



Complex and Harmonic Analysis 2011

July, 10th - 14th, 2011
Málaga, Spain

BOOK OF ABSTRACTS

Complex and Harmonic Analysis 2011

July, 10th - 14th, 2011

Málaga, Spain

BOOK OF ABSTRACTS

The mathematics research group in *Complex Analysis and Operator Theory* of the University of Málaga is organizing the Meeting **Complex and Harmonic Analysis 2011**, a biannual Greco-Spanish Mathematical Congress, whose main objective is to increase ties between the different mathematics research groups from Greece and Spain in the broad areas of Complex and Harmonic Analysis. Of course, the event is also open to researches from other countries.

This is the second Meeting of this series. The first one took place in **Archanes (Crete, Greece) in September 2009**. The idea is to organize one every other year, alternating places between Greece and Spain. So this time it will take place in Málaga (Spain), from July 10th to 14th, 2011, at the Molina Lario ****Hotel, which is located at the heart of the city of Málaga, just opposite the Cathedral, a few meters from the port, the Picasso Museum, the Thyssen Museum, and the pedestrian downtown area of the city.

The registration period ended on May 31st, 2011. The event will gather about **53 participants**, 20 of which are invited speakers and 10 will contribute with a short talk.

Alexandru ALEMAN, Univ. Lund, Sweden
Venancio ÁLVAREZ, Univ. Málaga, Spain
María José BELTRÁN, Univ. Politécnica Valencia, Spain
Luis BERNAL GONZÁLEZ, Univ. Sevilla, Spain
Dimitrios BETSAKOS, Univ. Thessaloniki, Greece
Óscar BLASCO, Univ. Valencia, Spain
José BONET, Univ. Politécnica Valencia, Spain
Antonio BONILLA RAMÍREZ, Univ. La Laguna, Spain
María Jesús CARRO, Univ. Barcelona, Spain
Christos CHATZIFOUNTAS, Univ. Málaga, Spain
Manuel CONTRERAS, Univ. Sevilla, Spain
George COSTAKIS, Univ. Crete, Greece
Javier FALCÓ BENAVENT, Univ. Politécnica Valencia, Spain
Petros GALANOPOULOS, Univ. Thessaloniki, Greece
Daniel GIRELA, Univ. Málaga, Spain
Daniel GIRELA SARRIÓN, Univ. Málaga, Spain
Nihat G. GÖĞÜS, Univ. Sabancı, Turkey
Cristóbal GONZÁLEZ, Univ. Málaga, Spain
Rodrigo HERNÁNDEZ, Univ. Adolfo Ibáñez, Chile
Antonio JIMÉNEZ MELADO, Univ. Málaga, Spain
H. Turgay KAPTANOĞLU, Univ. Bilkent, Turkey
Gabriela KOHR, Univ. Babeş-Bolyai, Romania
Mirela KOHR, Univ. Babeş-Bolyai, Romania
María LORENTE DOMÍNGUEZ, Univ. Málaga, Spain
María Auxiliadora MÁRQUEZ, Univ. Málaga, Spain
María José MARTÍN, Univ. Autónoma Madrid, Spain

Francisco J. MARTÍN REYES, Univ. Málaga, Spain
Josep MARTÍNEZ CENTELLES, Univ. Valencia, Spain
Pedro ORTEGA SALVADOR, Univ. Málaga, Spain
Konstantinos PANTERIS, Univ. Crete, Greece
Margit PAP, Univ. Vienna, Austria
Christos PAPACHRISTODOULOS, Univ. Crete, Greece
Mihalis PAPADIMITRAKIS, Univ. Crete, Greece
Ioannis PARISSIS, Univ. Técnica Lisboa, Portugal
Jordi PAU, Univ. Barcelona, Spain
Pedro J. PAÚL ESCOLANO, Univ. Sevilla, Spain
José Ángel PELÁEZ, Univ. Málaga, Spain
Carlos PÉREZ, Univ. Sevilla, Spain
Fernando PÉREZ GONZÁLEZ, Univ. La Laguna, Spain
Karl M. PERFEKT, Univ. Lund, Sweden
Sandra POTT, Univ. Lund, Sweden
Stamatis POULIASIS, Univ. Thessaloniki, Greece
Consuelo RAMÍREZ, Univ. Córdoba, Spain
Jouni RÄTTYÄ, Univ. Eastern Finland, Finland
Juan M. RIBERA PUCHADES, U. Politécnica Valencia, Spain
Luis RODRÍGUEZ PIAZZA, Univ. Sevilla, Spain
Aristomenis SISKAKIS, Univ. Thessaloniki, Greece
Javier SORIA, Univ. Barcelona, Spain
Georgios STYLOGIANNIS, Univ. Thessaloniki, Greece
Ana VARGAS, Univ. Autónoma Madrid, Spain
Dragan VUKOTIĆ, Univ. Autónoma Madrid, Spain
Carme ZARAGOZA BERZOSA, U. Politécnica Valencia, Spain
Nina ZORBOSKA, Univ. Manitoba, Canada

The organization is being run by **Daniel GIRELA** as coordinator, **Venancio ÁLVAREZ**, **Petros GALANOPOULOS**, **Cristóbal GONZÁLEZ**, **Antonio JIMÉNEZ MELADO**, and **María Auxiliadora MÁRQUEZ**. The technical organization is being assigned to **Paloma VILLENA** from TÉCNICA VIAJES, S.L.

