |
| 10:50 -11:20 | Yiu-Tung Poon Title: Linear Preservers of Tensor Product of Unitary Orbits, and Product Numerical Range | Jianlong Chen Title: Generalized Drazin inverses in rings and Banach algebras |
| 11:20 -11:50 | Nung-Sing Sze Title: Linear Preservers of spectral radius of tensor products | Qingxiang Xu Title: Explicit characterization of the Drazin index |
| 11:50 - 14:00 Lunch | | |
| Chair: Xiaomin Tang | | Chair: Qingxiang Xu |
| 14:00 -14:30 | Yang Zhang Title: Computing the Hermite Form of a Quaternion Matrix | Li Yang Title: A theorem on the decomposability of high-order linear differential operators with variable coefficients |
| 14:30 -15:00 | Xiaoyan Liu Title: | Anbao Xu Title: Norm-constrained least-squares solutions to the matrix equation $AXB=C$ |
| 15:00 -15:30 | Chundi Zhang Title: Results for the Drazin inverses of the matrices | Qingping Zeng Title: Spectra originated from semi-B-Fredholm theory and commuting perturbations |
| 15:30 - 15:50 Coffee break | | |
| Chair: Jianlong Chen | | Chair: Congguang Cao |
| 15:50 -16:20 | Chi-keung Ng Title: A Murray-von Neumann type classification of SC^* -algebras | Deyu Wu Title: On the Adjoint of Operator Matrices with Unbounded Entries |
| 16:20-16:50 | Kuo-Zhong Wang Title: Maximizing Numerical Radii of Weighted Shifts under Weight Permutations | Zizong Yan Title: The SNIEP with prescribed diagonal entries: a necessary and sufficient condition |
| 16:50-17:20 | Kezheng Zuo Title: Convex combination preserving maps and quantum measurement | Limin Zhang Title: Norm-constrained least-squares solutions to the matrix equation $AXB=C$ |
| <p>July 16</p> <p>City tourism</p> <p style="text-align: center;">Harbin City Sightseeing (free of charge)</p> <p>In the morning, we will visit Siberian Tiger Park and Sun Island Park.</p> <p>Lunch</p> <p>In the afternoon, we will visit the Church of St Sophia(the largest orthodox church in the Far East), Zhongyang Street(the longest walkway in china), Stalin Park , the Memorial Tower of Flood Prevention, Russian Trade Market and Northeast Specialty Store.</p> | | |

Abstracts

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| Name: Zheng-Jian Bai | Institutions: Xiamen University |
| Title: Applications of the Alternating Direction Method of Multipliers to the Semidefinite Inverse Quadratic Eigenvalue Problem with Partial Eigenstructure | |
| Abstract: This paper shows that the alternating direction method of multipliers (ADMM) is an efficient approach to solving the semidefinite inverse quadratic eigenvalue problem (SDIQEP) with partial eigenstructure. We derive several ADMM-based iterative schemes for SDIQEP, and demonstrate their efficiency for large-scale cases of SDIQEP numerically. | |

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| Name: Changjiang Bu | Institutions: Harbin Engineering University |
| Title: Some results on graph spectra, generalized inverse and signed generalized inverse | |
| Abstract: In recent years, many results on graph spectra and generalized inverse are given by the research group of Harbin Engineering University. In this talk, we mainly discuss the following three topics. 1. Graph spectra (graph spectra and quantum computing, spectral characterizations of graphs); 2. Generalized inverse (Drazin inverse of block matrices, group inverse of graph Laplacian); 3. Sign pattern of generalized inverse (Block matrices with signed Drazin inverse). | |

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| Name: Man-Duen Choi | Institutions: Math Department, University of Toronto |
| Title: The Taming of the Shrew with Positive Linear Maps | |
| Abstract: I look into the full structure of positive linear maps between matrix algebras. In particular, I wish to tame the quantum entanglements, from the pure mathematical point of view. Note that the research work along these lines, has been proven to be useful to the foundation of abstract quantum information in the light of (the reality of) quantum computers. | |

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| Name: Chongguang Cao | Institutions: Heilongjiang University |
| Title: Mapping preserve classical adjoint of product of two matrices | |

