

Workshop on Matrices and Operators

矩陣與算子研討會 2009

National Sun Yat-sen University

台灣·高雄·中山大學

Kaohsiung, Taiwan.

July 3-4, 2009

Organizers: Chi-Kwong Li 李志光 and Ngai-Ching Wong 黃毅青

In 2007 and 2008, there has been a series of workshops on Matrices and Operators held at Hong Kong. These workshops brought active researchers on matrix analysis, operator theory and operator algebras together to exchange their results, experiences and ideas. These stimulate collaborations and advances of various topics in matrix and operator theory. To facilitate the participation of researchers, especially the younger ones, from different regions, future workshops will be held at different locations. The 2009 workshop will take place in the National Sun Yat-Sen University in Taiwan. All researchers interested in matrices and operators are welcome to participate.

Speakers:

Jor-Ting Chan 陳作庭 (Hong Kong); Kong Chan 陳鋼 (Hong Kong); Chang-Pao Chen 陳璋泡 (Taiwan); Wai-Shun Cheung 張偉信 (Hong Kong); Guang-gui Ding 定光桂 (China); Wei-Shih Du 杜威仕 (Taiwan); Hwa-Long Gau 高華隆 (Taiwan); Jinchuan Hou 侯晉川 (China); Huikun Jiang 江惠坤 (China); Hang-Chin Lai 賴漢卿 (Taiwan); Sen-Hua Lan 藍森華 (China); Chi-Wai Leung 梁子威 (Hong Kong); Denny H. Leung 梁浩瀚 (Singapore); Chi-Kwong Li 李志光 (USA); Chin-Cheng Lin 林欽誠 (Taiwan); Ying-Fen Lin 林英芬 (Taiwan); Chi-Kueng Ng 吳志強 (Nankai); Yiu Tung Poon 潘耀東 (USA); Chao-Liang Shen 沈昭亮 (Taiwan); Mau-Hsiang Shih 施茂祥 (Taiwan); Raymond Nung-Sing Sze 施能聖 (USA); Bit-Shum Tam 譚必信 (Taiwan); Tin Yau Tam 譚天祐 (USA); Mu-Ming Wong 王牧民 (Taiwan); Pei-Yuan Wu 吳培元 (Taiwan).

Registration Fee: 0.

Sponsors: Research Center of Nonlinear Analysis and Discrete Mathematics, and Department of Applied Mathematics, National Sun Yat-sen University.

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<http://www.math.nsysu.edu.tw/~wong/mao2009>

Ma0 2009 “矩陣與算子研討會” 議程

會場：高雄市 [中山大學應用數學系](#) [理 3001 教室](#)

2009. 7. 3 (星期五 Friday)

9:00-9:25 報到及註冊

9:25-9:30 開幕式 (chair: 姚任之)

9:30-10:00 演講者：[Mau-Hsiang Shih 施茂祥 \(Taiwan\)](#) (chair: 黃毅青)
Labelling neural matrix and collective dynamics;

10:00-10:30 演講者：[Jinchuan Hou 侯晉川 \(China\)](#) (chair: 黃毅青)
Characterizations of derivations on prime rings: additive maps derivable at an idempotent;

10:30-10:45 休息;

10:45-11:15 演講者：[Tin Yau Tam 譚天祐 \(USA\)](#) (chair: 林欽誠)
Generalized numerical ranges and multiplicities;

11:15-11:45 演講者：[Bit-Shuu Tam 譚必信 \(Taiwan\)](#) (chair: 林欽誠)
Maximizing spectral radius of signless Laplacian matrix;

11:45-12:15 演講者：[Chao-Liang Shen 沈昭亮 \(Taiwan\)](#) (chair: 林欽誠)
Nonselfadjoint operators, invariant subspaces, and inverse Sturm-Liouville problems;

12:15-12:30 團體照 Group photograph (會場 at the venue)

12:30-14:00 午餐

14:00-14:30 演講者：[Kong Chan 陳鋼 \(Hong Kong\)](#) (chair: 吳培元)
Numerical range diameter preserving maps on C^ -algebras*

14:30-15:00 演講者：[Ying-Fen Lin 林英芬 \(Taiwan\)](#) (chair: 吳培元)
Completely bounded disjointness preserving operators on the Fourier algebras

15:00-15:30 演講者：[Mu-Ming Wong 王牧民 \(Taiwan\)](#) (chair: 吳培元)
Some problems in the classification of algebraic elements in a C^ -algebra*

15:30-15:45 休息

15:45-16:15 演講者：[Chang-Pao Chen 陳璋泡 \(Taiwan\)](#) (chair: 林來居)
Lower bounds of copson type for lower triangular matrices;

16:15-16:45 演講者：[Denny H. Leung 梁浩瀚 \(Singapore\)](#) (chair: 林來居)
Khintchine's inequality for Walsh functions

16:45-17:00 休息

17:00-17:30 演講者：[Chin-Cheng Lin 林欽誠 \(Taiwan\)](#) (chair: 林來居)
A fundamental principle for the boundedness of operators on weighted Hardy spaces

17:30-18:00 演講者：[Hwa-Long Gau 高華隆 \(Taiwan\)](#) (chair: 林來居)
Higher-rank numerical ranges and unitary dilations: the infinite-dimensional case.

