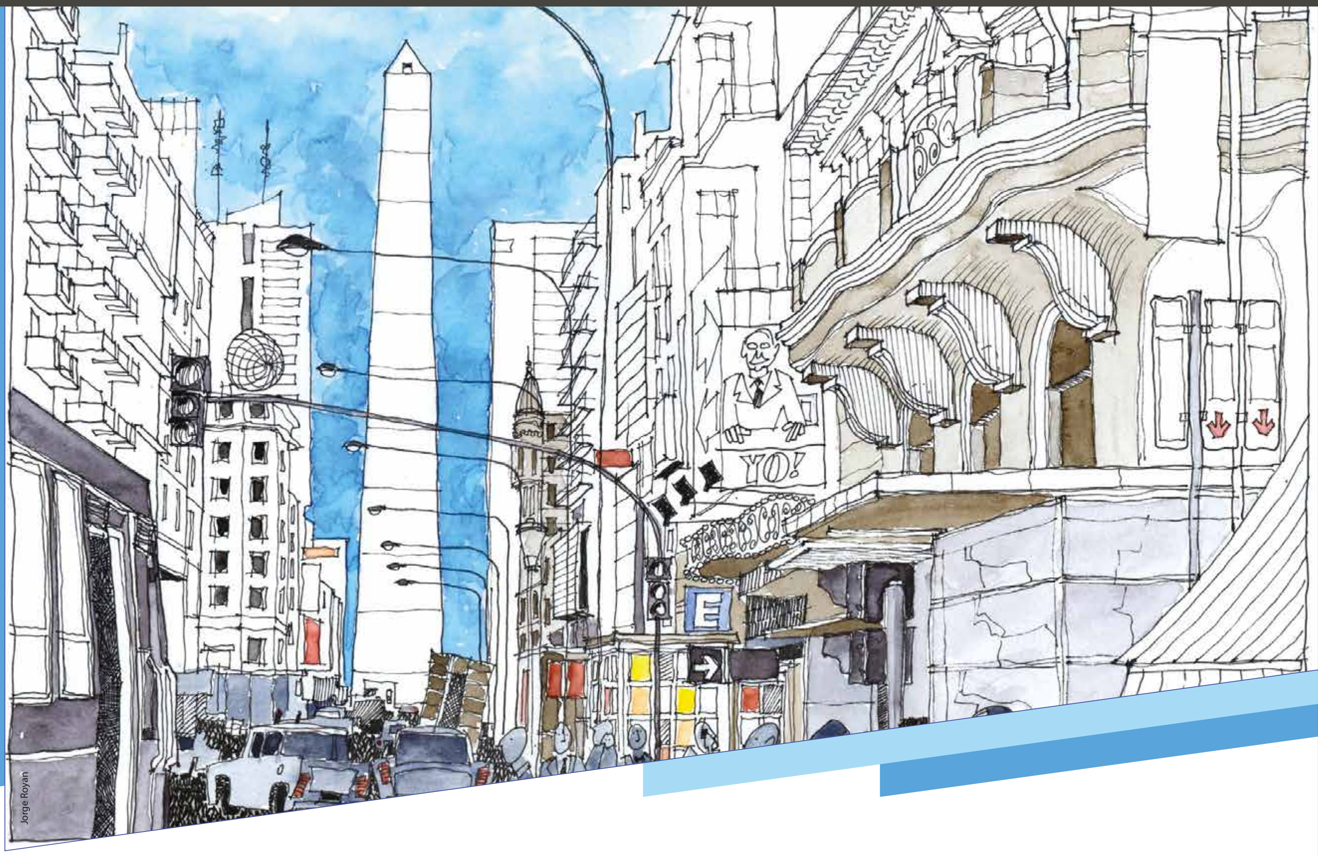

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List of talks

The Grassmann manifold of a Hilbert space

Esteban Andruchow *Universidad General Sarmiento & IAM-CONICET*

We survey the geometric properties of the Grassmann manifold $Gr(\mathcal{H})$ of an infinite dimensional complex Hilbert space $\mathcal{H}$. $Gr(\mathcal{H})$ is viewed as a set of operators, identifying each closed subspace $\mathcal{S} \subset \mathcal{H}$ with the orthogonal projection $P_{\mathcal{S}}$ onto $\mathcal{S}$. Most of the results surveyed here were stated by G. Corach, H. Porta and L. Recht: submanifold structure, homogeneous reductive structure, local minimality of geodesics. Some recent results concerning the existence and uniqueness of a geodesic joining two given subspaces, which were obtained by the present author, are also presented. For instance, it is shown that two subspaces are joined by a unique geodesic if and only if they are in generic position (as defined by P. Halmos).