This event has received the support from many institutions and organizations, to whom we are grateful. We would like to mention the support from the “Ministerio de Ciencia e Innovación” (Spanish government), “i-math, Ingenio Mathematica”, the Andalusian government, the Andalusian project groups “PAIDI FQM-2010” and “Excel P09-FQM-4468”, the University of Málaga, its vice-chancellorship on Research, and its Department of “Análisis Matemático”.

SCHEDULE OF CONFERENCES

Monday, 11th

- 09:15-09:50** **MARÍA J. CARRO**, U. Barcelona, Spain
Weighted estimates in a limited range with applications to the Bochner-Riesz operators.
- 10:00-10:35** **ANA VARGAS**, U. Autónoma Madrid, Spain
Restriction theorems for surfaces with vanishing curvatures.
- 10:45-11:10** **MARGIT PAP**, U. Vienna, Austria
Multiresolution in $H^2(\mathbb{T})$ generated by a special Mamquist-Takenaka system.
- 11:15-11:45** **Coffee break.**
- 11:45-12:20** **CARLOS PÉREZ**, U. Sevilla, Spain
Theory of singular integrals and weights: Recent results.
- 12:30-13:05** **FRANCISCO J. MARTÍN-REYES**, U. Málaga, Spain
A dominated ergodic theorem for some bilinear averages.
- 13:15-13:50** **GEORGE COSTAKIS**, U. Crete, Greece
Extreme limiting behavior of the partial sums of "smooth" functions.
- Lunch.**

Tuesday, 12th

- 09:00-09:35** **JAVIER SORIA**, U. Barcelona, Spain
Solution to a conjecture on the Hardy operator minus the identity and a new class of minimal rearrangement invariant spaces.
- 09:45-10:20** **MIHALIS PAPADIMITRAKIS**, U. Crete, Greece
Composition operators on B_1 .
- 10:30-11:05** **JOSÉ A. PELÁEZ**, U. Málaga, Spain
Spectra of integration operators on Hardy spaces.
- 11:15-11:45** **Coffee break.**
- 11:45-12:20** **DRAGAN VUKOTIĆ**, U. Autónoma Madrid, Spain
Derivatives of Blaschke products and Bergman spaces with normal weights.
- 12:30-13:05** **MANUEL CONTRERAS**, U. Sevilla, Spain
Loewner Theory in Annulus.
- 13:15-13:40** **GABRIELA KOHR**, U. Babeş-Bolyai, Romania
Extreme points, support points and univalent subordination chains in \mathbb{C}^n .
- Lunch.**
- 16:00-16:25** **STAMATIS POULIASIS**, U. Thessaloniki, Greece
Equality cases for condenser capacity inequalities under symmetrization.
- 16:30-16:55** **ANTONIO BONILLA**, U. La Laguna, Spain
Rate of growth of D -frequently hypercyclic functions.
- 17:00-17:25** **CHRISTOS PAPACHRISTODOULOS**, U. Crete, Greece
Universality, summability and Rogosinski's Formula.
- 17:30-18:00** **Coffee break.**
- 18:00-18:25** **LUIS BERNAL-GONZÁLEZ**, U. Sevilla, Spain
Topological and algebraic structure of the set of strongly annular functions.
- 18:30-18:55** **KARL M. PERFEKT**, U. Lund, Sweden
On duality and distance results in BMO type spaces.
- 19:00-19:25** **MIRELA KOHR**, U. Babeş-Bolyai, Romania
Potential analysis for pseudodifferential Brinkman operators on Lipschitz domains.
- 19:30-19:55** **GEORGIOS STYLOGIANNIS**, U. Thessaloniki, Greece
A brief review on Brennan's conjecture.

Wednesday, 13th

- 09:00-09:35** ALEXANDRU ALEMAN, U. Lund, Sweden
A quantitative estimate for bounded point evaluations in $P_2(\mu)$ -spaces.
- 09:45-10:20** OSCAR BLASCO, U. Valencia, Spain
Remarks on weighted mixed norm spaces.
- 10:30-11:05** JOSÉ BONET, U. Politécnica Valencia, Spain
Holomorphic dependence of diagonal operators between sequence spaces.
- 11:15-11:45** *Coffee break.*
- 11:45-12:20** DIMITRIOS BETSAKOS, U. Thessaloniki, Greece
A variant of Schwarz's lemma.
- 12:30-13:05** FERNANDO PÉREZ-GONZÁLEZ, U. La Laguna, Spain
Inner functions in Möbius invariant spaces.
- 13:15-13:50** SANDRA POTT, U. Lund, Sweden
A dyadic approach to Sarason's conjecture on Toeplitz products on Bergman space.

Thursday, 14th

- 09:30-09:55** H. TURGAY KAPTANOĞLU, U. Bilkent, Turkey
Three problems for weighted Bloch-Lipschitz spaces of holomorphic functions on the unit ball.
- 10:00-10:25** RODRIGO HERNÁNDEZ, U. Adolfo Ibáñez, Chile
Schwarzian derivative for harmonic functions.
- 10:30-11:05** MARÍA J. MARTÍN, U. Autónoma Madrid, Spain
Besov spaces, multipliers, and univalent functions.
- 11:15-11:45** *Coffee break.*
- 11:45-12:20** NINA ZORBOSKA, U. Manitoba, Canada
Schwarzian derivative and general Besov-type domains.
- 12:30-13:05** ARISTOMENIS SISKAKIS, U. Thessaloniki, Greece
Strong continuity of composition semigroups in spaces of analytic functions - A survey.