19:00- 晚宴 Banquet ([漢王飯店 Kingship Hotel](#))

2009. 7. 4 (星期六 Saturday)

- 9:00-9:30 演講者：[Pei-Yuan Wu 吳培元 \(Taiwan\)](#) (chair: 李志光)
Numerical ranges of radial Toeplitz operators on Bergman space.
- 9:30-10:00 演講者：[Guang-gui DING 定光桂 \(China\)](#) (chair: 李志光)
On isometric extension problem between two unit spheres;
- 10:00-10:30 演講者：[Yiu Tung Poon 潘耀東 \(USA\)](#) (chair: 李志光)
Quantum error correction and generalized numerical ranges;
- 10:30-10:45 休息;
- 10:45-11:15 演講者：[Jor-Ting Chan 陳作庭 \(Hong Kong\)](#) (chair: 賴漢卿)
Separating maps of the Bochner space $L^p(\mu, H)$.
- 11:15-11:45 演講者：[Wai-Shun Cheung 張偉信 \(Hong Kong\)](#) (chair: 賴漢卿)
Inclusion Relation among generalized numerical ranges
- 11:45-11:50 休息;
- 11:50-12:20 演講者：[Sen-Hua Lan 藍森華 \(China\)](#) (chair: 定光桂)
Fractional integral operators on weighted anisotropic H_p and L_p spaces
- 12:20-12:50 演講者：[江惠坤教授 \(China\)](#) (chair: 定光桂)
Generalization of Hausdorff Dimension of Fractal Sets
- 12:50-14:00 午餐
- 14:00-14:30 演講者：[Chi-Wai Leung 梁子威 \(Hong Kong\)](#) (chair: 陳作庭)
Orthogonality Relations on Domains in Compact Symmetric Spaces.
- 14:30-15:00 演講者：[Chi-Kueng Ng 吳志強 \(China\)](#) (chair: 陳作庭)
Partially defined matrix orderings on subspaces of $L(H)$;
- 15:00-15:30 演講者：[Raymond Nung-Sing Sze 施能聖 \(USA\)](#) (chair: 陳作庭)
The Kemeny constant for finite homogeneous ergodic Markov chains.
- 15:30-15:45 休息
- 15:45-16:15 演講者：[Wei-Shih Du 杜威仕 \(Taiwan\)](#) (chair: 侯晉川)
From an abstract maximal element principle to optimization problems, stationary point theorems and common fixed point theorems
- 16:15-16:45 演講者：[Hang-Chin Lai 賴漢卿 \(Taiwan\)](#) (chair: 侯晉川)
Canonical Characterization of Multiplier Operators.
- 16:45-17:15 演講者：[Chi-Kwong Li 李志光 \(USA\)](#) (chair: 侯晉川)
Sum of unitary orbits of operators;
- 17:15-17:30 閉幕式 (chair: 李志光)

Abstracts

Labelling Neural Matrix and Collective Dynamics

Mau-Hsiang Shih 施茂祥
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Abstract

The brain is considered to be a complex, self-organizing system; it consists of enormous numbers of interacting neurons and perpetually weaves its intricate web. Scientists believe that collective dynamics of the brain is deeply entwined with the neural circuits. But working out how neural circuits affect collective dynamics has been a great mystery. From the mathematical perspective, we wish to introduce a novel conception of “labeling neural circuits” and unlock how neural circuits affect collective dynamics.

Characterizations of derivations on prime rings: additive maps derivable at an idempotent

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Abstract

A given element Z in a ring \mathcal{A} is called an additive full-derivable point of \mathcal{A} if every additive map δ from \mathcal{A} into itself derivable at Z (i.e. $\delta(A)B + A\delta(B) = \delta(Z)$ for every $A, B \in \mathcal{A}$ with $AB = Z$) is a derivation. Let \mathcal{A} be a unital prime ring containing a nontrivial idempotent P . It is shown that if δ is derivable at 0 and $\delta(I)$ belongs to the center of \mathcal{A} , then there exists an additive derivation τ such that $\delta(A) = \tau(A) + \delta(I)A$ for all $A \in \mathcal{A}$; if, for every $A \in \mathcal{A}$, there is some integer n such that $nI - A$ is invertible, then the idempotent P is an additive full-derivable point of \mathcal{A} ; if, in addition, the characteristic of \mathcal{A} is not 2, then the unit I is an additive full-derivable point of \mathcal{A} , too. These are applied to some operator algebras such as Banach algebras and von Neumann algebras. For instance, it is shown that every nonzero idempotent in a factor von Neumann algebra is a full-derivable point.

Generalized numerical ranges and multiplicities

Tin Yau Tam 譚天祐
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Abstract

We will discuss the classical numerical range of an operator and its variations (including those of Au-Yeung and Tsing, Brickman, McIntosh, Tam). Embry's result on the multiplicity of classical numerical range is reviewed. Then we introduce the notion of multiplicity for the corresponding numerical range. New results will be discussed.

Maximizing spectral radius of signless Laplacian matrix

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Abstract

For a (simple) graph G , by the signless Laplacian matrix of G we mean the matrix $Q(G) = D(G) + A(G)$, where $A(G), D(G)$ denote respectively the adjacency matrix and the diagonal matrix of vertex degrees of G . It is known that connected graphs that maximize the signless Laplacian spectral radius over all connected graphs with the same number of vertices and edges are (degree) maximal. Let G be a maximal graph with n vertices and r distinct vertex degrees: $\delta_r > \delta_{r-1} > \cdots > \delta_1$. It is proved that $\rho(Q(G)) < \rho(Q(H))$ for some maximal graph H with $n + 1$ (respectively, n) vertices and the same number of edges as G if G has precisely two dominating vertices or there exists an integer $i, 2 \leq i \leq \lceil \frac{r}{2} \rceil$ such that $\delta_i + \delta_{r+1-i} \leq n + 1$ (respectively, if there exist positive integers i, l with $l + 2 \leq i \leq \lceil \frac{r}{2} \rceil$ such that $\delta_i + \delta_{r+1-i} \leq \delta_l + \delta_{r-l} + 1$). Maximal graphs that maximize the signless Laplacian spectral radius over the class of maximal graphs with m edges and not more than $m - q$ vertices, where q is a fixed small nonnegative integer, are completely determined.