Maximal spaceability and optimal estimates for summing multilinear operators

Gustavo Araújo *Universidade Federal da Paraíba (Brazil)*

We show that given a positive integer m, a real number $p \in [2, \infty)$ and $1 \leq s < p^*$ the set of non–multiple (r, s)–summing m–linear forms on $\ell_p \times \cdots \times \ell_p$ is maximal spaceable whenever $r < \frac{2ms}{s+2m-ms}$. This result is optimal since for $r \geq \frac{2ms}{s+2m-ms}$ all m–linear forms on $\ell_p \times \cdots \times \ell_p$ are multiple (r, s)–summing. Among other results, we generalize a result related to cotype (from 2010) due to Botelho, Michels and Pellegrino, and prove some new coincidence results for the class of absolutely summing multilinear operators. In particular we show that a well-known coincidence result from the theory of absolutely summing multilinear operators is optimal. Joint work with Daniel Pellegrino.

A tale of two inequalities

Ron Blei *University of Connecticut (USA)*

The Khintchin inequality (1930) and the Grothendieck inequality (1953) are among the important and fundamental mathematical discoveries in the last century, each a milestone in the development of modern analysis. I will describe certain upgrades of these two inequalities, and also a basic connection between them.

Abel's functional equation and eigenvalues of composition operators on spaces of real analytic functions

José Bonet *Universitat Politècnica de València (Spain)*

We present a full description of eigenvalues and eigenvectors of composition operators C_φ acting on the space $A(\mathbb{R})$ of real analytic function on the real line for a real analytic self map φ, as well as an isomorphic description of corresponding eigenspaces. We also completely characterize those self maps φ for which Abel's equation $f \circ \varphi = f + 1$ has a real analytic solution on the real line. Finally, we find cases when the operator C_φ has roots using a constructed embedding of φ into a so-called real analytic iteration semigroups.
Joint work with Pawel Domański.

Geometry of Spaces of Polynomials of Degree at most n

Christopher Boyd *University College Dublin (Ireland)*

Given a Banach space E and a natural number n we let $\mathcal{P}(^{\leq n}E)$ denote the space of polynomials $P\colon E \to \mathbb{K}$ of degree at most n. We introduce the space $\mathcal{P}_I(^{\leq n}E)$ of n-homogeneous integral polynomials of degree at most n. This space allows to develop the isometric theory of spaces of polynomials of degree at most n. The results obtained show that there are significant differences between the geometric theory of spaces of polynomials of degree at most n and spaces of homogeneous polynomials.
The work presented in this talk forms part of the thesis of Anthony Brown for which we was awarded a Ph.D. from UCD.

Infinite dimensional Banach spaces have dimension $\geq \mathfrak{c}$

Geraldo Botelho *Universidade Federal de Uberlândia (Brazil)*

A standard application of Baire's Theorem shows that every infinite dimensional Banach space has dimension $> \aleph_0$ = cardinal of $\mathbb{N}$. Assuming the continuum hypothesis (CH), we conclude that every infinite dimensional Banach space has dimension $\geq \mathfrak{c}$ = cardinal of the continuum. What about a proof of this fact that does not depend on the CH? In this talk we give a CH-free proof of this fact as a byproduct of a result in which we compute the dimension of arbitrary $L_p(\Omega)$-spaces, $0 < p < \infty$. This is a (small) part of a joint work with D. Cariello, V. Fávaro, D. Pellegrino and J. Seoane.
Supported by CNPq Grant 302177/2011-6 and Fapemig Grant PPM-00326-13.

The Bishop-Phelps-Bollobás version of Lindenstrauss properties A and B

Yun Sung Choi *POSTECH (South Korea)*

We study the Bishop-Phelps-Bollobás version of Lindenstrauss properties A and B. For domain spaces, we study Banach spaces X such that (X, Y) has the Bishop-Phelps-Bollobás property (BPBp) for every Banach space Y proving that, in this case, there exists a universal function $\eta_X(\varepsilon)$ such that for every Y, the pair (X, Y) has the BPBp with this function. This allows to prove some necessary isometric conditions on X. We also prove that if X has this property in every equivalent norm, then X is one-dimensional. For range spaces, we study Banach spaces Y such that (X, Y) has the Bishop-Phelps-Bollobás property for every Banach space X proving that, in this case, there is a universal function $\eta_Y(\varepsilon)$ such that for every X, the pair (X, Y) has the BPBp with this function. This gives that this property of Y is strictly stronger than Lindenstrauss property B. The main tool to get these results is the study of the Bishop-Phelps-Bollobás property for c_0-, ℓ_1- and ℓ_∞-sums of Banach spaces.
Joint work with R. Aron, S.K. Kim, H.J. Lee and M. Martín

