

Notions of Convexity on Carnot Groups

饒維明 (中央大學)

Abstract: Convex functions and convex analysis play a substantial role in analysis, in particular in some non-linear problems and variational problems. We introduce the notion of convexity on Carnot groups and highlight some of its applications to sub-elliptic PDEs.

Tb theorem on product spaces

李明憶 (中央大學)

Abstract: In this talk, we show a *Tb* theorem on product spaces $\mathbb{R}^n \times \mathbb{R}^m$, where $b(x_1, x_2) = b_1(x_1)b_2(x_2)$, b_1 and b_2 are para-accretive functions on \mathbb{R}^n and \mathbb{R}^m , respectively.

Extremality of numerical radii of matrix products

高華隆 (中央大學)

Abstract: For two n -by- n matrices A and B , it was known before that their numerical radii satisfy the inequality $w(AB) \leq 4w(A)w(B)$, and the equality is attained by the 2-by-2 matrices $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$. Moreover, the constant “4” here can be reduced to “2” if A and B commute, and the corresponding equality is attained by $A = I_2 \otimes \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} \otimes I_2$. In this talk, we give a complete characterization of A and B for which the equality holds in each case. Analogous characterizations for the extremal equalities for tensor products and Hadamard products are also proven. For doubly commuting matrices, we obtain a unitary similarity model, namely, A and B satisfy $AB = BA$ and $AB^* = B^*A$ if and only if they are simultaneously unitarily similar to matrices of the form $\sum_{j=1}^k \oplus (A_j \otimes I_{n_j})$ and $\sum_{j=1}^k \oplus (I_{m_j} \otimes B_j)$. For commuting 2-by-2 matrices A and B , we show that $w(AB) = w(A)w(B)$ if and only if either A or B is a scalar matrix, or A and B are simultaneously unitarily similar to $\begin{bmatrix} a_1 & 0 \\ 0 & a_2 \end{bmatrix}$ and $\begin{bmatrix} b_1 & 0 \\ 0 & b_2 \end{bmatrix}$ with $|a_1| \geq |a_2|$ and $|b_1| \geq |b_2|$.

Monge-Ampère singular integral operators acting on Hardy spaces and their duals

林欽誠 (中央大學)

Abstract: We study the Hardy spaces $H_{\mathcal{F}}^p$ associated with a family \mathcal{F} of sections which are closely related to the Monge-Ampère equation. We characterize the dual spaces of $H_{\mathcal{F}}^p$, which can be realized as Carleson measure spaces, Campanato spaces, and Lipschitz spaces. Then we prove that Monge-Ampère singular operators are bounded from $H_{\mathcal{F}}^p$ into L_{μ}^p , and bounded on both $H_{\mathcal{F}}^p$ and their dual spaces.

Composition operators on the Bergman space via quasiconformal mappings

方向 (中央大學)

Abstract: We extend the theory of composition operators on the Bergman space from analytic symbols to non-analytic symbols. The symbols we choose are quasiconformal mappings, which form a beautiful area in analysis but previously disjoint from operator theory.