Nonselfadjoint operators, invariant subspaces, and inverse Sturm-Liouville problems

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Abstract

We apply the theory of characteristic operator functions developed by M. S. Livšic and M. S. Brodskii for classifying nonselfadjoint operators to investigate the isospectral problem of the potential equation with a scalar-valued potential function, which was originally investigated by G. Borg by a different approach. For each potential equation we construct a bounded Volterra integral operator, and compute its characteristic operator function. Suppose two potential equations have the same spectra subject to two kinds of boundary conditions. Then the corresponding Volterra integral operators have the same characteristic operator function, and the theory of Livšic and Brodskii implies that these two Volterra operators are unitarily equivalent. By observing the invariant subspaces of these Volterra operators, we find the unitary transformation linking these two Volterra operators is the identity transformation. Consequently we find that the corresponding potential functions are equal at their common points of continuity. We also apply this result to prove a characterization theorem for the potential equation to have a constant potential function

by comparing the eigenvalues of the Dirichlet boundary value problem and the Neumann boundary value problem of the potential equation.

Numerical Range Diameter Preserving Maps On C^* -algebras

Kong Chan 陳鋼

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Abstract

Let A be a C^* -algebra with unit 1. We show that for a linear bijection $T : A \rightarrow A$ such that it preserves the diameter of the numerical range of each $a \in A$ if and only if $T(a) = \tau\Phi(a) + \Lambda(a)1$ for every $a \in A$, where $\tau \in \mathbb{C}$ and $|\tau| = 1$, Φ is a C^* -isomorphism on A and Λ is a linear functional on A such that $\Lambda(1) + \tau \neq 0$.

Completely bounded disjointness preserving operators on the Fourier algebras

Ying-Fen Lin 林英芬

National Dong Hwa University, Taiwan

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Abstract

In this talk, we show that every surjective completely bounded disjointness preserving linear operator on the Fourier algebras is a weighted completely bounded homomorphism induced by a piecewise affine map.

Some problems in the classification of algebraic elements in a C^* -algebra

Mu-Ming Wong 王牧民

Christian Chung Yuan University, Taiwan

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Abstract

In this talk we want to present some classical problems about the the classifications of algebraic elements in a C^* -algebra. We will introduce the technique of algebraic K Theory in a C^* -algebra and some simple developments in these problems.

Lower bounds of copson type for lower triangular matrices

Chang-Pao Chen 陳璋泡
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Abstract

Let $A = (a_{n,k})_{n,k \geq 0}$ be a non-negative matrix. Denote by $L_{p,q}(A)$ the supremum of those L satisfying the following inequality:

$$\left(\sum_{n=0}^{\infty} \left(\sum_{k=0}^{\infty} a_{n,k} x_k \right)^q \right)^{1/q} \geq L \left(\sum_{k=0}^{\infty} x_k^p \right)^{1/p} \quad (X \in \ell_p, X \geq 0).$$

In this talk, I shall give a brief survey on the recent development in the aspect of the values of $L_{p,q}(A)$ or $L_{p,q}(A^t)$, where A is a lower triangular matrix and A^t denotes its transpose. The matrices involved here include Hausdorff matrices, the weighted mean matrices, and Nörlund matrices.

Khinchine's inequality for Walsh functions

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Abstract

The well known Khinchine's inequality states that the sequence of Rademacher functions in $L^p[0, 1]$ ($1 \leq p < \infty$) is equivalent to the unit vector basis of ℓ^2 . Walsh functions are products of Rademacher functions. We say that a Walsh function has order n if it is the product of n distinct Rademacher functions. In this talk, we give a proof that the set of all Walsh functions in $L^p[0, 1]$ of order up to and including n is equivalent to the unit vector basis of ℓ^2 . The proof uses Burkholder's inequality for martingales and Hilbert-Schmidt operators.

A fundamental principle for the boundedness of operators on weighted Hardy spaces

Chin-Cheng Lin 林欽誠
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Abstract

we establish a new atomic decomposition for $f \in L_w^q \cap H_w^p$, where $0 < p \leq 1 < q \leq \infty$ and the decomposition converges in L_w^q -norm rather than in the distribution sense.

As applications of this decomposition, assuming that T is a linear operator bounded on L_w^q , we obtain

1. if T is uniformly bounded in L_w^p -norm for all w - (p, q, N) -atom, then T can be extended to be bounded from H_w^p to L_w^p ;
2. if T is uniformly bounded in H_w^p -norm for all w - (p, q, N) -atom, then T can be extended to be bounded on H_w^p ;
3. if T is bounded on H_w^p , then T can be extended to be bounded from H_w^p to L_w^p .

Higher-rank numerical ranges and unitary dilations: the infinite-dimensional case

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Abstract

For a positive integer k , the rank- k numerical range $\Lambda_k(A)$ of an operator A acting on a separable Hilbert space H of dimension at least k is the set of scalars λ such that $PAP = \lambda P$ for some rank k orthogonal projection P . It is shown that if A is a contraction on H with $d \equiv \text{rank}(I - A^*A) = \text{rank}(I - AA^*) < \infty$, then

$$\overline{\Lambda_k(A)} = \bigcap \{ \overline{\Lambda_k(U)} : U \in B(H \oplus C^{3d}) \text{ is a unitary dilation of } A \}.$$

Moreover, if $\Lambda_\infty(A) \neq \emptyset$, then we have

$$\overline{\Lambda_\infty(A)} = \bigcap \{ \overline{\Lambda_\infty(U)} : U \text{ is a unitary dilation of } A \}.$$

Numerical ranges of radial Toeplitz operators on Bergman space

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Abstract

A Toeplitz operator on the Bergman space of the open unit disc D is said to be radial if the values of its symbol on D depend only on the moduli of the variable z . In this talk, we consider the problem of which nonempty convex subset of the complex plane is the numerical range of such an operator. We show that any finite line segment, any convex hull of an analytic image of D and any closed convex polygonal region are such numerical ranges, but leave open a complete characterization.