Some aspects of holomorphic functions in high dimensions and primes

Andreas Defant *University of Oldenburg (Germany)*

Recently it became more and more apparent that the study of holomorphic functions $f : U \to \mathbb{C}$ on high dimensional polydiscs (i.e., U the n-dimensional polydisc $\mathbb{D}^n$ for large n, or the infinite dimensional polydisc $\mathbb{D}^\infty$) is intimately related with the analytic study of Dirichlet series. Dirichlet series form a fundamental tool within analytic number theory – the analytic theory of the distribution of primes numbers. The aim of this talk is to comment on some recent developments in this direction based on joint work with various coauthors: F. Bayart, D. Carando, L. Frerick, D. García, M. Maestre, J. Ortega-Cerdà, M. Ounaïes, S. Schlüters, K. Seip, and P. Sevilla Peris.

Banach and quasi-Banach spaces of vector-valued sequences with special properties

Vinicius V. Fávaro — *Universidade Federal de Uberlândia (Brazil)*

We prove new results on the existence of infinite dimensional Banach (or quasi-Banach) spaces formed by vector-valued sequences with special properties.
Given a Banach space X, in [1] the authors introduce a large class of Banach or quasi-Banach spaces formed by X-valued sequences, called *invariant sequences spaces*, which encompasses several classical sequences spaces as particular cases (cf. [1, Example 1.2]). Roughly speaking, the main results of [1] prove that, for every invariant sequence space E of X-valued sequences and every subset Γ of $(0, \infty]$, there exists a closed infinite dimensional subspace of E formed, up to the null vector, by sequences not belonging to $\bigcup_{q\in\Gamma} \ell_q(X)$; as well as a closed infinite dimensional subspace of E formed, up to the null vector, by sequences not belonging to $c_0(X)$.
In this work we consider the following much more general situation: given Banach spaces X and Y, a map $f: X \longrightarrow Y$, a set $\Gamma \subseteq (0, +\infty]$ and an invariant sequence space E of X-valued sequences, we investigate the existence of closed infinite dimensional subspaces of E formed, up to the origin, by sequences $(x_j)_{j=1}^{\infty} \in E$ such that either

$$(f(x_j))_{j=1}^{\infty} \notin \bigcup_{q\in\Gamma} \ell_q(Y) \text{ or } (f(x_j))_{j=1}^{\infty} \notin \bigcup_{q\in\Gamma} \ell_q^w(Y) \text{ or } (f(x_j))_{j=1}^{\infty} \notin c_0(Y).$$

For example, given an unbounded linear operator $u: X \longrightarrow Y$, we prove the existence of an infinite dimensional Banach space formed, up to the null vector, by null sequences (absolutely p-summable sequences, respectively) in X whose images under u are non-null (non-weakly p-summable, respectively) in Y.
This is a joint work with G. Botelho.
Supported by Fapemig Grant CEX-APQ-01409-12 and CNPq Grant 482515/2013-9.

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Gleason's problem in Infinite Dimension

Pablo Galindo — *Universidad de Valencia (Spain)*

On natural uniform Banach algebras of bounded analytic functions defined either in the infinite-dimensional Euclidean ball or the infinite-dimensional polydisc, we discuss Gleason's problem whether the ideal of functions that vanish at some given point is generated by the canonical projections.

The Bishop-Phelps-Bollobás Theorem for Numerical Radius

Han Ju Lee *Dongguk University (South Korea)*

The notion of the Bishop-Phelps-Bollobás property for numerical radius (in short, BPBp-nu) will be presented and we find sufficient conditions for Banach spaces ensuring the BPBp-nu. Among other results, we show that $L_1(\mu)$ spaces have this property for every measure μ. On the other hand, we show that every infinite-dimensional separable Banach space can be renormed to fail the BPBp-nu. In particular, this shows that the Radon-Nikodým property (even reflexivity) is not enough to get BPBp-nu.