PROGRAM

8:30 - 9:00 Info Desk			
Monday, 11th	Tuesday, 12th	Wednesday, 13th	Thursday, 14th
9:10 - 9:15 : Welcoming	9:00 - 9:35	9:00 - 9:35	
9:15 - 9:50	J. Soria	A. Aleman	
M.J. Carro			9:30 - 9:55
	9:45 - 10:20	9:45 - 10:20	H.T. Kaptanoğlu
10:00 - 10:35	M. Papadimitrakis	O. Blasco	10:00 - 10:25
A. Vargas			R. Hernández
	10:30 - 11:05	10:30 - 11:05	10:30 - 11:05
10:45 - 11:10	J.Á. Peláez	J. Bonet	M.J. Martín
M. Pap			
11:15 - 11:45 Coffee Break	11:15 - 11:45 Coffee Break	11:15 - 11:45 Coffee Break	11:15 - 11:45 Coffee Break
11:45 - 12:20	11:45 - 12:20	11:45 - 12:20	11:45 - 12:20
C. Pérez	D. Vukotić	D. Betsakos	N. Zorboska
12:30 - 13:05	12:30 - 13:05	12:30 - 13:05	12:30 - 13:05
F.J. Martín-Reyes	M. Contreras	F. Pérez-González	A. Siskakis
13:15 - 13:50	13:15 - 13:40	13:15 - 13:50	
G. Costakis	G. Kohr	S. Pott	
...	...		
LUNCH	LUNCH		ThE eNd
	16:00 - 16:25		
	S. Pouliasis		
	16:30 - 16:55		
	A. Bonilla		
	17:00 - 17:25		
	C. Papachristodoulos		
	17:30 - 18:00 Coffee Break		
	18:00 - 18:25		
	L. Bernal-González		
	18:30 - 18:55		
	K.M. Perfekt		
	19:00 - 19:25		
	M. Kohr		
	19:30 - 19:55		
	G. Stylogiannis		
		...	
		DINNER	

Speaker: ALEXANDRU ALEMAN

Univ. Lund, Sweden

Title: *A quantitative estimate for bounded point evaluations in $P_2(\mu)$ -spaces***Scheduled:** Wednesday, 9:00 - 9:35

Abstract: Given a compactly supported positive measure μ in the complex plane, $P_2(\mu)$ is the closure of analytic polynomials in $L_2(\mu)$. A description of these spaces has been obtained by J. Thomson in 1991, a famous result that considerably improves S. Brown's proof of the existence of nontrivial invariant subspaces of operators with normal extensions. The basic idea is the dichotomy: Either $P_2(\mu) = L_2(\mu)$, or the functional of evaluation at some fixed point extends to a bounded linear functional on $P_2(\mu)$. The proof however is not constructive and does not yield information about the norm of these evaluations, or their location. The purpose of the talk is to show how the, (seemingly unrelated) work of X. Tolsa on analytic capacity can be used to address these questions.

This is joint work with S. Richter and C. Sundberg.

Alexandru.Aleman@math.lu.se
Speaker: LUIS BERNAL-GONZÁLEZ

Univ. Sevilla, Spain

Title: *Topological and algebraic structure of the set of strongly annular functions***Scheduled:** Tuesday, 12th, 18:00 - 18:25

Abstract: In this talk, we consider the space $H(\mathbb{D})$ of holomorphic functions in the open unit disk \mathbb{D} of the complex plane. By an elementary application of the maximum modulus principle, there is no function $f \in H(\mathbb{D})$ such that $\lim_{|z| \rightarrow 1} |f(z)| = +\infty$, or equivalently, $\lim_{r \rightarrow 1} m(r, f) = +\infty$, where $m(r, f) := \min\{|f(z)| : |z| = r\}$ ($0 < r < 1$). But functions $f \in H(\mathbb{D})$ with the weaker property

$$\limsup_{r \rightarrow 1} m(r, f) = +\infty$$

do exist, and they are called *strongly annular functions*. Starting from D. Bonar (1971), these functions have been extensively studied from several points of view. Specially, D. Bonar and F. Carroll proved in 1975 that strongly annular functions occur in a generic way: they form a residual subset ($=: \mathcal{SA}$) of $H(\mathbb{D})$ when this space is endowed with the compact-open topology. And recently, D. Redett (2007) has been able to construct a function $f \in \mathcal{SA}$ in each generalized Bergman space $A_\alpha^p(\mathbb{D})$, defined, for $0 < p < +\infty$ and $\alpha > -1$, as

$$A_\alpha^p(\mathbb{D}) := \{f \in H(\mathbb{D}) : \iint_{\mathbb{D}} |f(z)|^p (1 - |z|)^\alpha dx dy < +\infty\}.$$

In this talk, we show that the residuality can be extended to several spaces of holomorphic functions. Moreover, it is proved that the family \mathcal{SA} is large not only topologically, but even algebraically: there exist dense vector subspaces as well as infinitely generated algebras contained, except for zero, in \mathcal{SA} . A number of open problems are proposed. [Joint work with A. Bonilla].

lbernal@us.es
Speaker: DIMITRIOS BETSAKOS

Univ. Thessaloniki, Greece

Title: *A variant of Schwarz's lemma***Scheduled:** Wednesday, 13th, 11:45 - 12:20

Abstract: Suppose that f is holomorphic in the unit disk \mathbb{D} and $f(\mathbb{D}) \subset \mathbb{D}$, $f(0) = 0$. A classical inequality due to Littlewood generalizes Schwarz's lemma and asserts that for every $w \in f(\mathbb{D})$, we have $|w| \leq \prod_j |z_j(w)|$, where $z_j(w)$ is the sequence of pre-images of w . We prove a similar inequality replacing the assumption $f(\mathbb{D}) \subset \mathbb{D}$ by the weaker assumption $\text{Diam } f(\mathbb{D}) = 2$. The main tools in the proof are Green's function and Steiner symmetrization.