On isometric extension problem between two unit spheres

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Abstract

In this paper we introduce the isometric extension problem of isometric mappings between two unit spheres. Some important results of the related problems are outlined and the recent progress is mentioned.

Quantum error correction and generalized numerical ranges

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Abstract

For a noisy quantum channel, a quantum error correcting code exists if and only if the joint higher rank numerical ranges associated with the error operators of the channel is non-empty. In this paper, geometric properties of the joint higher rank numerical ranges are obtained and their implications to quantum computing are discussed. It is shown that if the dimension of the underlying Hilbert space of the quantum states is sufficiently large, the joint higher rank numerical range of operators is always star-shaped and contains a non-empty convex subset. In case the operators are infinite dimensional, the joint infinite rank numerical range of the operators is a convex set lying in the core of all joint higher rank numerical ranges, and is closely related to the joint essential numerical ranges of the operators. In addition, equivalent formulations of the joint infinite rank numerical range are obtained. As by products, previous results on essential numerical range of operators are extended.

Separating maps of the Bochner space $L^p(\mu, H)$

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Abstract

Let $L^p(\mu, H)$ be a Bochner space for a σ -finite measure μ and a separable Hilbert space H . We will show that every bi-separating map of $L^p(\mu, H)$ is continuous. This is a joint work with Chi-Weng Cheong.

Inclusion Relation Among Generalized Numerical Ranges

Wai-Shun Cheung 張偉信

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Abstract

Let A be a $n \times n$ matrix of trace 0. If A is not hermitian, then for any $n \times n$ matrix of trace 0, there exists α , depending on the norm of B only, such that $\alpha W_B(C) \subseteq W_A(C)$ for all $n \times n$ matrices C .

Fractional integral operators on weighted anisotropic H_p and L_p spaces

Sen-Hua Lan 藍森華

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Abstract

In this talk, we study weighted inequalities for fractional integral operators on anisotropic H_p and L_p spaces. Such Hardy spaces are associated with a general discrete group of dilations, $A^k : k \in \mathbb{Z}$, where A is a generating matrix whose all eigenvalues r satisfy $|r| > 1$.

Generalization of Hausdorff Dimension of Fractal Sets

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Abstract

In this talk the concepts of so-called multi-dimensional measure and multi-dimension are introduced, which generalize the concepts of the Hausdorff measure and dimension. An example is constructed, which shows that there exists a class of sets that the Hausdorff measures of them are either 0 or ∞ while the multi-dimensional measures are positive numbers, and that the components of a multi-dimension may be any real number except for that the first non-zero component is positive.

Orthogonality Relations on Domains in Compact Symmetric Spaces

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Abstract

Let G be a compact group and K a closed subgroup of G . And let \widehat{G} be the dual space of G , that is the set of all equivalent classes of irreducible representations of G . Put $X = G/K$ the corresponding homogeneous space with a G -invariant normalized measure dx . Let Ω be a measurable subset of X with positive measure. For each $\pi \in \widehat{G}$, write π'_{ij} s for the corresponding matrix coefficients and $\widetilde{\pi}_{ij} := \pi_{ij}|_{\Omega}$ for the restriction to Ω of π_{ij} . In this talk, we shall investigate the following question: under what conditions, the set $\{\widetilde{\pi}_{ij} \mid \pi \in \widehat{G}\}$ will form an orthogonal base for $L^2(\Omega)$.

Partially defined matrix orderings on subspaces of $L(H)$

Chi-Kueng Ng 吳志強
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Abstract

The Kemeny constant for finite homogeneous ergodic Markov chains

Raymond Nung-Sing Sze 施能聖
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Abstract

For a finite homogeneous ergodic Markov chain, the Kemeny constant is an interesting quantity which is also known as the *expected time to mixing* of the chain. In this talk, a new formula and several perturbation results for the Kemeny constant will be presented.

This talk is based on a joint work with M. Catral, S. J. Kirkland, and M. Neumann.

From an abstract maximal element principle to optimization problems, stationary point theorems and common fixed point theorems

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Abstract

In this paper, we first establish an existence theorem related with intersection theorem, maximal element theorem and common fixed point theorem for multivalued maps by applying an abstract maximal element principle proved by Lin and Du. Some new stationary point Theorems, minimization problems, new fixed point theorems and a system of nonconvex equilibrium theorem are also given.

Canonical characterization of multiplier operators

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Abstract

Let G be a LCA group. The multiplier operators have four equivalent definitions in different view points. The characterization of multiplier algebras are developed from these definitions. In this talk we focus on the topological tensor product to present the multiplier algebra on module Banach spaces. Several multiplier algebras are characterized as the function spaces, and some interesting behavior of multipliers are represented in this context.

