JORDAN GEOMETRIC ANALYSIS AND APPLICATIONS

List of Lectures

- Boyd, C. (3.40 p.m. 3 September)
  Surjectivity of isometries between weighted spaces of holomorphic functions

  We investigate conditions that implies the surjectivity of isometries between weighted spaces of holomorphic functions. We show that for certain classical weights every isometry is automatically surjective. As a special case we look at surjectivity of isometries of the Bloch space. This is a joint work with P. Rueda (Universidad de Valencia).

- Bunce, L. (2.45 p.m. 3 September)
  Triple involutions and reversibility

- Chen, C. (4.25 p.m. 4 September)
  Dynamics of cosine operator functions on groups

- Gowda, M. (9.20 a.m. 5 September)
  On the game-theoretic value of a linear transformation relative to a symmetric cone

- Honda, T. (4.25 p.m. 3 September)
  Growth and distortion theorems on the unit ball of a JB*-triple

- Jimenez-Vargas, A. (11.10 a.m. 5 September)
  Lipschitz compact operators

- Kum, S. (10.10 a.m. 4 September)
  Moving averages on convex metric spaces

  Recently, Bauschke et al. studied the homogeneous linear difference equation in a Banach space called the moving average in connection with a Gauss-Seidel iteration scheme. Moreover, they considered simple but powerful moving Kolmogorov means including arithmetic, harmonic and resolvent means of positive definite matrices as special cases. Motivated by their work, we show that the moving average induced by a contractive mean on a complete metric space converges. Significant portions of the derivation can be carried out in general convex metric spaces, which means that the results have broader applications beyond the setting of Banach spaces. Then we apply the convergence result to investigate properties of the limit of the moving geometric average of positive definite operators on a Hilbert space.

- Lemmens, B. (10.10 p.m. 5 September)
  Isometries of Hilbert geometry and symmetric cones

- Li, X. (12.00 p.m. 4 September)

  Amenability and Liouville property

- Lim, Y. (9.20 a.m. 4 September)

  Karcher equations on symmetric cones

  The Karcher or least squares mean has recently become an important tool for the averaging and study of positive definite matrices. It is the unique minimizer of the sum of the squares of the Riemannian (trace) distances:

  $$\Lambda(A_1, \ldots, A_n) = \arg\min_{X \in \mathbb{P}} \sum_{i=1}^{n} \delta^2(X, A_i)$$

  and coincides with the unique positive definite solution of the Karcher equation

  $$\sum_{i=1}^{n} w_i \log(X^{1/2} A_i^{-1} X^{1/2}) = 0.$$

  However, the significant theory that has been developed for the Karcher mean of positive definite matrices does not readily carry over to the setting of positive operators on a Hilbert space, since one has no such Riemannian structure nor NPC-metric available. We will show the (unique) existence of positive definite solution of the Karcher equation of positive operators and discuss it on the symmetric cones from JB-algebras.

- Mellon, P. (2.45 a.m. 4 September)

  Denjoy-Wolff theory on finite dimensional domains

- Ng, C-K. (2.45 p.m. 5 September)

  Berkovich spectra of elements in Banach rings

- Oliveira, L. (2.00 p.m. 3 September)

  On the geometry of the unit ball in a JB^*-triple

  In this talk, we discuss the connections between support tripotents, compact tripotents and norm-exposed faces of the unit ball in a JB^*-triple. This is a joint work with C.M. Edwards *(The Queen's College, Oxford).*

- Peralta, A. (2.00 p.m. 4 September)

  Local derivations: the shift from the associative theory of Kadison and Johnson to Jordan triple scene

  An (associative) derivation from a C-algebra A into a Banach A-bimodule X is a linear mapping $D : A \to X$ satisfying $D(ab) = D(a)b + aD(b)$; for every a; b in A. In 1990, in one of his most referred papers, R.V. Kadison introduced the notion of local derivations from A into X in the following sense: a linear mapping $T : A \to X$ is a local derivation if for each a in A there is a derivation D_a from A into X with $D_a(a) = T(a)$. It is due to Kadison that every continuous local derivation from a von Neumann algebra M (i.e. a C*-algebra which is also a dual Banach space) into a dual Banach M-bimodule is a derivation. The problem whether every (continuous) local derivation from a C*-algebra A into a Banach A-bimodule is a derivation, remained open for over ten years. Kadison's theorem motivated a flourishing line of research which culminates in 2001 with a definite contribution by B.E. Johnson, who showed that every bounded local derivation from a C*-algebra A into a Banach A-bimodule is a derivation. In his contribution, Johnson also showed that the continuity hypothesis is, in fact, superfluous by proving that every local derivation from a C*-algebra A into a Banach A-bimodule is continuous. Every C*-algebra can be naturally regarded as an element in the class of JB*-triples.*