betsakos@math.auth.gr

Speaker: OSCAR BLASCO

Univ. Valencia, Spain

Title: *Remarks on weighted mixed norm spaces*

Scheduled: Wednesday, 13th, 9:45 - 10:20

Abstract: We find conditions on a measurable function $\rho : (0, 1] \rightarrow \mathbb{R}^+$, which is bounded on compact sets, for the boundedness of the Bergman projection, the Berezin transform and the averaging operator to hold on weighted mixed norm spaces $L(p, q, \rho)$ consisting of measurable functions satisfying

$$\left(\int_0^1 \frac{\rho(1-r)}{1-r} \left(\int_0^{2\pi} |f(re^{i\theta})|^p \frac{d\theta}{2\pi} \right)^{q/p} dr \right)^{1/q} < \infty.$$

Our results extend those known for $L^p(\mathbb{D}, (1 - |z|^2)^\alpha dA(z))$ and mixed norm spaces $L(p, q, \alpha)$.

Oscar.Blasco@uv.es

Speaker: JOSÉ BONET

Univ. Politécnica de Valencia, Spain

Title: *Holomorphic dependence of diagonal operators between sequence spaces*

Scheduled: Wednesday, 13th, 10:30 - 11:05

Abstract: In this lecture we investigate properties of diagonal operators defined on Köthe echelon spaces in case the diagonal depends holomorphically on a parameter $z \in \mathbb{D}$. To do this we study operator-weighted composition maps $W_{\psi, \varphi} : f \mapsto \psi(f \circ \varphi)$ on unweighted $H(\mathbb{D}, X)$ and weighted $H_v^\infty(\mathbb{D}, X)$ spaces of vector valued holomorphic functions on the unit disc \mathbb{D} . Here φ is an analytic self-map of \mathbb{D} and ψ is an analytic operator-valued function on \mathbb{D} and X is a Fréchet space. We characterize when the operator is continuous or maps bounded sets into relatively compact sets. In this way we extend results due to Laitila and Tylli for the case of Banach valued functions. This more general setting permits us to compare the results in the unweighted and weighted case. The diagonal operators between Köthe echelon spaces show the differences between the present setting and the case of functions taking values in Banach spaces.

jbonet@mat.upv.es

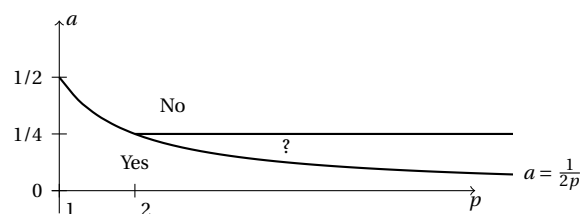
Speaker: ANTONIO BONILLA

Univ. La Laguna, Spain

Title: *Rate of growth of D -frequently hypercyclic functions*

Scheduled: Tuesday, 12th, 16:30 - 16:55

Abstract: We study the possible rates of growth of frequently hypercyclic entire functions for the differentiation operator. The following diagram represents our present knowledge of possible or impossible growth rates e^r/r^a for $M_p(f, r) := \left(\frac{1}{2\pi} \int_0^{2\pi} |f(re^{it})|^p dt \right)^{1/p}$, with $1 \leq p < \infty$, and $M_\infty(f, r) := \sup_{|z|=r} |f(z)|$.



[1] O. Blasco, A. Bonilla, and K.-G. Grosse-Erdmann, *Rate of growth of frequently hypercyclic functions*, Proc. Edinburgh Math Soc. **53** (2010), 39-59.

[2] J. Bonet and A. Bonilla, *Chaos of the differentiation operator on weighted Banach spaces of entire functions*, Complex Analysis and Operator Theory, To appear.

abonilla@ull.es

Speaker: MARÍA J. CARRO

Univ. Barcelona, Spain

Title: *Weighted estimates in a limited range with applications to the Bochner-Riesz operators***Scheduled:** Monday, 11th, 9:15 - 9:50**Abstract:** In this talk, I shall present the latest result of a joint work with Javier Duoandikoetxea and María Lorente concerning a problem for the so-called limited extrapolation theory of Rubio de Francia.

This theory states that if we know the boundedness of an operator T on $L^{p_0}(u)$ for a subclass of weights in A_{p_0} , we can deduce the boundedness of T on $L^p(u)$ for every $p > 1$ and every u in a certain subclass of A_p . We shall prove that we can also deduce two kinds of weighted estimates, from $L^p(u)$ to $L^{q,\infty}(v)$ and from the weighted Lorentz space $\Lambda^p(w)$ to $\Lambda^{p,\infty}(w)$.

The applications include the Bochner-Riesz operators and some others. We also consider the results in the case of one-sided operators.

carro@ub.edu**Speaker:** MANUEL D. CONTRERAS

Univ. Sevilla, Spain

Title: *Loewner Theory in Annulus***Scheduled:** Tuesday, 12th, 12:30 - 13:05

Abstract: Loewner Theory in the unit disk was originated in K. Loewner's seminal paper of 1923, where he introduced the so-called parametric representation of univalent functions as a powerful tool for solving extremal problems of Geometric Function Theory, including the famous Bieberbach's conjecture. Since that time Loewner Theory has gone far beyond the scope of the original problem. The most spectacular example is a stochastic version of the Loewner equation (SLE) introduced in 2000 by O. Schramm, which appeared to be intrinsically related to several important lattice models in Statistical Physics, such as the critical Ising model. Recently Filippo Bracci, Santiago Díaz-Madrigal and the author have proposed a general approach in Loewner Theory, which brings together similar but yet independent constructions from the classical theory in the unit disk.