The Bishop-Phelps-Bollobás property for operators between spaces of continuous functions

Mary Lilian Lourenço *Universidade de São Paulo (Brazil)*

The classical Bishop-Phelps-Bollobás Theorem [1] says that, given a Banach space X, $0 < \varepsilon < 1/2$, $x \in B_X$ and $x^* \in S_{X^*}$ with $|1 - x^*(x)| < \frac{\varepsilon^2}{2}$, there are elements $y \in S^*_X$ and $y^* \in S_{X^*}$ such that $y^*(y) = 1$, $\|y - x\| < \varepsilon + \varepsilon^2$ and $\|y^* - x^*\| < \varepsilon$. In other words, every element x^* of the dual X^8 can be approximated by a norm attaining element y^* in X^* in such a way that for a given point x at which x^* almost attains its norm one finds a close point y at which y^* attains its norm. An analogue, the so-called Bishop-Phelps-Bollobáas property (BPBp) for operators, was introduced in [2]. One says that, given a subspace $M \subset \mathcal{L}(X;Y)$, the space M has the BPBp if for every $\varepsilon > 0$ there is $\eta(\varepsilon) > 0$ such that for all $T \in S_M$ and $x_0 \in S_X$ with $\|Tx_0\| > 1 - \eta(\varepsilon)$, there exist a point $u_0 \in S_X$ and an operator $S \in S_M$ satisfying the following conditions:

$$\|Su_0\| = 1, \quad \|u_0 - x_0\| < \varepsilon, \quad \text{and} \quad \|S - T\| < \varepsilon.$$

In the case that $\mathcal{M} = \mathcal{L}(X, Y)$ satisfies the previous property it is said that the pair (X, Y) has the *Bishop-Phelps-Bollobás property for operators* (shortly *BPBp for operators*).
In this tlalk we show that:

1. The pair $(C(K); C(S))$ for two Hausdorff topological spaces K and S, has the BPBp for operators.
2. The space of compact operators $\mathcal{K}(C_0(L); Y)$ for a locally compact Hausdorff space L and a uniformly convex Banach space Y , has the BPBp.
3. $\mathcal{K}(X; Y)$, where X is an arbitrary Banach space and Y is a predual of an L_1-space, has the BPBp.

Joint work with M. D. Acosta, J.Becerra-Guerrero,Y. S. Choi, M. Ciesielski, S.W. Kim, H.J. Lee, M. Martín

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A new radius for Dirichlet series

Manuel Maestre — *University of Valencia (Spain)*

In this talk we report on very recent work done with Daniel Carando, Andreas Defant, Domingo García and Pablo Sevilla on the study of some new properties of Dirichlet series.
We denote by $\Omega(n)$ the number of prime divisors of $n \in \mathbb{N}$ (counted with multiplicities). For $x \in \mathbb{N}$ we define the Dirichlet-Bohr radius L_x to be the best $r > 0$ such that for every finite Dirichlet polynomial $\sum_{n=1}^{x} a_n n^{-s}$ we have

$$\sum_{n=1}^{x} |a_n| r^{\Omega(n)} \leq \sup_{t \in \mathbb{R}} \Big| \sum_{n=1}^{x} a_n n^{-it} \Big| .$$

We prove that the asymptotically correct order of L_x is $(\log x)^{1/4} x^{-1/8}$.
We motivate this definition and the techniques involved by showing the connection given by Harlad Bohr between Dirichlet series on the complex plane and holomorphic functions in several variables and on the open unit ball of c_0.

Parseval quasi-dual frames

Pedro Massey — *Univ. Nac. La Plata & IAM-CONICET (Argentina)*

Let $\mathcal{F} = \{f_i\}_{i \in \mathbb{N}}$ be a frame for a complex Hilbert space $\mathcal{H}$, with synthesis operator $T_{\mathcal{F}} : \ell^2(\mathbb{N}) \to \mathcal{H}$. Let $\mathcal{P}(\mathcal{H})$ denote the class of Parseval frames $\mathcal{G} = \{g_i\}_{i \in \mathbb{N}}$ for $\mathcal{H}$ i.e. such that $T_{\mathcal{G}} T_{\mathcal{G}}^* = I$. $\mathcal{P}(\mathcal{H})$ is a particularly well behaved class of frames for $\mathcal{H}$. In this talk, we discuss some results concerning the computation of

$$\alpha(\mathcal{F}) = \inf_{\mathcal{G} \in \mathcal{P}(\mathcal{H})} \left\{ \sup_{x \in \mathcal{H}, \|x\|=1} \Big\| \sum_{n \in \mathbb{N}} \langle x, g_n \rangle f_n - x \Big\| \right\}$$

i.e. the infimum of the operator norm of $T_{\mathcal{F}} T_{\mathcal{G}}^* - I$, where $\mathcal{G}$ is a Parseval frame for $\mathcal{H}$. $\alpha(\mathcal{F})$ is the optimal lower bound for the (normalized) worst-case error in the reconstruction of vectors when analyzed with the Parseval frame and synthesized with $\mathcal{F}$. In case that the infimum is attained on a frame $\mathcal{G} \in \mathcal{P}(\mathcal{H})$ we call it a Parseval quasi-dual of $\mathcal{F}$.
This talk is based on a joint work with Mariano Ruiz (FCE-UNLP and IAM-CONICET) and Gustavo Corach (FI-UBA and IAM-CONICET).