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| Name: Jianlong Chen | Institutions: Southeast University |
| Title: Generalized Drazin inverses in rings and Banach algebras | |
| Abstract: The notion of the generalized Drazin inverse in Banach algebras and rings are introduced in 1996 and 2002, respectively. Because of desirable spectral property, the generalized Drazin inverse attracted widely concern. In this talk, we introduce additive and multiplicative property of (generalized) Drazin invertibility of elements in a ring. In particular, we present Cline's formula and Jacobson's lemma for the generalized Drazin inverse in rings, and the applications of the related results of generalized Drazin inverses in Banach algebras. | |

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| Name: Mao-Ting Chien | Institutions: Soochow University Taiwan |
| Title: Numerical range and central force | |
| <p>Abstract: Let A be an $n \times n$ matrix. A homogeneous polynomial associated with A is defined by</p> $F_A(t, x, y) = \det(t I_n + x(A + A^*)/2 + y(A - A^*)/(2i)).$ <p>It is known that the numerical range of A, which is defined as the set</p> $W(A) = \{\zeta^* A \zeta : \zeta \in C^n, \zeta^* \zeta = 1\},$ <p>is the convex hull of the real part of the dual curve of $F_A(t, x, y) = 0$.</p> <p>In this talk, I will discuss orbits of some central forces which are interpreted as the algebraic curves $F_A(I, x, y) = 0$ for some matrix A. It is shown that the orbit of a point mass under a central force $f(r) = -r^{-3}$ with angular momentum M, satisfying $M/(M^2 - I)^{1/2} = m/p$, is represented by the algebraic curve $F_A(I, x, y) = 0$ for some</p> | |

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| Name: Chun-Yuan Deng | Institutions: South China Normal University |
| Title: On invertibility of combinations of k-potent operators | |
| <p>Abstract: In this talk, we will report some recent results on the general invertibility of the products and differences of projectors and generalized projectors. The invertibility, the group invertibility and the k-potency of the linear combinations of k-potents are investigated, under certain commutativity properties imposed on them. In addition, the range relations of projectors and the detailed representations for various inverses are presented.</p> | |

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| Name: Huai-An Diao | Institutions: Northeast Normal University |
| Title: On Condition Numbers for Constrained Linear Least Squares Problems | |
| <p>Abstract: Condition numbers are important in numerical linear algebra, who can tell us the poste-rior error bounds for the computed solution. Classical condition numbers are normwise, but they ignore the input data sparsity and/or scaling. Componentwise analysis had been introduced, which gives a powerful tool to study the perturbations on input and output data regarding on the sparsity and scaling. In this paper under componentwise perturbation analysis we will study the condition numbers for constrained linear least squares problems. The obtained expressions of the condition numbers avoid the explicit forming Kronecker products, which can be estimated by power methods efficiently. Numerical examples show that our condition numbers can give better error bounds.</p> | |

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| Name: Shigeru Furuichi | Institutions: Tokyo University of Science |
| Title: On some refinements of Young inequalities for positive operators | |
| <p>Abstract: We show two different kinds of refinements of Young inequalities for positive operators. Based on one of refinements, we give two reverse Young inequalities. We also give alternative reverse Young inequalities. This talk is based on the following papers.</p> <p>[1] S.Furuichi, On refined Young inequalities and reverse inequalities, Journal of Mathematical inequalities, Vol.5(2011), pp.21-31.</p> | |

- [2] S.Furuichi, Refined Young Inequalities with Specht's Ratio, J.Egypt.Math. Soc. (10.1016/j.joems.2011.12.010), in press.
- [3] S.Furuichi, and N. Minculete, Alternative reverse inequalities for Young's inequality, Journal of Mathematical inequalities, Vol.5(2011), pp. 595–600.

