

30th Annual Conference of the Ramanujan Mathematical Society
Symposium on Functional Analysis and Operator Theory
Abstracts of Talks

May 15, 2015

11:30 AM - 12:10 PM

Curvature inequalities

Gadadhar Misra, Indian Institute of Science, Bangalore

Abstract: The curvature of a contraction in the Cowen-Douglas class of rank one on the unit disc is bounded above by the curvature of the backward shift operator. However, in general, an operator satisfying this curvature inequality need not be contractive. We find a stronger inequality for the curvature which ensures contractivity of the operator. The case of multiply connected domains will be discussed.

12:15 PM - 12:55 PM

Dilation on the symmetrized bidisc

Sourav Pal, Indian Statistical Institute, Delhi

Abstract: The closed symmetrized bidisc, denoted by Γ , is defined as

$$\Gamma = \{(z_1 + z_2; z_1 z_2) : |z_i| \leq 1; i = 1, 2\}$$

A pair of commuting operators $(S; P)$ for which Γ is a spectral set is called a Γ -contraction. We show that rational dilation succeeds on the symmetrized bidisc by explicitly constructing a normal dilation to a Γ -contraction. This is a joint work with Tirthankar Bhattacharyya and Subrata Shyam Roy.

2:00 PM - 2:40 PM

Pseudospectrum of an element of a Banach Algebra

S. H. Kulkarni, Indian Institute of Technology - Madras, Chennai

Abstract: Let A be a Banach algebra, $a \in A$ and $\varepsilon > 0$. The ε -pseudospectrum $\Lambda_\varepsilon(a)$ of a is defined by

$$\Lambda_\varepsilon(a) := \{\lambda \in \mathbb{C} : \|(\lambda - a)^{-1}\| \geq \frac{1}{\varepsilon}\}$$

with the convention that $\|(\lambda - a)^{-1}\| = \infty$ if $\lambda - a$ is not invertible. This set contains the spectrum $\sigma(a)$ of a and is contained in the numerical range of a . In this talk we give an overview of the idea of the pseudospectrum and discuss some interesting properties including

its relationships with the spectrum and numerical range of a . Characterizations of scalar, Hermitian and idempotent elements by means of their pseudospectra are given. It is shown that the pseudospectrum has no isolated points, and has a finite number of components, each containing an element of the spectrum of a . Suppose that for some $\varepsilon > 0$ and $a, b \in A$; $\Lambda_\varepsilon(ax) = \Lambda_\varepsilon(bx)$ for all $x \in A$. It is shown that $a = b$ if:

- (i) a is invertible.
- (ii) A is semisimple and a is unit regular.
- (iii) $A = B(X)$ for a Banach space X .
- (iv) A is a C^* -algebra.
- (v) A is a commutative semisimple Banach algebra.

2:45 PM - 3:25 PM

Quantized Functional Analysis

Ajay Kumar, University of Delhi, Delhi

Abstract: We look into the impact of Grothendieck inequality on Classical Banach space theory and the theory of C^* -algebras. The talk will review the following topics: (1) Quantum analogue of function spaces (2) Introduction to operator spaces (3) Grothendieck Inequality (4) Tensor products of operator spaces (5) Harmonic analysis and operator spaces (6) Structure of operator space projective tensor product (7) Operator systems

May 16, 2015

11:30 AM - 12:10 PM

Subspaces of L_p : The story along the avenue

Sudipta Dutta, Indian Institute of Technology - Kanpur, Kanpur

Abstract: In 40 minutes we try to walk the main avenue along which the story of subspaces of L_p , $1 < p < \infty$ progressed in last 40 years. We will see questions encountering answers and giving birth to more questions. We will leave the road without much being sure what may wait us ahead - successes or failures. If time permits, we may make a brief visit to tragedy queen L_1 , to see what went wrong with her and if she can still find some solace somewhere.

12:15 PM - 12:55 PM

Small Combination of slices in Banach spaces

Sudeshna Basu, George Washington University, USA

Abstract: In this work, we study certain stability results for Ball Separation properties in Banach Spaces leading to a discussion in the context of operator spaces. In this work, we study certain stability results for Small Combination of Slices Property (SCSP) leading to a

discussion on SCSP in the context of operator spaces. SCS points were first introduced as a slice generalisation of the PC (i.e. point of continuity points for which the identity mapping from weak topology to norm topology is continuous.) It is known that X is strongly regular (respectively X^* is w^* -strongly regular) if and only if every non empty bounded convex set K in X (respectively K in X^*) is contained in the norm closure (respectively w^* - closure) of $\text{SCS}(K)$ (respectively w^* - $\text{SCS}(K)$) i.e. the SCS points (w^* - SCS points) of K . Later, it was proved that a Banach space has Radon- Nikodym Property (RNP) if and only if it is strongly regular and it has the Krein-Milamn Property(KMP). Subsequently, the concepts of SCS points was used to investigate the structure of non-dentable closed bounded convex sets in Banach spaces. The point version of the result was also shown to be true.

2:00 PM - 2:40 PM

A generalised Korovkins Theorem

Pradipta Bandyopadhyay, Indian Statistical Institute, Kolkata

Abstract: In this talk, we will present a generalized version of Korovkins theorem and give some examples to illuminate our points of departure from its more familiar cousins.

2:45 PM - 3:25 PM

Operator summability in Banach spaces

Anil Karn, National Institute of Science Education and Research, Bhubaneswar

Abstract: We propose a new kind of summability in Banach spaces which, in general, is different from weak- and norm- p -summabilities. We relate it to two different types of geometric properties in Banach spaces, namely, Gelfand-Phillips property and Dunford- Pettis property.