Bloch functions on the unit ball of an infinite dimensional Hilbert space

Alejandro Miralles *Universitat Jaume I (Spain)*

The Bloch space has been studied on the open unit disk of $\mathbb{C}$ and some homogeneous domains of $\mathbb{C}^n$. We define Bloch functions on the open unit ball of a Hilbert space E and prove that the corresponding space $\mathcal{B}(B_E)$ is invariant under composition with the automorphisms of the ball, leading to a norm that- modulo the constant functions - is automorphism invariant as well. All bounded analytic functions on B_E are also Bloch functions.
This is a joint work with Oscar Blasco and Pablo Galindo.

Dynamical Sampling

Ursula Molter *Univ. Buenos Aires & IMAS - CONICET (Argentina)*

The typical sampling and reconstruction problem consists of recovering a function f from its samples $f(X) = \{f(x_j)\}_{x_j \in X}$. There are many situations in which the function f is an initial distribution that is evolving in time under the action of a family of evolution operators $\{A_t\}_{t\in[0,\infty)}$:

$$f_t(x) = (A_t f)(x).$$

In some cases obtaining the samples at a sufficient rate at time $t = 0$ may not be possible. In this talk we present the novel method of *spatio-temporal sampling* in which an initial state f of an evolution process $\{f_t\}_{t\geq 0}$ is to be recovered from a set of samples $\{f_t(X_t)\}_{t\in\mathcal{T}}$ at different time levels, i.e., $t \in \mathcal{T} = \{t_0 = 0, t_1, \ldots, t_N\}$. Clearly for the problem to be well posed, certain assumptions on f are necessary. A standard assumption (consistent with the nature of signals) is that f belongs to a Reproducing Kernel Hilbert Space (RKHS) such as a Paley-Wiener space or some other Shift Invariant Spaces (SIS) V. The objective is to describe all spatio-temporal sampling sets $(\mathcal{X}, \mathcal{T}) = \{X_t,\ t \in \mathcal{T}\}$ such that any $f \in V$ can be stably recovered from the samples $f_t(X_t)$, $t \in \mathcal{T}$.
We show a complete solution in the finite dimensional case, and some interesting connections with the Kadison-Singer theorem in the infinite dimensional setting.

Algebras of Lorch analytic mappings

Luiza A. Moraes *Universidade Federal do Rio de Janeiro (Brazil)*

If U is a connected subset of a Banach algebra E, a mapping $f : U \to E$ is Lorch analytic if given any $a \in U$ there exists $\rho > 0$ and there exist unique elements $a_n \in E$, such that $\{z \in E : \|z - a\| < \rho\} \subset U$ and $f(z) = \sum_{n=0}^{\infty} a_n(z - a)^n$, for all z in $\|z - a\| < \rho$. The theory of Lorch-analytic mappings goes back to the 1940's and is a very natural extension of the classical concept of analytic function to infinite dimensional algebras.
In this talk we consider the space $\mathcal{H}_L(U, E)$ of the Lorch analytic mappings from U into E endowed with a convenient topology τ_d which coincides with the topology τ_b when $U = E$ or $U = B_r(z_0) = \{z \in E; \|z - z_0\| < r\}(z_0 \in E, r > 0)$. We start by showing that $(\mathcal{H}_L(U, E), \tau_d)$ is a Fréchet algebra whenever E is separable. Moreover, a description of the spectrum of $(\mathcal{H}_L(B_r(z_0), E), \tau_b)$ is given and as a consequence, it is showed that the algebra $\mathcal{H}_L(B_r(z_0), E)$ is semi-simple if and only if E is semi-simple.
Joint work with Guilherme Mauro and Alex F. Pereira.

Some roles of function spaces in wavelet theory — detection of singularities —

Shinya Moritoh *Nara Women's University (Japan)*

Two-microlocal analysis is useful for the detection of singularities. We first recall the idea of two-microlocal analysis. Ridgelet analysis is also considered. We then consider some roles of function spaces in wavelet theory.

Lipschitz functions and M-ideals

Heiki Niglas
University of Tartu (Estonia)

In [1], D. Werner and H. Berninger tried to answer the following question.