Sum of unitary orbits of operators

Chi-Kwong Li 李志光

College of William and Mary, USA

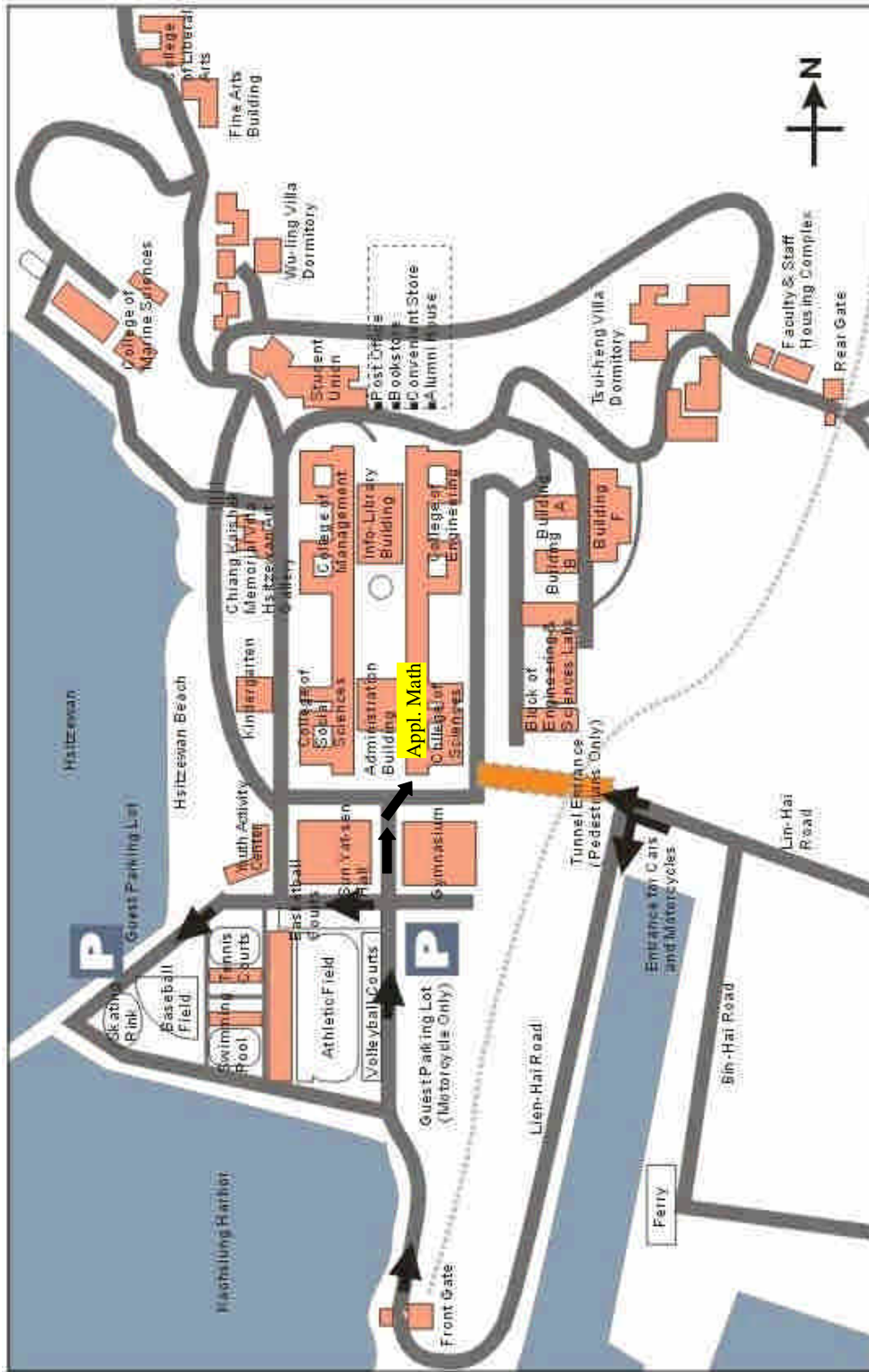
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Abstract

We discuss recent results and problems on sum of unitary orbits of operators.

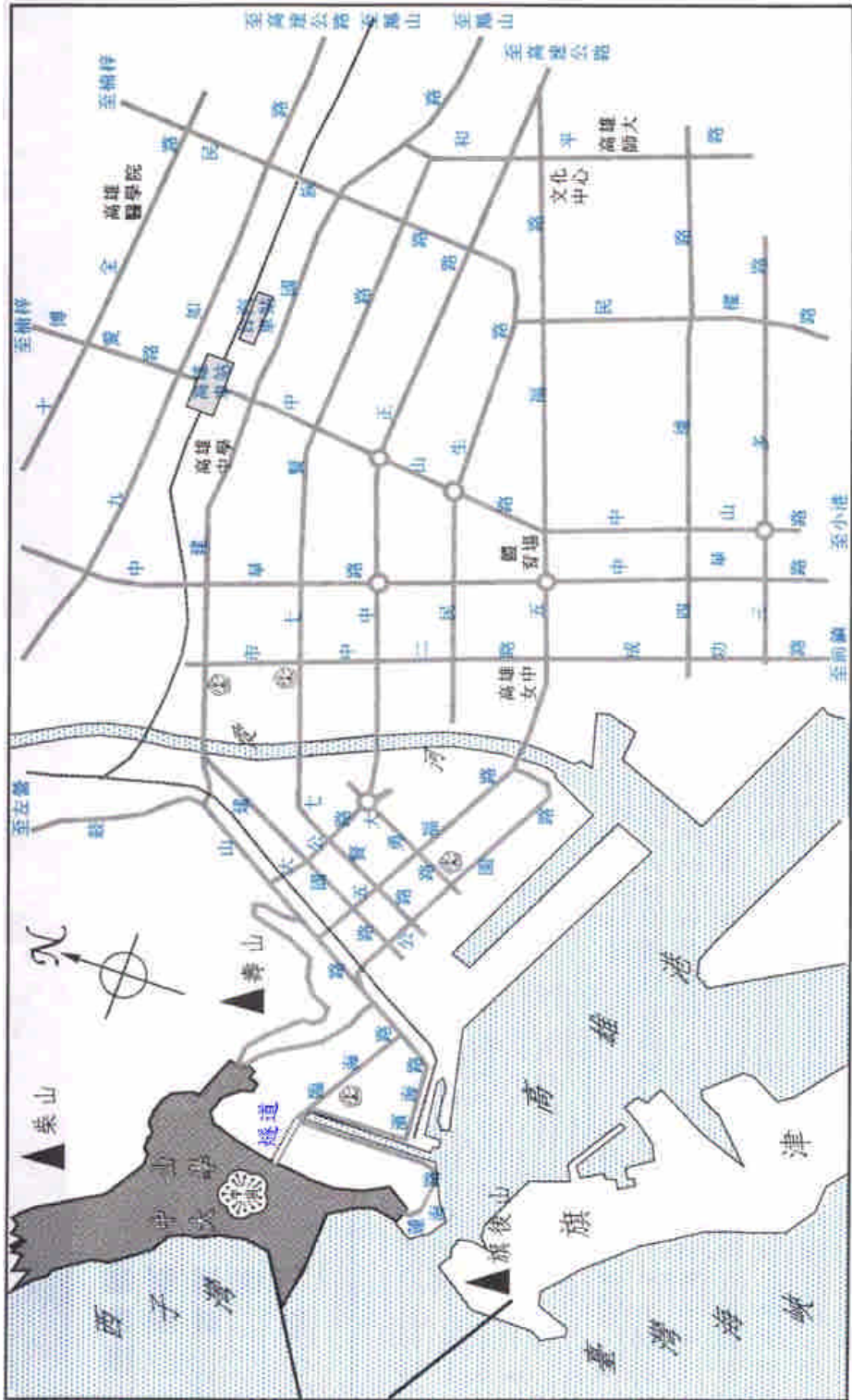
E-mail addresses of registered participants (as of June 30, 2009)