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| Name: Nathaniel Johnston | Institutions: University of Guelph |
| Title: Right CP-Invariant Cones of Superoperators | |
| Abstract: We consider cones of superoperators (i.e., linear maps on matrices) that are closed under composition on one side by completely positive maps. We see that many results involving positive and superpositive maps follow from this simple property. We also consider other examples motivated by quantum information theory, and we show that every such cone corresponds to an abstract operator system | |

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| Name: Zejun Huang | Institutions: Polytechnic University |
| Title: Partial matrices all of whose completions have the same rank | |
| Abstract: We characterize the partial matrices all of whose completions have the same rank, determine the largest number of indeterminates in such partial matrices of a given size, and determine the partial matrices that attain this largest number | |

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| Name: Jin-Chuan Hou | Institutions: Taiyuan university of technology |
| Title: Convex combination preserving maps and quantum measurement | |
| Abstract: We show an essential relationship between quantum measurement and a convex combination preserving maps. This gives a geometric characterization of invertible quantum measurement. Similar characterization of invertible local quantum measurement is also obtained. | |

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| Name: Hwa-Long Gau | Institutions: National Central University |
| Title: Weighted Shift Matrices | |
| Abstract: An n -by- n ($n \geq 3$) weighted shift matrix A is one of the form $\begin{pmatrix} 0 & a_1 & & \\ & \ddots & \ddots & \\ & & 0 & a_{n-1} \\ & & & 0 \end{pmatrix},$ where the a_j 's, called the weights of A , are complex numbers. Assume that all a_j 's are nonzero and B is an n -by- n weighted shift matrix with weights b_1, \dots, b_n . We show that B is unitarily equivalent to A if and only if $b_1 \cdots b_n = a_1 \cdots a_n$ and, for some fixed k , $1 \leq k \leq n$, $ b_j = a_{k+j} $ ($a_{n+j} \equiv a_j$) for all j . Next, we show that A is reducible if and only if A has periodic weights, that is, for some fixed k , $1 \leq k \leq \lfloor n/2 \rfloor$, n is divisible by k , and $ a_j = a_{k+j} $ for all $1 \leq j \leq n-k$. Finally, we prove that A and B have the same numerical range if and only if $a_1 \cdots a_n = b_1 \cdots b_n$ and $S_r(a_1 ^2, \dots, a_n ^2) = S_r(b_1 ^2, \dots, b_n ^2)$ for all $1 \leq r \leq \lfloor n/2 \rfloor$, where S_r 's are the circularly symmetric functions. | |

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| Name: Yu Guo | Institutions: Taiyuan university of technology |
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| Title: Local channel preserving quantum correlations |
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| Name: Chi-Kwong Li | Institutions: College of William and Mary |
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| Title: Physical transformation of quantum states |
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Abstract: Given two sets of quantum states $\{A_1, \dots, A_k\}$ and $\{B_1, \dots, B_k\}$, represented as sets as density matrices, necessary and sufficient conditions are obtained for the existence of a physical transformation T , represented as a trace-preserving completely positive map, such that

$$T(A_i) = B_i \text{ for } i = 1, \dots, k.$$

General completely positive maps without the trace-preserving requirement, and unital completely positive maps transforming the states are also considered.

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| Name: Zhongshan Li | Institutions: Georgia State University |
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| Title: Sign patterns with minimum rank 2 and upper bounds on minimum ranks |
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Abstract: A {sign pattern (matrix)} is a matrix whose entries are from the set $\{+, -, 0\}$. The minimum rank (resp., rational minimum rank) of a sign pattern matrix \mathcal{A} is the minimum of the ranks of the real (resp., rational) matrices whose entries have signs equal to the corresponding entries of \mathcal{A} . The notion of a condensed sign pattern is introduced.

A new, insightful proof of the rational realizability of the minimum rank of a sign pattern with minimum rank 2 is obtained. Several characterizations of sign patterns with minimum rank 2 are established, along with linear upper bounds for the absolute values of an integer matrix achieving the minimum rank 2. A known upper bound for the minimum rank of a $(+,-)$ sign pattern in terms of the maximum number of sign changes in the rows of the sign pattern is substantially extended to obtain upper bounds for the rational minimum ranks of general sign pattern matrices. The new concept of the number of polynomial sign changes of a sign vector is crucial for this extension. Another known upper bound for the minimum rank of a $(+,-)$ sign pattern in terms of the smallest number of sign changes in the rows of the sign pattern is also extended to all sign patterns using the notion of the number of strict sign changes. Some examples and open problems are also presented.