In 1943, Y. Komatu was able to apply Loewner's ideas to parametric representation of univalent functions in the annulus. Since then, there have been several works on Loewner Theory for multiply connected domains, but all of them consider some special cases. This talk is devoted to a general version of Loewner Theory for the annulus. It is based on two joint works [arXiv:1011.4253] and [arXiv:1105.3187] with P. Gumenyuk and S. Díaz-Madrigal. One of the main new features of Loewner Theory in the doubly (and, more generally, multiply) connected setting is that there is no autonomous analogue of the Loewner Evolution, which is a good source of intuition for the theory in the unit disk, because for multiply connected case the semigroup structure disappears: instead of self-maps of a static domain one has to consider holomorphic mappings between one-parametric family of reference domains. We will discuss the notions of Loewner chain and evolution family over an expanding system of annuli and its relationship with Carathéodory ODEs driven by semi-complete non-autonomous holomorphic vector fields.

contreras@us.es**Speaker:** GEORGE COSTAKIS

Univ. Crete, Greece

Title: *Extreme limiting behavior of the partial sums of "smooth" functions***Scheduled:** Monday, 11th, 13:15 - 13:50

Abstract: This is joint work with J. Muller. Let $A(\mathbb{D})$ denote the disk algebra, i.e., the set of holomorphic functions in the open unit disk, \mathbb{D} , which extend continuously on the closure of \mathbb{D} . We investigate the behavior of the partial sums of typical functions $f \in A(\mathbb{D})$ on compact sets of the unit circle. In particular we show that there exists $g \in A(\mathbb{D})$ so that on certain "thin" subsets of the unit circle the partial sums of g behave "extremely wild". On the other hand, it is well known that the partial sums $S_n(g, 0)$ of every function $g \in A(\mathbb{D})$ behave "regular" on "fat" subsets of the unit circle \mathbb{T} , that is, $S_n(g, 0)$ converges to g a.e. on \mathbb{T} . As a byproduct of our work we give a negative answer to a question of Pichorides.

costakis@math.uoc.gr

Speaker: RODRIGO HERNÁNDEZ

Univ. Adolfo Ibáñez, Chile

Title: *Schwarzian derivative for harmonic functions*

Scheduled: Thursday, 14th, 10:00 - 10:25

Abstract: We give a definition of schwarzian derivative for harmonic functions that preserve the orientation and no additional assumption on the complex dilatation ω . The way to understand this formula is based on the fact that it should characterize the harmonic Möbius transformations. The definition characterizes the Möbius harmonic mappings as a natural way to extend the schwarzian derivative for this kinds of functions.

rodrigo.hernandez@uai.cl

Speaker: H. TURGAY KAPTANOĞLU

Univ. Bilkent, Ankara, Turkey

Title: *Three problems for weighted Bloch-Lipschitz spaces of holomorphic functions on the unit ball*

Scheduled: Thursday, 14th, 9:30 - 9:55

Abstract: We consider weighted Bloch-Lipschitz spaces \mathcal{B}_α of holomorphic functions on the unit ball \mathbb{B} of \mathbb{C}^N . For any $\alpha \in \mathbb{R}$, they are defined by requiring that $\|f\|_\alpha := \sup \{ (1 - |z|^2)^{\alpha+t} D^t f(z) : z \in \mathbb{B} \} < \infty$ for some t satisfying $\alpha + t > 0$, where D^t is a radial differential operator of order $t \in \mathbb{R}$.

We concentrate on three problems on \mathcal{B}_α that can be solved for all $\alpha \in \mathbb{R}$. First, for each $b \in \mathbb{B}$, we determine the unique extremal function realizing $\sup \{ f(b) > 0 : f \in \mathcal{B}_\alpha, \|f\|_\alpha = 1 \}$. Second, we prove that \mathcal{B}_α contains those α -Möbius-invariant spaces that possess a decent linear functional. Third, for $\alpha > 0$, we find new complete Hermitian metrics ρ_α with which the functions in \mathcal{B}_α satisfy a Lipschitz-type inequality, which is well-known for $\alpha \leq 0$.

This is joint work with S. Tülü.

kaptan@fen.bilkent.edu.tr

Speaker: GABRIELA KOHR

Univ. Babeş-Bolyai, Romania

Title: *Extreme points, support points and univalent subordination chains in \mathbb{C}^n*

Scheduled: Tuesday, 12th, 13:15 - 13:40

Abstract: In this talk we survey recent results in the theory of Loewner chains and the generalized Loewner differential equation in several complex variables. Also we investigate certain properties of extreme points and support points of the family $S^0(B^n)$ of normalized biholomorphic mappings on the unit ball in \mathbb{C}^n that have parametric representation.

This talk is based on joint work with Mirela Kohr (Cluj-Napoca), Ian Graham (Toronto) and Hidetaka Hamada (Fukuoka).

gkohr@math.ubbcluj.ro

Speaker: MIRELA KOHR

Univ. Babeş-Bolyai, Romania

Title: *Potential analysis for pseudodifferential Brinkman operators on Lipschitz domains*

Scheduled: Tuesday, 12th, 19:00 - 19:25

Abstract: The purpose of this talk is to present a potential analysis for pseudodifferential Brinkman operators on Lipschitz domains in the Euclidean setting or in compact Riemannian manifolds. We apply this analysis to treat transmission problems for such operators.