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| 王陽澄 | 國立清華大學 | cameronwang1572@yahoo.com.tw |
| Mu-Ming Wong 王牧民 | 中原大學 | mmwong@cycu.edu.tw |
| Ngai-Ching Wong 黃毅青 | 國立中山大學 | wong@math.nsysu.edu.tw |
| Pei-Yuan Wu 吳培元 | 國立交通大學 | pywu@math.nctu.edu.tw |
| 吳淑惠 | 台北海洋技術學院 | f0579@mail.tcmt.edu.tw |



National Sun Yat-sen University Campus Locations

National Sun Yat-sen University Campus Locations



國立中山大學高雄市位置圖

Transportation

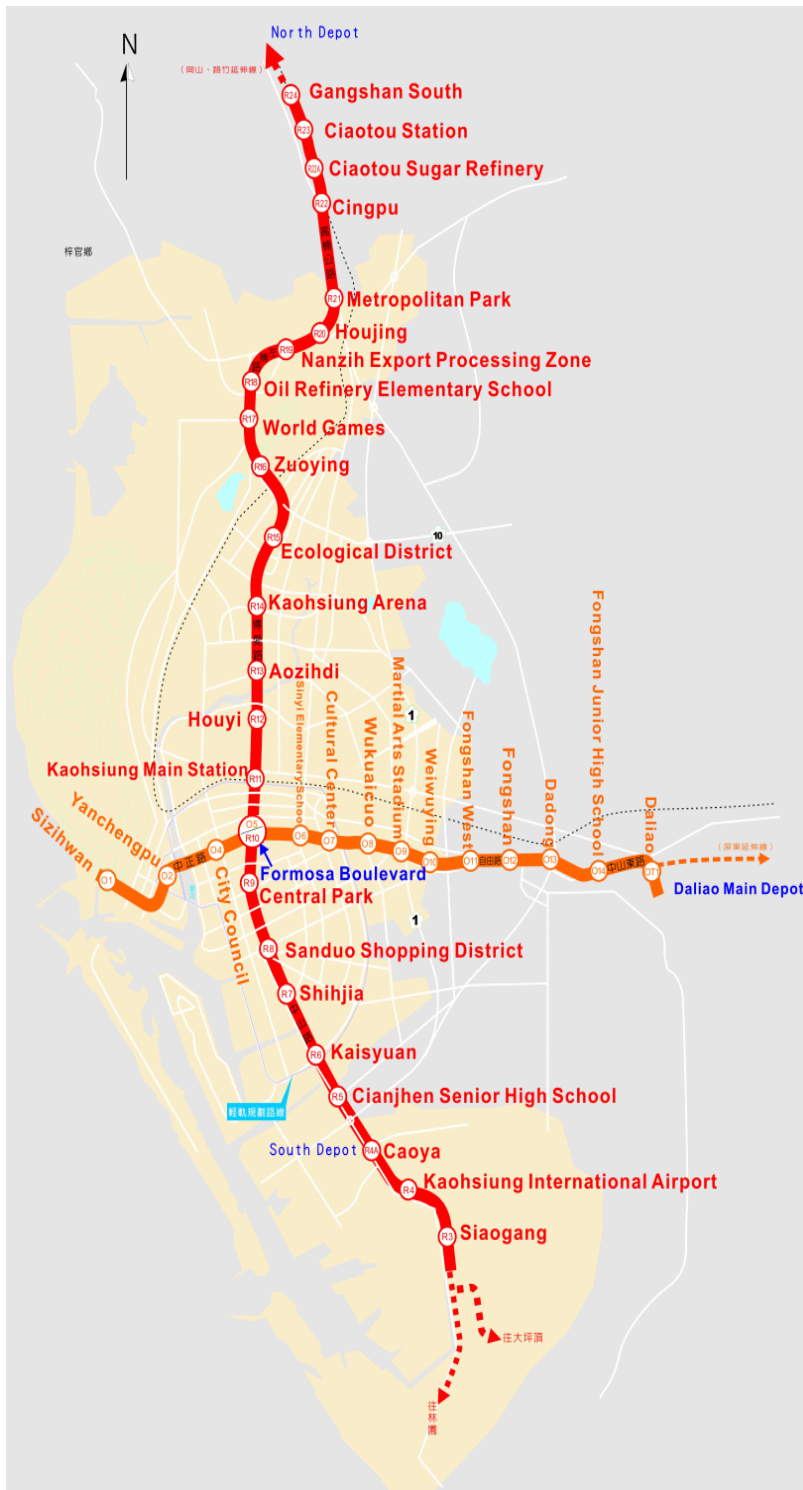
Kaohsiung International Airport ↔ Chinatrust/ ZhongZheng Hotels:
 You can take a taxi or metro. The taxi fare is roughly NTD400 and the metro fare is roughly NT60. You can show the following to the drivers if necessary. They will help you. If you want to take the metro to Chinatrust/ ZhongZheng hotels, you need to transfer from Formosa Boulevard station (R10) to Yanchengpu station (O2) which is much near to the hotels.