Berninger–Werner problem. *Is the little Hölder space* $\mathrm{lip}([0,1]^\alpha)$ *an M-ideal in the Hölder space* $\mathrm{Lip}([0,1]^\alpha)$ *for every* $\alpha \in (0,1)$*?*

They showed that $\mathrm{lip}([0,1]^\alpha)$ is an M-ideal in a non-separable subspace of $\mathrm{Lip}([0,1]^\alpha)$, whilst they conjectured that the answer to the problem might be negative.
In [2, Theorem 6.6] Nigel J. Kalton presented proof to the following theorem.

Theorem. *For a compact metric space M and every* $\epsilon > 0$*, the little Lipschitz space* $\mathrm{lip}(M)$ *is* $(1+\epsilon)$*-isomorphic to a subspace of* c_0*.*

After the proof Kalton remarked: "In particular this implies that $\mathrm{lip}(M)$ is an M-ideal in $\mathrm{Lip}(M)$ when M is compact and $\mathrm{lip}(M)$ is a predual of $\mathcal{F}(M)$. See [1] for the case when $M = [0,1]$."
As it is well-known that $\mathrm{lip}(M^\alpha)$ is a canonical predual of $\mathcal{F}(M^\alpha)$ for a compact metric space M, Kalton solved Berninger–Werner problem in full generality, which means that the following holds: If M is a compact metric space, then the little Hölder space $\mathrm{lip}(M^\alpha)$ is an M-ideal in the Hölder space $\mathrm{Lip}(M^\alpha)$.
We show how to use Kalton's theorem to prove some results concerning properties of the spaces $\mathrm{lip}(M)$, $\mathcal{K}(lip(M))$, and $\mathcal{L}(lip(M))$ for a compact metric space M. We also present some further applications.
The research was partially supported by Estonian Science Foundation Grant 8976 and Estonian Targeted Financing Project SF0180039s08.
This is a joint work with Eve Oja and Indrek Zolk.

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On (a, B, c)-ideals in Banach Spaces

Ksenia Niglas Tartu University (Estonia)

We say that a closed subspace Y of a Banach space X is an *ideal satisfying the* (a, B, c)*-inequality* (in short, an (a, B, c)*-ideal*) in X if there is a norm one projection P on X^* such that $\ker P = Y^\perp$ and

$$\|ax^* + bPx^*\| + c\|Px^*\| \le \|x^*\| \quad \forall b \in B, \forall x^* \in X^*.$$

This approach was first suggested by E. Oja and it allows us to handle well-known special cases of ideals, namely M-, h-, u- and $M(r, s)$-ideals (for definitions and references, see, e.g., [3]), in a more unified way.
We have developed easily verifiable equivalent conditions for a subspace of ℓ_∞^2 to be an (a, B, c)-ideal.
Following what was done in [1] for $M(r, s)$-ideals, we obtain new results in a more general (a, B, c)-setting. Our main results are as follows. Suppose X and Y are closed subspaces of a Banach space Z such that $X \subset Y \subset Z$. If X is an (a, B, c)-ideal in Y and Y is an (d, E, f)-ideal in Z, then X is an ideal satisfying a certain type of inequality in Z. Relying on this result, we show that if X is an (a, B, c)-ideal in its second bidual, then X is an ideal satisfying a certain type of inequality in $X^{(2n)}$ for every $n \in \mathbb{N}$.
For illustration, we list here two corollaries of our results.

- *If X is an (a, B, c)-ideal in Y and Y is an M-ideal in Z, then X is an (a, B, c)-ideal in Z.*
- *If X is a u-ideal in X^{**}, then X is an $\left(\frac{1}{2n-1}, \left\{-\frac{2}{2n-1}\right\}, 0\right)$-ideal in $X^{(2n)}$ for every $n \in \mathbb{N}$.*

The talk is based on [2].
Joint work with Indrek Zolk.

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Lower bounds for norms of products of polynomials on $L_p(\mu)$ spaces

Jorge Tomás Rodríguez *Universidad de Buenos Aires and CONICET (Argentina)*

The aim of the talk is to give lower bounds for the norm of products of continuous polynomials on a Banach space. More precisely, we study the problem of finding the optimal constant M such that, for any set of continuous homogeneous polynomials $P_1, \cdots, P_n$ of degrees $k_1, \cdots, k_n$, the inequality

$$M \prod_{i=1}^{n} \|P_i\| \leq \left\| \prod_{i=1}^{n} P_i \right\|$$

holds. This problem has been studied by several authors (see, for example, [1], [2], [4], [5]). We have shown in [3] that for spaces $L_p(\mu)$ with $1 < p < 2$ and $dim(L_p(\mu)) \geq n$, the optimal constant is

$$M = \sqrt[p]{\frac{k_1^{k_1} \cdots k_n^{k_n}}{(k_1 + \cdots + k_n)^{(k_1+\cdots+k_n)}}}$$