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| Name: Minghua Lin | Institutions: University of Waterloo |
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| Title: The generalized Wielandt inequality in inner product spaces |
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Abstract: A new inequality between angles in inner product spaces is formulated and proved. It leads directly to a concise statement and proof of the generalized Wielandt inequality, including a simple description of all cases of equality. As a consequence, several recent results in matrix analysis and inner product spaces are improved. The talk is based on this manuscript <http://arxiv.org/abs/1201.6294>

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| Name: Shuchao Li | Institutions: Central China Normal University |
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| Title: Ordering trees by the minimum entry of their doubly stochastic graph matrices |
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Abstract. Given an n -vertex graph G , the matrix $\Omega(G) = (I_n + L(G))^{-1} = (\omega_{ij})$ is called the doubly stochastic graph matrix of G , where I_n is the $n \times n$ identity matrix and $L(G)$ is the Laplacian matrix of G . Let $\underline{\omega}(G)$ be the smallest element of $\Omega(G)$. Zhang and Wu [X.D. Zhang, J.X. Wu, Doubly stochastic matrices of trees, Appl. Math. Lett. 18 (2005) 339 – 343] determined the tree T with the minimum $\underline{\omega}(T)$ among the set of n -vertex trees. In this paper, as a continuance of it, we determine the first $\lceil \frac{n-1}{2} \rceil$ trees $T_1, T_2, \dots, T_{\lceil \frac{n-1}{2} \rceil}$ among the set of n -vertex trees such that $\underline{\omega}(T_1) < \underline{\omega}(T_2) < \dots < \underline{\omega}(T_{\lceil \frac{n-1}{2} \rceil}) \leq \underline{\omega}(T_{\lceil \frac{n-1}{2} \rceil}) < \underline{\omega}(T)$, where T_i is obtained by attaching a pendant vertex to v_i of path $P_{n-1} = v_1 v_2 \dots v_i \dots v_{n-1}$ and $T \in \mathcal{T}_n \setminus \{T_1, T_2, \dots, T_{\lceil \frac{n-1}{2} \rceil}\}$, where \mathcal{T}_n is the set of all n -vertex trees.

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| Name: Fangyan Lu | Institutions: Suzhou University |
| Title: Similarity-preserving linear maps on $B(X)$ | |
| <p>Abstract: Let X be an infinite-dimensional Banach space, $B(X)$ the algebra of all bounded linear operators on X. Then a bijective linear map $\phi: B(X) \rightarrow B(X)$ is similarity-preserving if and only if one of the following holds:</p> <p style="text-align: center;">\begin{itemize} \item[(1).] There exist a nonzero complex number c, an invertible bounded operator T in $B(X)$ and a similarity-invariant linear functional h on $B(X)$ with $h(I) \neq -c$ such that</p> <p style="text-align: center;">$\phi(A) = cTAT^{-1} + h(A)I$ for all $A \in B(X)$;</p> <p style="text-align: center;">\item[(2).] There exist a nonzero complex number c, an invertible bounded operator $T: X^* \rightarrow X$ and a similarity-invariant linear functional h on $B(X)$ with $h(I) \neq -c$ such that $\phi(A) = cTA^*T^{-1} + h(A)I$ for all $A \in B(X)$.</p> <p style="text-align: center;">\end{itemize}</p> | |

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| Name: Chi-Keung Ng | Institutions : Chern's Institute of Mathematics, Nankai University |
| Title: A Murray-von Neumann type classification of SC^* -algebras | |
| <p>Abstract: \noindent Abstract:</p> <p>We define type \mathfrak{A}, type \mathfrak{B}, type \mathfrak{C} as well as SC^*-semi-finite SC^*-algebras.</p> <p>It is shown that a von Neumann algebra is a type \mathfrak{A}, type \mathfrak{B}, type \mathfrak{C} or SC^*-semi-finite SC^*-algebra if and only if it is, respectively, a type I, type II, type III or semi-finite von Neumann algebra.</p> <p>Any type I SC^*-algebra is of type \mathfrak{A} (actually, type \mathfrak{A} coincides with the discreteness as defined by Peligrad and Zsid\u{o}), and any type II SC^*-algebra (as defined by Cuntz and Pedersen) is of type \mathfrak{B}. Moreover, any type \mathfrak{C} SC^*-algebra is of type III (in the sense of Cuntz and Pedersen). Conversely, any purely infinite SC^*-algebra (in the sense of Kirchberg and R\u{a}rdam) with real rank zero is of type \mathfrak{C}, and any separable purely infinite SC^*-algebra with stable rank one is also of type \mathfrak{C}. We also prove that type \mathfrak{A}, type \mathfrak{B}, type \mathfrak{C} and SC^*-semi-finiteness are stable under taking hereditary SC^*-subalgebras, multiplier algebras and strong Morita equivalence. Furthermore, any SC^*-algebra A contains a largest type \mathfrak{A} closed ideal $J_{\mathfrak{A}}$, a largest type \mathfrak{B} closed ideal $J_{\mathfrak{B}}$, a</p> | |

