SEMINARIS D'ANÀLISI MATEMÀTICA 2003–2004

- **Nicolae Popa** (Institut de Matemàtiques de la Academia de Ciències de Rumania).
  "Some problems in matriceal harmonic analysis".
  Dia i hora: dimarts 23 de setembre a les 15.00.
  Lloc: aula 7 de la UB.

- **Sergei Hruscev** (Atilim University, Ankara).
  "Continued Fractions and Orthogonal Polynomials".
  Dia i hora: 29 de setembre a les 15.00.
  Lloc: aula gran del CRM.
  Abstract: I plan to present a point of view of continued fractions to different problems of Analysis and then illustrate this approach on my results on orthogonal polynomials on the unit circle.

- **Joaquim Martín** (UAB).
  "Interpolació d'espais de funcions mitjançant mètodes definits per polígons".
  Dia i hora: 6 d'octubre a les 15 h.
  Lloc: aula 7 de la UB.

- **Xavier Dussau** (UAB).
  "Reflexivity results for multipliers of weighted spaces".
  Dia i hora: 13 d'octubre a les 15.00.
  Lloc: aula gran del CRM.
  Abstract: For some translation invariant spaces E we prove that T is a multiplier of E if and only if T leaves invariant every translation invariant subspace of E.

- **Oscar Lemmers** (UAB).
  "The Gleason problem, past and present".
  Dia i hora: 20 d'octubre a les 15.00.
  Lloc: Aula gran del CRM.
  Abstract : We shall discuss a decomposition problem in function theory of several complex variables, that is known as the Gleason problem. First some history and known results, then some new results.

- **Michael Solomyak** (Weizmann Institute of Science, Israel).
  "On approximation of functions from Sobolev spaces on metric graphs".

Dia i hora: 27 d'octubre a les 15.00.
Lloc: Aula 7 de la UB.
Abstract: We show that the approximation numbers a_n of the embedding operator of the Sobolev space $W^{1,p}(G)$ on a graph G of finite length $|G|$ into the space $L^p(G,\mu)$, where μ is an arbitrary finite Borel measure on G, satisfy the inequality

$$a_n \le |G|^{1/p'}\mu(G)^{1/p}n^{-1}, \qquad 1 < p < \infty.$$

The estimate is sharp for any integer n.

- **Cristina Pereyra** (New Mexico i CRM).
"Haar multipliers revisited".
Dia i hora: 3 de novembre a les 15.00.
Lloc: Aula 7 de la UB.
Abstract: The Haar multipliers are operators of the form

$$Tf(x) = \sum_I s(x,I) < f, h_I > h_I(x),$$

where the sum is over all dyadic intervals I, the functions h_I are the Haar functions, $< ., . >$ is the L^2 inner product, and $s(x,I)$ denotes the symbol of the operator. We are interested in symbols of the form $s(x,I) = (w(x)/m_I w)^t$, where w is a weight, $m_I w$ the average of w in I, and t a real parameter. The necessary and sufficient conditions on w for boundedness of these operators on $L^p(\mathbb{R})$ are known. In particular, for $t = 1, -1/2$, they reduce to w satisfying a Reverse Holder (RH_q) or A_q condition. We are interested in finding the sharp rate of growth in terms of the A_q and RH_q characteristic of the weight. The techniques that have proven very useful for this purpose are the Bellman functions of Nazarov, Treil and Volberg. Our problem is closely related to the problem of finding sharp bounds for the dyadic square function on weighted Lebesgue spaces, and for the weighted maximal function on unweighted Lebesgue spaces. Very recently S. Petermichl has found the sharp linear bound for the Hilbert transform on $L^2(w)$. Her proof reduces to obtaining sharp estimates for some dyadic operators closely related to the Haar multipliers. In a 2002 Duke J. paper, Petermichl and Volberg established a linear bound on $L^p(w)$ for the Beurling transform and for p greater or equal than 2. This result implies an important end-point result in the theory of quasi-regular maps (Astala-Iwaniek-Saksman, Duke 2001).

- **Bruno Demange** (UAB).
"A variant of the Uncertainty Principle associated to non positive definite quadratic forms"
Dia: 10 de novembre.
Lloc: CRM

Abstract: The well known Hardys Uncertainty Principle Theorem states that a function F and $\hat{F}$ (the Fourier transform) cannot decay as fast as gaussians. More precisely we cannot have, for example in $\mathbb{R}^2$,

$$|\hat{F}(x,y)| + |F(x,y)| < (1+x+y)^N e^{-x^2-y^2},$$

unless F is a Hermite function. Here we generalise this kind of uncertainty principle, namely an integral version of Hardys theorem, by replacing the quantity x^2+y^2 in the exponent by the smaller quantity $2xy$. This leads to a new form of the uncertainty principle for Fourier and windowed Fourier transforms. Mathematics involved are distribution theory, Paley Wiener type theorems, entire functions of order 2 and classical Fourier analysis.