(the cases $p = 1$ and $p = 2$ were already known). For $L_p(\mu)$ spaces with $p > 2$, we have some estimates of the best constants. Finally, we consider the behavior of these constants for finite dimensional spaces ℓ_p^N (with N fixed) as the number n of polynomials increases.
The results presented are product of a joint work with D. Carando and D. Pinasco

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Regular Holomorphic Functions on Complex Banach Lattices

Ray Ryan *National University of Ireland Galway (Ireland)*

A homogeneous polynomial on a complex Banach lattice E is said to be **regular** if it has a modulus. In the case where E has an unconditional Schauder basis, the regular polynomials are those which have pointwise unconditionally convergent monomial expansions. We look at holomorphic functions whose Taylor polynomials are regular, with a suitable mode of convergence. We show how some geometric properties of the domain of convergence are related to regularity.

Bounded sets with respect to an operator ideal

Pilar Rueda *Universidad de Valencia (Spain)*

Stephani introduced in 1980 a distinguished family of bounded sets in a Banach space by means of an operator ideal $\mathcal{I}$. We call these sets $\mathcal{I}$-bounded sets and, taking them as a starting point, we present a general procedure to construct ideals of homogeneous polynomials. We discuss some of their properties as a stronger ideal property, the symmetric tensor stability of the ideal and the invariance of the $\mathcal{I}$-bounded sets via continuous homogeneous polynomials. This talk is based in some joint works with Richard Aron.

Hypercyclic operators on spaces of holomorphic functions

Martín Savransky *Universidad de Buenos Aires (Argentina)*

A theorem of G. Godefroy and J. H. Shapiro [2] states that every operator on $H(\mathbb{C}^n)$, $n \geq 1$, that commutes with the translations $\tau_a f(z) = f(z+a)$, $a \in \mathbb{C}^n$, and it is not a scalar multiple of the identity is hypercyclic. This family of operatos is known as convolution operators.
In the literature, there aren't many examples of hypercyclic non-convolution operators on $H(\mathbb{C}^n)$. R. Aron and D. Markose [1] studied hypercyclic properties of the operator $Tf(z) = f'(\lambda z + b)$, for $\lambda, b \in \mathbb{C}$, which is not a convolution operator if $\lambda \neq 1$. They prove that T is hypercyclic if $|\lambda| \geq 1$, and that T is not hypercyclic if $|\lambda| < 1$ and $b = 0$.
In this talk, we will comment hypercyclic properties of operators defined on spaces of holomorphic functions on $\mathbb{C}^n$ and on complex Banach spaces with unconditional basis. We will consider operators such as $Tf(z) = D^\alpha f(\lambda z + b)$, that is, operators which are a composition between a differentiation operator and a composition one. Here α indicates "the amount" of derivatives in the canonical directions, and the symbol of the composition operator, $z \mapsto \lambda z + b$, is a diagonal affine application. As the dimension increases, new difficulties appear and the hypercyclicity of T does not only depends on the size of λ as in the one dimensional case.
Joint work with Santiago Muro and Damián Pinasco.

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Tangent structures to measures: an invitation to the scenery flow

Pablo Shmerkin *Universidad Torcuato di Tella (Argentina)*

Taking tangents of rough objects (such as measures or metric spaces) is by now classical; in the usual approach, the tangent object belongs to the same category as the original one. I will describe an alternative way of taking tangents to Radon measures on Euclidean space, where the tangent object is not a measure but a measure on measures (or a random measure), which arises as the empirical measure for a measure-valued flow consisting in zooming in towards a typical point for the measure - the scenery flow. I will survey some of M. Hochman's stunning theorems on the regularity of these tangent objects, and describe some further results obtained in joint work with A. Käenmäki and T. Sahlsten

Approximation by Toeplitz operators on Bergman spaces

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Let $A^p_\alpha(B_n)$ be the α-weighted Bergman space on the unit ball of $\mathbb{C}^n$, where $1 < p < \infty$ and $\alpha > -1$. We will show that every operator on $A^p_\alpha(B_n)$ that belongs to a particular class $\mathcal{C}$ is a limit of Toeplitz operators T_f with bounded symbol f. This result will be used to characterize compactness for operators in $\mathcal{C}$ in terms of their Berezin transform.

Exactness of some $(0,1)$–forms in the unit ball of l^2

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One of the most fundamental questions in infinite dimensional complex analysis seem to be related to the solvability of the inhomogeneous Cauchy-Riemann, or $\bar{\partial}$ equations for $(0,1)$-forms in Banach spaces.