largest type

\mathfrak{C} closed ideal \mathfrak{C} as well as a largest C^* -semi-finite closed ideal \mathfrak{sf} .

Among them, we have $\mathfrak{A} + \mathfrak{B}$ being an essential ideal of \mathfrak{sf} , and $\mathfrak{A} + \mathfrak{B} + \mathfrak{C}$ being an

essential ideal of A . On the other hand, A/\mathfrak{C} is always C^* -semi-finite, and if A is C^* -semi-finite, then A/\mathfrak{B} is of type \mathfrak{A} .

Finally, we show that these results hold if type \mathfrak{A} , type \mathfrak{B} , type \mathfrak{C} and C^* -semi-finiteness are replaced by discreteness, type II, type III and semi-finiteness (as defined by Cuntz and Pedersen), respectively

[It is a joint work with Ngai-Ching Wong]

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| Name: Yiu Tung Poon | Institutions: Iowa State University |
| Title: Linear Preservers of Tensor Product of Unitary Orbits, and Product Numerical Range | |
| Abstract: It is shown that the linear group of automorphism of Hermitian matrices which preserves the tensor product of unitary orbits is generated by {\bf natural} automorphisms: change of an orthonormal basis in each tensor factor, partial transpose in each tensor factor, and interchanging two tensor factors of the same dimension. The result is then applied to show that automorphisms of the product numerical ranges have the same structure | |

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| Name: Xiaofei Qi | Institutions: Shanxi University |
| Title: Characterizations of Lie (ξ -Lie) derivations on some rings and algebras | |
| Abstract: Let A be an algebra over a field F . For any scalar ξ in F , a map $L : A \rightarrow A$ is called a ξ -Lie derivation if $[L(A);B]_{\xi} + [A;L(B)]_{\xi} = L([A;B]_{\xi})$, where $[A;B]_{\xi} = AB - \xi BA$ is the ξ -Lie product of $A, B \in A$. In this talk, such maps on some rings and algebras are characterized and the relations L to the derivations are revealed. | |

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| Name: Raymond Sze | Institutions: The Hong Kong Polytechnic University |
| Title: Linear Preservers of spectral radius of tensor products | |
| Abstract: In this talk, characterization of linear maps leaving invariant the spectral radius of Hermitian matrices in tensor form $A \otimes B$ will be presented. a brief survey of recent results on linear preserver problems relating to tensor product is given. In addition, some other related results will also be mentioned This talk is based on a joint work with A. Foner, Z. Huang, and C.K. Li. | |

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| Name: Lizhu Sun | Institutions: Harbin Engineering University |
| Title: Group inverse of graph Laplacian with applications | |
| Abstract: Let G be a graph with adjacency matrix $A(G)$, and let $D(G)$ be the diagonal | |

matrix of vertex degrees of G . The matrix $L(G) = D(G) - A(G)$ is called the Laplacian matrix of G .

In an electrical network, the effective resistance between two nodes is defined as the ratio between the total voltage drop across the circuit and the total current through the circuit if a voltage is applied between these two nodes. The resistance distance between vertices u and v in graph G , is defined to be the effective resistance between nodes u and v in electrical network G .

The group inverse of Laplacian matrix $L(G)$ can be used to obtain the resistance distance of graph G . It is discussed that the expression for the group inverse of block matrix with application.