我要在中信大飯店下車

(I want to get off at Chinatrust Hotel.)

我要在中正大飯店下車

(I want to get off at ZhongZheng Hotel.)



中信飯店/中正飯店



中信飯店/中正飯店

中信飯店：高雄市鹽埕區大仁路 43 號

【Tel】 (07) 521-7111

<http://kaohsiung.chinatrust-hotel.com.tw/>

中正飯店：高雄市鹽埕區大仁路 7 號

【Tel】 (07) 521-2266

Transportation

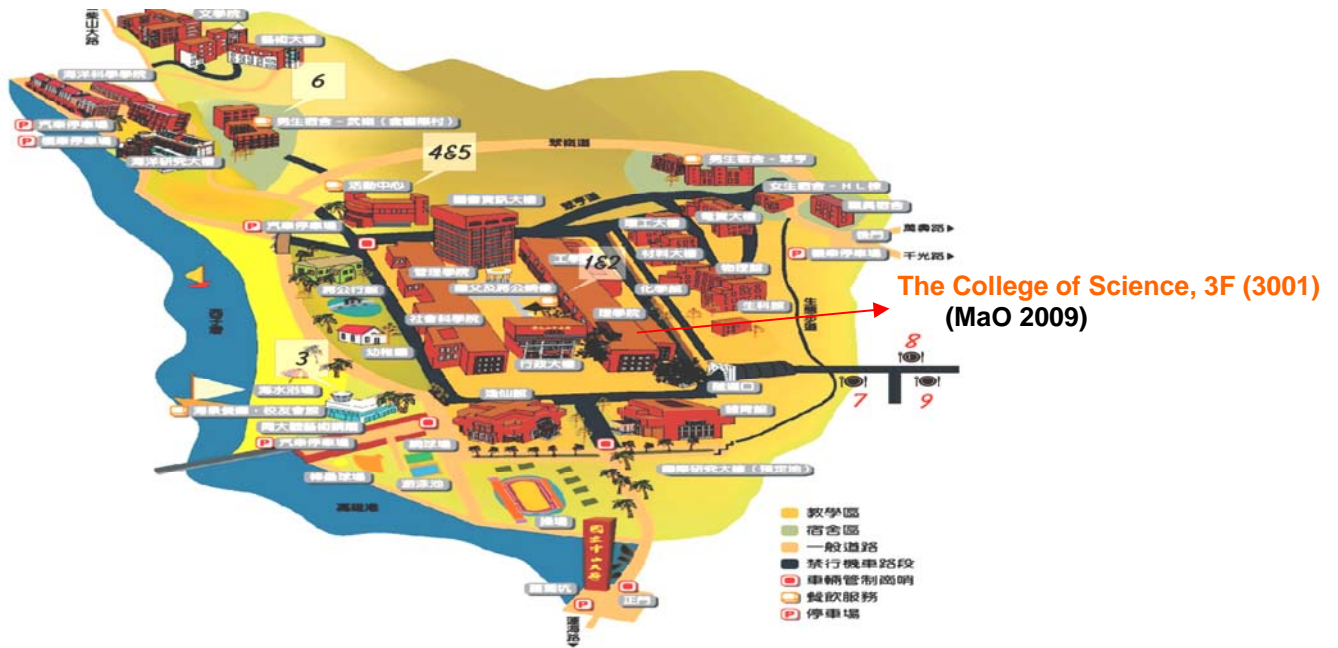
Chinatrust/ ZhongZheng Hotels \longleftrightarrow NSYSU: You can take a taxi, bus #248 or metro. The bus fare is NTD15 per person, the taxi fare is roughly NTD100 and the metro fare is NT20. You can show the following to the drivers if necessary. They will help you. When you get off at the tunnel, you go through the tunnel and will reach the College of Science of NSYSU.

中山大學隧道口下車

(I want to get off at the tunnel of NSYSU.)

中山大學體育館下車

(I want to get off at the gym of NSYSU.)