This is a joint work with Cornel Pinteau (Cluj-Napoca) and Wolfgang L. Wendland (Stuttgart).

mkohr@math.ubbcluj.ro

Speaker: MARÍA J. MARTÍN

Univ. Autónoma Madrid, Spain

Title: *Besov spaces, multipliers, and univalent functions***Scheduled:** Thursday, 14th, 10:30 - 11:05

Abstract: An analytic function f in the unit disk \mathbb{D} belongs to the conformally invariant Besov space B^p ($1 < p < \infty$) if its derivative f' belongs to the weighted Bergman space A_{p-2}^p . The *minimal space* B^1 is the set of analytic functions f in \mathbb{D} such that $f'' \in A^1$.

We focus on the problem of the boundedness of multiplication operators between the Besov spaces B^p ($1 \leq p < \infty$). We look for checkable descriptions of the spaces of multipliers $M(B^p, B^q)$ and give an extensive class of explicit examples. We also study which functions of certain important types (lacunary series, univalent functions, “modified”-inner functions) are to be found in the spaces $M(B^p, B^q)$.

This is a joint work with Petros Galanopoulos and Daniel Girela.

mariaj.martin@uam.es
Speaker: FRANCISCO J. MARTÍN-REYES

Univ. Málaga, Spain

Title: *A dominated ergodic theorem for some bilinear averages***Scheduled:** Monday, 11th, 12:30 - 13:05

Abstract: Let T be a positive invertible linear operator with positive inverse on some $L^p(\mu)$, $1 \leq p < \infty$, where μ is a σ -finite measure. We study the convergence in the $L^p(\mu)$ -norm and the almost everywhere convergence of the bilinear operators

$$\mathcal{A}_n(f_1, f_2) = \left(\frac{1}{2n+1} \sum_{i=-n}^n T^i f_1(x) \right) \left(\frac{1}{2n+1} \sum_{i=-n}^n T^i f_2(x) \right)$$

for functions $f_1 \in L^{p_1}(\mu)$ and $f_2 \in L^{p_2}(\mu)$, $1 \leq p, 1 < p_1, p_2 < \infty$, $1/p_1 + 1/p_2 = 1/p$. It turns out to be that the convergence in $L^p(\mu)$ is equivalent to the dominated estimate for the ergodic maximal operator associated to \mathcal{A}_n and to the uniform boundedness of the operators \mathcal{A}_n . It is also shown that the convergence in the $L^p(\mu)$ -norm implies the almost everywhere convergence. On one hand, the key facts to prove these results are transference arguments and the connection with a new class of weights recently introduced by Lerner et al. (Advances in Mathematics **220** (2009) 1222-1264). On the other hand, our main result can be viewed as the ergodic counterpart of one of the main results in the above cited paper.

martin_reyes@uma.es
Speaker: MARGIT PAP

Univ. Vienna, Austria

Title: *Multiresolution in $H^2(\mathbb{T})$ generated by a special Malmquist-Takenaka system***Scheduled:** Monday, 11th, 10:45 - 11:10

Abstract: In signal processing and system identification for $H^2(\mathbb{T})$ and $H^2(\mathbb{D})$ the traditional trigonometric bases and trigonometric Fourier transform are replaced by the more efficient rational orthogonal bases like the discrete Laguerre, Kautz and Malmquist-Takenaka systems and the associated transforms. These bases are constructed from rational Blaschke functions, which form a group with respect to function composition that is isomorphic to the Blaschke group, respectively to the hyperbolic matrix group. Consequently, the background theory uses tools from non-commutative harmonic analysis over groups and the generalization of Fourier transform uses concepts from the theory of the voice transform. The successful application of rational orthogonal bases needs a priori knowledge of the poles of the transfer function that may cause a drawback of the method. In this talk we present a set of poles and using them we will generate a multiresolution in $H^2(\mathbb{T})$ and $H^2(\mathbb{D})$. The construction is an analogy with the discrete affine wavelets, and in fact is the discretization of the continuous voice transform generated by a representation of the Blaschke group over the space $H^2(\mathbb{T})$. The constructed discretization scheme gives opportunity of practical realization of hyperbolic wavelet representation of signals belonging to $H^2(\mathbb{T})$ and $H^2(\mathbb{D})$ if we can measure their values on a given set of points inside the unit circle or on the unit circle. Convergence properties of the hyperbolic wavelet representation will be studied.

margit.pap@univie.ac.at

Speaker: CHRISTOS PAPACHRISTODOULOS

Univ. Crete, Greece

Title: *Universality, summability and Rogosinski's formula*

Scheduled: Tuesday, 12th, 17:00 - 17:25

Abstract: Let $\Omega \neq \mathbb{C}$ be an arbitrary domain in \mathbb{C} and $\zeta \in \Omega$. Let $R = \text{dist}(\zeta, \partial\Omega)$ and $K = \partial\Omega \cap \{z \in \mathbb{C} : |z - \zeta| = R\}$. We prove the existence of universal functions $f \in \mathcal{H}(\Omega)$ for K , that is the sequence of partial sums of the Taylor development $\sum_{n=0}^{\infty} c_n(z - \zeta)^n$ of f approximates uniformly any continuous function on K . Also we give sufficient conditions on K which guarantee that the above series is not (C, a) -summable for every $a > -1$. Finally we give examples of universal Taylor series $\sum_{n=0}^{\infty} c_n z^n$ for K , with K a finite subset of $\mathbb{T} = \{z \in \mathbb{C} : |z| = 1\}$, such that the series $\sum_{n=0}^{\infty} c_n z^n$ is (C, a) -summable for every $a \geq 1$.