Up to now, except the case of real analytical forms or with bounded support for which the answer is positive([1], [4]), precious little has been known about the solvability of the infinite equation

$$\bar{\partial} f = \omega, \quad (\bar{\partial}\omega = 0) \tag{1}$$

when ω is a $(0,1)$-form, even in Hilbert spaces. However, we must mention two important results. First, Coeuré gives an example of (0,1)-form ω of class C^1 in the unit ball of a infinite dimensional separable Hilbert space such that the equation (1) does not admit any local solution around 0, see ([3]). No other example is known with ω of class C^p $(1 < p \leq \infty)$. Second, Lempert shows the existence of a local solution of (1) in the Banach space l^1 when ω is taken as a (0,1)-lipschitz continuous form (see [2]).

The existence of local solutions of Cauchy-Riemann equations for $(0,1)$-forms in infinite dimensional Hilbert spaces is still an open problem related to the existence of solutions in finite dimensional spaces with estimates actually independent of the dimension (see [3]).

In this work, We study the local exactness of the $\bar{\partial}$ operator in the Hilbert space l^2 for a particular class of $(0,1)$-forms ω of the type $\omega(z) = \sum_i z_i \omega^i(z) d\bar{z}_i$, $z = (z_i)$ in l^2. We suppose each function ω^i of class C^∞ in the closed unit ball of l^2, of the form $\omega^i(z) = \sum_k \omega^i_k\left(z^k\right)$, where $\mathbf{N} = \bigcup I_k$ is a partition of $\mathbf{N}$, (card $I_k < +\infty$) and z^k is the projection of z on $\mathbf{C}^{I_k}$. We establish sufficient conditions for exactness of ω related to the expansion in Fourier series of the functions ω^i_k.

References

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Approximation properties determined by $\mathcal{A}$-compact sets

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In 1984, Carl and Stephani defined, for a fixed Banach operator ideal $\mathcal{A}$, the notion of $\mathcal{A}$-compact sets and the operator ideal of $\mathcal{A}$-compact operators, denoted by $\mathcal{K}_{\mathcal{A}}$. We use the Carl and Stephani theory to inspect two types of approximation properties. The first is rather standard. We say that a Banach space E has the $\mathcal{K}_{\mathcal{A}}$-uniform approximation property if the identity map is uniformly approximated by finite rank operators on $\mathcal{A}$-compact sets. For the second one, we introduce a way to measure the size of $\mathcal{A}$-compact sets and use it to give a norm to $\mathcal{K}_{\mathcal{A}}$. The geometric results obtained for $\mathcal{K}_{\mathcal{A}}$ are applied to give different characterizations of the $\mathcal{K}_{\mathcal{A}}$-approximation property, definded by Oja and the authors independently. This approach allow us to undertake the study of both approximation property in tandem. In particular, when $\mathcal{A} = \mathcal{N}^p$ the ideal of right p-nuclear operators, we cover the p-approximation property and the κ_p-approximation property, which were studied in the past 10 years by several authors.
The results of this talk are contained in a joint work with S. Lassalle, [1].

References

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Banach-Stone theorems for algebras of germs of holomorphic functions

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In this talk we show that when K and L are compact and balanced subsets of Tsirelson-like Banach spaces, then the algebras of holomorphic germs $\mathcal{H}(K)$ and $\mathcal{H}(L)$ are topologically isomorphic if, and only if, the polynomial hull of K is biholomorphically equivalent the polynomial hull of L.

Coincidence of extendible ideals with their minimal kernel

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We provide coincidence results for vector-valued ideals of multilinear operators. More precisely, if $\mathfrak{A}$ is an ideal of n-linear mappings we give conditions for which the following equality $\mathfrak{A}(E_1, \dots, E_n; F) = \mathfrak{A}^{min}(E_1, \dots, E_n; F)$ holds isometrically. As an application, we obtain in many cases that the monomials form a Schauder basis on the space $\mathfrak{A}(E_1, \dots, E_n; F)$. Several structural and geometric properties are also derived using this equality. We apply our results to the particular case where $\mathfrak{A}$ is the classical ideal of extendible or Pietsch-integral multilinear operators.
Joint work with Daniel Galicer.

Lagrange interpolation and approximation in Banach spaces

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Starting from Lagrange interpolation of the exponential function e^z, and using an integral representation of holomorphic functions on Banach spaces, we obtain some Lagrange interpolation and approximation results in the Banach space setting.
These results are part of a joint paper with Lisa Nilsson and Damián Pinasco.