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| Name: Tin-Yau Tam | Institutions: Department of Mathematics, Auburn University |
| Title: On Ky Fan's Result on Eigenvalues and Real Singular Values | |
| Abstract: Ky Fan's result states that the real parts of the eigenvalues of an $n \times n$ complex matrix A is majorized by the real singular values of A . The converse was established independently by Amir-Mo'ez and Horn, and Mirsky. We extend the results in the context of complex semisimple Lie algebras. The real semisimple case is also discussed. The complex skew symmetric case and the symplectic case are explicitly worked out in terms of inequalities. The symplectic case and the odd dimensional skew symmetric case can be stated in terms of weak majorization. The even dimensional skew symmetric case involves Pfaffian. | |

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| Name: Xiao-Min Tang | Institutions: Heilongjiang University |
| Title : ROTA-BAXTER OPERATORS ON 4-DIMENSIONAL SIMPLE COMPLEX ASSOCIATIVE ALGEBRAS | |
| Abstract: Rota-Baxter operators or relations were introduced to solve certain analytic and combinatorial problems and then applied to many fields in mathematics and mathematical physics. In this paper, we commence to study the Rota-Baxter operators of weight zero on 4-dimensional simple associative algebra. Such operators satisfy (the operator form of) the classical Yang-Baxter equation on the general linear Lie algebra. | |

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| Name: ,Bit-Shun Tam | Institutions: Tamkang University |
| Title: Every rational number is the sum of the entries of the inverse of the adjacency matrix of a nonsingular graph | |
| Abstract: For a graph G we use $A(G)$ to denote the adjacency matrix of G . It is proved that for any given integer a , every rational number can be attained as the sum of the entries of the inverse of the matrix $A(G) + aI$, where G is a connected graph for which $-a$ is not an eigenvalue of $A(G)$. Our proof depends on a characterization of the non-singularity of a matrix in the 2×2 block form $\begin{bmatrix} A_1 & J \\ J^T & A_2 \end{bmatrix}$, where A_1, A_2 are general real symmetric matrices with nullity 0 or 1 and J stands for a matrix of all 1 's. As another application of the latter characterization, we find equivalent conditions for vertex-disjoint graphs G_1, G_2 to satisfy $\text{rank}(A(G_1 \vee G_2)) = \text{dnr}(A(G_1 \vee G_2))$, where $G_1 \vee G_2$ is the join of G_1, G_2 and for any matrix A , $\text{dnr}(A)$ denotes the number of distinct | |

nonzero rows of SA ; thus we provide a new proof for Sillke's conjecture that for every cograph G , $\text{rank}(A(G)) = \text{dnzr}(A(G))$. This talk is based on a joint work with Liang-Hao Huang

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| Name: Yimin Wei | Institutions: Fudan University |
| Title: A sharp version of Bauer–Fike's theorem | |
| Abstract: In this talk, we present a sharp version of Bauer–Fike's theorem. We replace the matrix norm with its spectral radius or sign-complex spectral radius for diagonalizable matrices; 1-norm and ∞ -norm for non-diagonalizable matrices. We also give the applications to the pole placement problem and the singular system | |

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| Name: Pei-Yuan Wu | Institutions: National Chiao Tung University |
| Title: Numerical ranges of nilpotent operators | |
| Abstract: In this talk, we present properties of the numerical ranges of nilpotent operators on a (possibly infinite-dimensional) Hilbert space. More precisely, we show that (1) if A is a nonzero nilpotent operator, then 0 is always in the interior of its numerical range $W(A)$ and the boundary of $W(A)$ is a differentiable curve, (2) if A is as in (1) with nilpotency n , then its numerical radius $w(A)$ is at most the product of $n-1$ and the (generalized) Crawford number (i.e., the distance from the origin to the boundary of $W(A)$), and (3) in contrast to the finite-dimensional case, a noncircular elliptic disc can be the numerical range of a nilpotent operator with nilpotency 3 on an infinite-dimensional space. | |

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| Name: Ngai-Ching Wong | Institutions: National Sun Yat-sen University |
| Title: Compact disjointness preserving operators | |
| Abstract: We show that the compactness, the weak compactness, and the complete continuity of a disjointness preserving linear operator between continuous function spaces are equivalent. They provide a nuclear representation of the operator, and implement a tree structure on the underlying spectral space. This makes graph theoretic technique is applicable in studying these kind of operators. | |