papach@math.uoc.gr

Speaker: MIHALIS PAPADIMITRAKIS

Univ. Crete, Greece

Title: *Composition operators on B_1*

Scheduled: Tuesday, 12th, 9:45 - 10:20

Abstract: We review some previous results on the compactness and the essential norm of a composition operator C_ϕ on B_1 and, mainly, describe a necessary condition on the symbol ϕ for C_ϕ to have closed range.

papadim@math.uoc.gr

Speaker: JOSÉ A. PELÁEZ

Univ. Málaga, Spain

Title: *Spectra of integration operators on Hardy spaces*

Scheduled: Tuesday, 12th, 10:30 - 11:05

Abstract: We shall present weighted versions of the classical estimates due to Fefferman-Stein and Littlewood-Paley which express the H^p -norm of an analytic function with help of its derivative. These results shall be used to study the spectrum of integration operators

$$T_g f(z) = \int_0^z f(\xi) g'(\xi) d\xi,$$

acting on the Hardy spaces H^p . (Joint work with Alexandru Aleman.)

japelaiez@uma.es

Speaker: CARLOS PÉREZ

Univ. Sevilla, Spain

Title: *Theory of singular integrals and weights: Recent results*

Scheduled: Monday, 11th, 11:45 - 12:20

Abstract: It is well known that the basic operators from Harmonic Analysis are bounded on weighted L_p spaces when the weight satisfies the A_p condition. There is now a growing interest in understanding the behavior of the operator norm in terms of the A_p constant of the weight. The main result is the so called the A_2 theorem which was a conjecture until few months ago. We plan to discuss this theorem and a recent improvement obtained in joint work with T. Hytönen.

carlosperez@us.es

Speaker: FERNANDO PÉREZ-GONZÁLEZ

Univ. la Laguna, Spain

Title: *Inner functions in Möbius invariant spaces*

Scheduled: Wednesday, 13th, 12:30 - 13:05

Abstract: The classical problem of determining which inner functions (or their derivatives) belong to a given space of analytic function has a long story. In the talk we will focus on the Möbius invariant Besov-type spaces B_s^p , ($p > 0$, $s \geq 0$), which consist of the analytic functions in the open unit disc \mathbb{D} such that

$$\sup_{a \in \mathbb{D}} \int_{\mathbb{D}} |f'(z)|^p (1 - |z|^2)^{p-2} g^s(z, a) dA(z) < \infty,$$

where $g(z, a) = -\log|\varphi_a(z)|$ is the Green function of \mathbb{D} and $\varphi_a(z) = (a - z)/(1 - \bar{a}z)$. In fact, some of our results are stated for the general classes $F(p, q, s)$ ($p > 0$, $-2 < q < \infty$, $0 \leq s < \infty$, and $q + s > -1$), consisting of those analytic functions in \mathbb{D} for which

$$\sup_{a \in \mathbb{D}} \int_{\mathbb{D}} |f'(z)|^p (1 - |z|^2)^q g^s(z, a) dA(z) < \infty.$$

We prove that for $0 < s \leq 1$, the atomic singular inner function $S_{\gamma, w} \in F(p, q, s)$ if and only if $p \leq q + (s + 3)/2$. As a consequence, it follows that $S_{\gamma, w} \notin B_s^p$ and $S_{\gamma, w} \notin B_{1,0}^p$, but $S_{\gamma, w} \in B_1^p$. This is generalized by showing that for $0 < p < \infty$ and $0 \leq s < 1$ such that $p + s > 1$, B_s^p does not contain any singular inner functions.

Then, it is seen that Blaschke products belonging to B_s^p are those for which their zero sequences $\{z_n\}$ sequence satisfy $\sup_{a \in \mathbb{D}} \sum_{n=1}^{\infty} (1 - |\varphi_a(z_n)|^2)^s < \infty$.

(The talk is based upon a joint work with Jouni Rättyä).

fernando.perez.gonzalez@ull.es

Speaker: KARL M. PERFEKT

Univ. Lund, Sweden

Title: *On duality and distance results in BMO type spaces*

Scheduled: Tuesday, 12th, 18:30 - 18:55

Abstract: For the classical space of functions with bounded mean oscillation, it is well known that $VMO^{**} = BMO$ and there are many characterizations of the distance from a function f in BMO to VMO . When considering the Bloch space, results in the same vein are available with respect to the little Bloch space. In this talk it will be explained how to obtain such duality results and distance formulas by pure functional analysis. Applications include Möbius invariant spaces, Hölder spaces and rectangular BMO of several variables.

perfekt@maths.lth.se

Speaker: SANDRA POTT

Univ. Lund, Sweden

Title: *A dyadic approach to Sarason's conjecture on Toeplitz products on Bergman space*

Scheduled: Wednesday, 13th, 13:15 - 13:50

Abstract: In 1994, D. Sarason posed conjectures on the characterization of the boundedness of Toeplitz products on Hardy and Bergman spaces. The Hardy space case attracted much attention because of its close relation to the famous two-weight problem for the Hilbert transform in Analysis, but was shown to be false by F. Nazarov around 2000. The Bergman space case is still open. In the talk, I will present a dyadic model with a test function criterion for the Bergman space case. This is joint work with A. Aleman.