  A triple derivation on a JB-triple E is a linear mapping $\delta : E \to E$ satisfying that $\delta\{a, b, c\} = \{\delta(a), b, c\} + \{a, \delta(b), c\} + \{a, b, \delta(c)\}$ for every $a, b, c \in E$. Triple derivations on JB*-triples were deeply studied since 1990 up today, with contributions due to J.T. Barton and Y. Friedman and T. Ho, J. Martnez, B. Russo and A.M. Peralta. In 2012, M. Mackey introduced local triple derivations on a JB*-triple E. A local triple derivation on E is a linear map $T : E \to E$ such that for each a in E there exists a triple derivation δ_a on E satisfying $T(a) = \delta_a(a)$. Mackey established an appropriate triple version of Kadison's theorem in the setting of JB*-triples, showing that every local triple derivation on a JBW*-triple is a triple derivation. In collaboration with M. Burgos, F.J. Fernndez-Polo and J. Garcs we proved that every bounded local triple derivations on a unital C*-algebra is a triple derivation. We shall culminate the presentation with a very recent result showing that every local triple derivation on a general JB*-triple is continuous and a triple derivation.*

- Polo, F. J. Fernandez (12.00 p.m. 5 September)

  Local triple derivations in the real setting

- Roelands, M. (4.25 p.m. 5 September)

  Unique geodesics for Thompson's metric on (symmetric) cones

- Russo, B. (11.10 a.m. 3 September)

  Recent advances in the theory of derivations on Jordan structures

- Smirnov, O. (10.10 a.m. 3 September)

  Reflections of Jordan and Kantor Pairs

  Kantor pairs form a large class of non-assosiative objects that includes all associative and alternative algebras, Jordan algebras, triple systems, and pairs, Freudenthal triple systems, as well as many other interesting examples.

  In 1972 Kantor gave a classification of certain finite-dimensional simple Kantor pairs. The goal of our project is to extend and improve his classification. We discovered that one of important class of simple Kantor pairs can be understood as reflections of Jordan pairs. In my talk I will give necessary background, define Kantor and Jordan pairs and show how to reflect them. This is a joint work with Bruce Allison and John Faulkner.

- Stacho, L. (3.40 p.m. 4 September)

  On strongly continuous one-parameter groups of automorphisms

  We prove structure theorems for strongly continuous one-parameter groups formed by surjective linear isometries of spaces of bounded N-linear functionals over strictly convex complex Banach spaces. Complete description is given in the case of Hilbert-equivalent norms on the basis of probability arguments. As a consequence, we classify the strongly continuous one-parameter automorphism groups of all infinite-dimensional Cartan factors of Jordan theory.

- Upmeier, H. (9.20 a.m. 3 September)

  Homogeneous vector bundles and intertwining operators on symmetric domains

- Velasco, M.V. (11.10 a.m. 4 September)

  Nonassociative Banach algebras

  We define an algebra as a linear space A with a bilinear map $(a, b) \in A \times A \mapsto A$, called the multiplication *of A. Consequently, Jordan or associative algebras are nothing but a particular type of algebras. We say that $a \in A$ is invertible if the left and right multiplication operators L_a and R_a are bijective. We define the spectrum of an element $a \in A$ according to this notion of invertibility. With this definition of spectrum, we develop a non-associative spectral theory for algebras equipped with a complete algebra norm. Several important results in the classical theory of associative Banach algebras are extended to this non-associative setting, showing in many instances that the restrictive requirement of associativity is superfluous.*

- Wortel, M. (2.00 p.m. 5 September)

  Thompson isometries and symmetric cones

- Wright, J.D.M. (12.00 p.m. 3 September)

  Generic dynamics and operator algebras