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| Name: Qingwen Wang | Institutions: Shanghai University |
| Title: The new developments of matrix equations | |
| Abstract: This talk gives some new developments of some systems of linear and nonlinear matrix equations, presents some applications of the new results | |

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| Name: Kuo-Zhong Wang | Institutions: National transportation university |
| Title: Maximizing Numerical Radii of Weighted Shifts under Weight Permutations | |
| Abstract: Let $w_i \in \mathbb{C}$ ($1 \leq i \leq n$) and $r \in S_n$, the symmetric group of all permutations of 1, 2, ..., n. Suppose A_r is the weighted cyclic matrix with the weight $\{w_i\}_{i=1}^n$ and $w(A_r)$ denotes its numerical radius. We characterize those $\xi \in S_n$ which satisfy $w(A_\xi) = \max_{r \in S_n} w(A_r)$ The characterizations for unilateral and bilateral weighted (backward) shifts are also obtained. | |

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| Name: Wenzhe Wang | Institutions: Harbin Engineering University |
| Title: Some results on graph spectra | |
| Abstract: The sun graph $C_n \circ 2K_1$ is determined by its Laplacian spectrum and the caterpillars graph T_n^3 is determined by its signless Laplacian spectrum. | |

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| Name: Deyu Wu | Institutions: School of Mathematical Science |
| Title: On the Adjoint of Operator Matrices with Unbounded Entries | |
| Abstract: In this report, the adjoint of an densely defined block operator matrix $T = \begin{bmatrix} A & B \\ C & D \end{bmatrix} : D(T) \subset X \times X \rightarrow X \times X$ is studied ,and by applying perturbation theory of linear operator and Frobenius-Schur factorization, the sufficient conditions under which the conclusion $T^* = \begin{bmatrix} A^* & C^* \\ B^* & D^* \end{bmatrix}$ holds are obtained. | |

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| Name: Qingxiang Xu | Institutions: Shanghai Normal University |
| Title: Explicit characterization of the Drazin index | |
| Abstract: Let $\mathbb{B}(X)$ be the set of bounded linear operators on a Banach space X , and $A \in \mathbb{B}(X)$ be Drazin invertible. An element $B \in \mathbb{B}(X)$ is said to be a stable perturbation of A if B is Drazin invertible and $I - A^\pi B^\pi$ is invertible, where I is the identity operator on X , A^π and B^π where I is the identity operator on X , A^π and B^π are the spectral projectors of A and B respectively. Under the condition that B is a stable perturbation of A , a formula for the Drazin inverse B^D is derived. Based on this formula, a new approach is provided to the computation of the explicit Drazin indices of certain 2×2 operator matrices. | |

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| Name: An-Bao Xu | Institutions: Guilin electronic science and technology university |
| Title: Norm-constrained least-squares solutions to the matrix equation $AXB=C$ | |
| Abstract: In this paper, an iterative method to compute the norm-constrained least-squares solutions of the matrix $AXB=C$ is proposed. Numerical experiments are performed to illustrate the efficiency of the algorithm. | |

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| Name: Li Yang | Institutions: Xian industrial university science |
| Title: A theorem on the decomposability of high-order linear differential operators with variable coefficients | |
| Abstract: In this paper, we study the decomposability of high-order linear differential operators with variable coefficients, and obtain a decomposition theorem of high-order linear differential operators. Applying this result, we give out a sufficient condition that high-order linear differential equations can be reduced into lower order linear differential equations. | |

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| Name: Zi-Zong Yan | Institutions : The university information and mathematics institute |
| Title: The SNIEP with prescribed diagonal entries: a necessary and sufficient condition | |
| Abstract: With the help of the inverse of the interlacing theorem, this paper presents a necessary and sufficient condition for the symmetric nonnegative inverse eigenvalue problem. Meanwhile, we present a family of matrixes with prescribed diagonal entries. | |