sandra@maths.lth.se

Speaker: STAMATIS POULIASIS

Univ. Thessaloniki, Greece

Title: *Equality cases for condenser capacity inequalities under symmetrization*

Scheduled: Tuesday, 12th, 16:00 - 16:25

Abstract: It is well known that certain transformations decrease the capacity of a condenser. We prove equality statements for the condenser capacity inequalities under symmetrization and polarization without connectivity restrictions on the condenser and without regularity assumptions on the boundary of the condenser.

spoulas@math.auth.gr

Speaker: ARISTOMENIS SISKAKIS

Univ. Thessaloniki, Greece

Title: *Strong continuity of composition semigroups in spaces of analytic functions - A survey*

Scheduled: Thursday, 14th, 12:30 - 13:05

Abstract: Given a semigroup $\{\phi_t : t \geq 0\}$ of analytic self maps of the unit disc \mathbb{D} there arises a composition operator semigroup

$$T_t(f) = f \circ \phi_t, \quad f \in \mathcal{H}(\mathbb{D}),$$

on the space $\mathcal{H}(\mathbb{D})$ of all analytic functions on \mathbb{D} . If X is a linear subspace of $\mathcal{H}(\mathbb{D})$ with a norm $\|\cdot\|_X$ such that the composition operators T_t are bounded on X , we are interested when $\{T_t\}$ are strongly continuous on X . We will survey results on classical spaces X of analytic functions, stressing the case of $BMOA$ where the question is more difficult and partially open.

siskakis@math.auth.gr

Speaker: JAVIER SORIA

Univ. Barcelona, Spain

Title: *Solution to a conjecture on the Hardy operator minus the identity and a new class of minimal rearrangement invariant spaces*

Scheduled: Tuesday, 12th, 9:00 - 9:35

Abstract: N. Kruglyak and E. Setterqvist [PAMS **136** (2008), 2505–2513] have shown that the norm of the Hardy operator minus the identity $S - I$, on the cone of decreasing functions in L^p and for $p \in \{2, 3, \dots\}$, is given by:

$$\|S - I\|_p = \frac{1}{(p-1)^{1/p}},$$

and conjectured that the estimate would also hold for $p \geq 2$.

In collaboration with S. Boza [JFA **260** (2011), 1020–1028] we have proved that this is true, even for a larger class of weights w : If $w \in B_p$ (the Ariño and Muckenhoupt class) and

$$r^{p-1} \int_r^\infty \frac{w(x)}{x^p} dx \leq \frac{w(r)}{p-1}, \quad \text{a. e. } r > 0,$$

then,

$$\|S - I\|_{p,w} = \|w\|_{B_p}^{1/p}, \quad p \geq 2.$$

Observe that if the operator $S - I : L_{\text{dec}}^p(w) \longrightarrow L^p(w)$ is bounded, necessarily $w \in B_p$.

Motivated by these results, for a rearrangement invariant space X we have introduced [Studia Math. **197** (2010), 69–79] a new space $R(X)$, where

$$\|f\|_{R(X)} = \int_0^\infty W_X(\lambda_f(t)) dt < +\infty,$$

and $W_X(t) = \|1/(1 + \frac{\cdot}{t})\|_X$, and have characterized when $R(X) \neq \{0\}$ or $R(X) = \Lambda(X)$ (joint work with S. Rodríguez-López, to appear in Proc. Edinb. Math. Soc.). Some other new properties will also be discussed.

soria@ub.edu

Speaker: GEORGIOS STYLOGIANNIS

Univ. Thessaloniki, Greece

Title: *A brief review on Brennan's Conjecture*

Scheduled: Tuesday, 12th, 19:30 - 19:55

Abstract: Brennan's conjecture concerns integrability of the derivative of a conformal map g of a simply connected planar domain G onto the unit disk \mathbb{D} . The conjecture is that, for all such G and g ,

$$\int_G |g'(z)|^p dA(z) < \infty$$

holds for $4/3 < p < 4$. Here dA is the area measure on the plane.

We will present a brief review of results concerning Brennan's conjecture. We will focus on the work of W. Smith and S. Shimorin that establishes a connection between the conjecture and weighted composition operators.

stylog@math.auth.gr

Speaker: ANA VARGAS

Univ. Autónoma Madrid, Spain

Title: *Restriction theorems for surfaces with vanishing curvatures*

Scheduled: Monday, 11th, 10:00 - 10:35

Abstract: This is a joint work with Sanghyuk Lee. We prove some bilinear restriction estimates for conic type surfaces with more than one vanishing curvature. As corollary, we show new restriction estimates for some conic surfaces.

ana.vargas@uam.es

Speaker: DRAGAN VUKOTIĆ

Univ. Autónoma Madrid, Spain

Title: *Derivatives of Blaschke products and Bergman spaces with normal weights*

Scheduled: Tuesday, 12th, 11:45 - 12:20

Abstract: This talk is based on a recent joint work with A. Aleman.

We consider the membership of the derivative of a Blaschke product in a Bergman space with normal weights (in the sense of Shields and Williams) and present several results that generalize or complement earlier findings by various authors.

dragan.vukotic@uam.es

Speaker: NINA ZORBOSKA

Univ. Manitoba, Canada

Title: *Schwarzian derivative and general Besov-type domains*

Scheduled: Thursday, 14th, 11:45 - 12:20

Abstract: We will look at the univalent functions f for which $\log f'$ belongs to a class of general Besov-type spaces. We provide a characterization of the general Besov-type domains in terms of Carleson measure conditions on the schwarzian derivative of f .

zorbosk@cc.umanitoba.ca