飯店交通資訊：

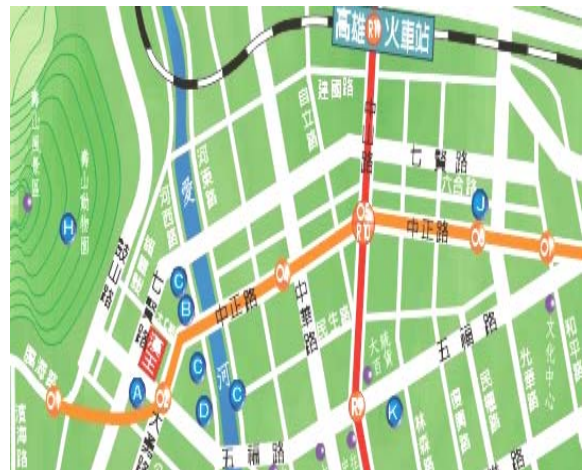
- ◆自行開車：由中山高速公路下中交流道，至飯店約 20 分鐘
- ◆搭火車：至高雄火車站下，搭公車或轉乘捷運約 15 分鐘
- ◆搭公車：至鹽埕公車站下，步行約 5 分鐘
- ◆搭飛機：至高雄小港機場，搭計程車約 30 分鐘

高鐵左營站如何到高雄中信大飯店/中正大飯店：

- ◆最方便快捷的方法是搭乘計程車,約 20 分內到達飯店,費用約 250 元以內。
- ◆可從捷運高鐵站搭捷運至鹽埕埔站下車,步行至飯店約 2 分鐘
- ◆在左營高鐵站內換台鐵到高雄火車站,車票\$15,在高雄火車站外可再轉搭公車 214 號或 60 號公車車票\$12(直接告知司機要在中信飯店/中正飯店下車即可)
- ◆在高鐵左營站外的公車停靠區搭 224 或 301 號公車到高雄火車站，在高雄火車站外可再轉搭公車 2 號或 60 號公車車票\$12(直接告知司機要在中信飯店/中正飯店下車即可)

晚宴地點：漢王大飯店

交通資訊：在捷運鹽埕埔站(O2)下車，往五福路方向右轉，步行至飯店約 5 分鐘



地址：高雄市七賢三路 98 號

No.98 Cisian 3rd.Rd Kaohsiung

Phone number: **+886-7-5313131**

<http://en.swanlake.com.tw/king/>

MaO2009 國際研討會住宿名單 中信大飯店

| NO. | 姓名 | 服務單位 | 住宿時間 | 房型 | 備註 |
|-----|-----|--------------------|-------------|-----|-----|
| 1 | 賴漢卿 | 中原大學 | 07/02~07/04 | 單人房 | 2 晚 |
| 2 | 施茂祥 | 台灣師大 | 07/02~07/05 | 單人房 | 3 晚 |
| 3 | 林欽誠 | 中央大學 | 07/02~07/03 | 單人房 | 1 晚 |
| 4 | 吳培元 | 交通大學 | 07/02~07/04 | 單人房 | 2 晚 |
| 5 | 林英芬 | 東華大學 | 07/03~07/04 | 單人房 | 1 晚 |
| 6 | 林來居 | 彰化師範大學 | 07/02~07/04 | 單人房 | 2 晚 |
| 7 | 譚必信 | Tamkang University | 07/02~07/04 | 單人房 | 2 晚 |

中信大飯店：高雄市鹽埕區大仁路 43 號 (07) 521-7111

<http://kaohsiung.chinatrust-hotel.com.tw/>

MaO2009 國際研討會住宿名單 中正大飯店

| NO. | 姓名 | 服務單位 | 住宿時間 | 房型 | 備註 |
|-----|-----|---------------------------|--------------------|-----|---------------------|
| 1 | 吳淑惠 | 台北海洋技術學院 | 07/02~07/04 | 單人房 | 2 晚 |
| 2 | 黃鵬瑞 | 淡江大學 | 07/02~07/04 | 單人房 | 2 晚 |
| 3 | 張定中 | 致理技術學院 | 07/02~07/04 | 單人房 | 2 晚 |
| 4 | 王牧民 | 中原大學 | 07/02~07/04 | 單人房 | 2 晚 |
| 5 | 江惠坤 | 南京大學數學系 | 07/02~07/05 | 單人房 | 3 晚 |
| 6 | 梁浩瀚 | 新加坡國立大學 | 07/02~07/08 | 單人房 | 6 晚 |
| 7 | 潘耀東 | Iowa State University | 07/02~07/05 | 單人房 | 3 晚 |
| 8 | 定光桂 | 南開大學 | 07/01~07/07 | 單人房 | 6 晚 |
| 9 | 梁子威 | 香港中文大學 | 06/30~07/05 | 單人房 | 5 晚 |
| 10 | 吳志強 | 南開大學 | 07/02~07/11 | 單人房 | 9 晚 |
| 11 | 譚天佑 | Auburn University | 07/02~07/04 | 單人房 | 2 晚 |
| 12 | 侯晉川 | 太原理工大學 | 07/02~07/08 | 單人房 | 6 晚 |
| 13 | 林淑慧 | 真理大學 | 07/02~07/04 | 單人房 | 2 晚 |
| 14 | 施能聖 | University of Connecticut | 07/02~07/05 | 單人房 | 3 晚 |
| 15 | 藍森華 | 國立中央大學 | 07/02~07/05 | 單人房 | 3 晚 |
| 16 | 陳璋泡 | 玄奘大學 | 07/02~07/04 | 雙人房 | 2 晚 |
| 17 | 陳 鋼 | 香港大學 | 07/02~07/06 | 雙人房 | 4 晚 *2 間 (2 房相連) |

中正大飯店：高雄市鹽埕區大仁路 7 號 (07) 521-2266

MaO2009 國際研討會住宿名單 中山大學校友會館

| NO. | 姓名 | 服務單位 | 住宿時間 | 房型 | 備註 |
|-----|-----|--------|-------------|-----|-----|
| 1 | 沈昭亮 | 國立清華大學 | 07/02~07/05 | 雙人房 | 3 晚 |
| | | | | | |

大會網址：<http://www.math.nsysu.edu.tw/~wong/mao2009/>

聯絡人：劉莉莉小姐

連絡電話：(07)5252000 轉 3815 手機：0953-106828