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|---|---|
| Name: Jiang Zhou | Institutions: Harbin Engineering University |
| Title: Graph spectra and quantum computing | |
| Abstract: Let G be a graph with adjacency matrix A , and let $H(t) = \exp(itA)$, where $i = \sqrt{-1}$. For two vertices u, v of G , we say that perfect state transfer occurs from u to v , if there exists a time τ such that the (u, v) -entry of $H(\tau)$ has length one. The unitary matrix $H(t)$ has important applications in quantum spin networks, it builds a bridge between graph spectra and quantum computing. In this talk, we discuss some topics on graphs with perfect state transfer. | |

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| Name: Karol Zyczkowski | Institutions: Jagiellonian University |
| Title: Almost Hadamard matrices | |
| Abstract: We analyze "almost Hadamard matrices"- orthogonal matrices of a given order N with modulus of all elements distributed as uniform as possible. Formally an Almost Hadamard matrix is an orthogonal matrix, for which the 1-norm on $O(N)$ achieves a local maximum of. Our study includes a detailed discussion of the circulant case and of the two-entry case, with the construction of several families of examples, and some 1-norm computations. | |

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| Name: Yang Zhang | Institutions: University of Manitoba |
| Title: Computing the Hermite Form of a Quaternion Matrix | |
| Abstract: In this talk, we discuss an algorithm to compute the Hermite form of a quaternion matrix, and give a careful analysis of the complexity in terms of matrix size and entry degree. | |

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| Name: Chundi Zhang | Institutions: Harbin Engineering University |
| Title: Results for the Drazin inverses of the matrices | |
| Abstract: In the talk, some new results are introduced on Drazin inverse of matrix. | |

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| Name: Qing-Ping Zeng | Institutions: Fujian normal university |
| Title: Spectra originated from semi-B-Fredholm theory and commuting perturbations | |
| Abstract: In [cite{Burgos-Kaidi-Mbekhta-Oudghiri}], Burgos, Kaidi, Mbekhta and Oudghiri provided an affirmative answer to a question of Kaashoek and Lay and proved that an operator FS is power finite rank if and only if $\sigma_{\text{dsc}}(T+F) = \sigma_{\text{dsc}}(T)$ for every operator T commuting with FS . Later, several authors | |

extended this result to the essential descent spectrum, the left Drazin spectrum and the left essentially Drazin spectrum.

In this paper, using the theory of operator with eventual topological uniform descent and the technique used in [\cite{Burgos-Kaidi-Mbekhta-Oudghiri}], we generalize this result to various spectra originated from seni-B-Fredholm theory. As immediate consequences, we give affirmative answers to several questions posed by Berkani, Amouch and Zariouh. Besides, we provide a general framework which allows us to derive in a unify way commuting perturbational results of Weyl-Browder type theorems and properties (generalized or not). These commuting perturbational results, in particular, improve many recent results of [\cite{Berkani-Amouch}, \cite{Berkani-Zariouh partial}, \cite{Berkani Zariouh}, \cite{Berkani Zariouh Functional Analysis}, \cite{Rashid gw}] by removing certain extra assumptions.

Name: Min-Li Zhang

Institutions: Beijing university of post and telecommunications

Title: Norm-constrained least-squares solutions to the matrix equation $AXB=C$

Abstract: In this note we consider the classical gambler's ruin problem with two players as a random walk problem. Ruin probability in matrix form is expressed and it can be easily calculate in MATLAB. This two-gambler's ruin model can be also extended to multiple transition states. And an in-depth analysis is given

Name: Kezheng Zuo

Institutions: Generalized inverses of combinations of idempotent operators

Title: Convex combination preserving maps and quangtum measurement

Abstract: Studied the criteria and representation of the Drazin inverse of combinations of two idempotent operators on a Hilbert space. By using the methods of splitting operator's matrix into blocks and space decompositions, the existence and calculation formulas of Drazin inverse of the combinations $aP + bQ + cPQ$ of two idempotent operators P and Q are obtained under the conditions $PQP = 0$, $PQP = P$ and $PQP = PQ$ respectively. These generalized the related results of Deng Chunyuan's work, which characterized the Drazin inverse of the sumand difference of two idempotents.

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Map



A: 港城饭店 B: 八一宾馆 C: 鑫城酒店 D: 理学楼 E: 启航活动中心

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