- **Jordi López** (CRM).
"A class of Banach spaces with no unconditional basic sequence".
Dia i hora: 17 de novembre a les 15.00.
Lloc: UB
Abstract: We construct a family of reflexive Banach spaces X_γ ($\gamma < \omega_1$) with long transfinite bases but with no unconditional basic sequences. In each of these spaces X_γ every bounded operator T is split into its diagonal part D_T and its strictly singular part S_T. Having long transfinite bases our spaces X_γ have rich spaces $D(X_\gamma)$ of diagonal operators. Rather unexpectedly, we were able to identify the spaces $D(X_\gamma)$. For example, we show that $D(X_{\omega^2})$ is isomorphic to the dual of the quasi-reflexive Banach space J_{T_0}, the James space over the mixed Tsirelson space T_0. We discover several other new phenomena by looking at subspaces X of our spaces X_γ. For example, we show that every finite-dimensional subspace of any X_γ can be moved by an $(4+\varepsilon)$-isomorphism to essentially any region of any other member X_δ of our class. We also find subspaces X of X_γ such that the operator space $L(X, X_\gamma)$ is quite rich but any bounded operator T from X into X is a strictly singular variation of a scalar multiple of the identity. This is a joint work with S. A. Argyros (Athens) and S. Todorcevic (CNRS-Paris 7).

- **Juan Luis Varona** (U. de la Rioja).
"Multiplicadores para la transformada de Hankel y series de Fourier-Neumann".
Dia i hora: 17 de novembre, a les 16.00.
Lloc: UB.

- **Eero Saksman** (Jyväskylä).
"On the boundary correspondence of the Nevanlinna counting function".

Dia i hora: 24 de novembre, a les 15.00.
Lloc: Aula del CRM.
Abstract: Let ϕ be a holomorphic self-map of the unit disc $\mathcal{D}$. Associated to such a ϕ is its classical Nevanlinna counting function N_ϕ. It can be thought to measure the affinity of ϕ towards the value w. Also for any value $\alpha \in \partial\mathcal{D}$ on the boundary, there is a natural measure for the affinity, given by the Alexandrov measure $\{\tau_\alpha\}$.

A priori these two concepts are fairly unrelated. However, our main result reveals that the Alexandrov measures can be considered as non-tangential boundary values of (a measure valued modification of) the Nevanlinna counting function. The boundary correspondence takes place outside an exceptional set E of small capacity. We also discuss the optimality of our estimates for the size of E (in terms of capacity). The work is joint with Pekka Nieminen (Helsinki)

- **Andrea Cianchi** (Universitat de Florencia).
"Moser-Trudinger inequalities without boundary conditions and isoperimetric problems".
Dia i hora: 1 de desembre a les 15.00.
Lloc: UB
Abstract: The best constant is exhibited in Trudinger's exponential inequality for functions from the Sobolev space $W^{1,n}(\Omega)$, with $\Omega \subset \mathbb{R}^n$ and $n \geq 2$. This complements a classical result by Moser dealing with the subspace $W_0^{1,n}(\Omega)$. An extension to the borderline Lorentz-Sobolev spaces $W^1L^{n,q}(\Omega)$ with $1 < q \leq \infty$ is also established. A key step in our proofs is an asymptotically sharp relative isoperimetric inequality for domains in $\mathbb{R}^n$.

- **Konstantin Fedorovskiy** (Moscow State University).
"On the Dirichlet problem for bianalytic functions".
Dia i hora: Dimecres 10 de desembre, a les 15.00.
Lloc: aula petita del CRM.
Abstract: The talk will be devoted to the Dirichlet problem for bianalytic functions in its classical statement. We recall, that a function f is called bianalytic on an open set $U \subset \mathbb{C}$ if $\bar\partial^2 f = 0$ in U; each bianalytic in U function f is of the form $f(z) = \bar z f_1(z) + f_0(z)$, where f_0, f_1 are holomorphic in U.

A bounded domain Ω is called $\bar\partial^2$-regular if for each function φ being continuous on $\partial\Omega$ there exists a function f continuous on $\bar\Omega$ and bianalytic in Ω such that $f_{|\partial\Omega} = \varphi$. Otherwise, Ω is called $\bar\partial^2$-irregular.

It is planned to discuss the problem of $\bar\partial^2$-regularity of a domain $\Omega \subset \mathbb{C}$. Some results, supporting the conjecture that every bounded

domain is $\bar{\partial}^2$-irregular will be presented.

- **Luis Vega** (Universitat del País Basc).
  "Sobre la dinámica de hilos de torbellino".
  Dia i hora: 15 desembre, a les 15.00.
  Lloc: CRM.
  Abstract: La mayor parte de la charla versará sobre un trabajo conjunto con Susana Gutierrez en el que caracterizamos todas las soluciones autosemejantes de la ecuación del hilo de torbellino. Esta ecuación es una aproximación a la dinámica autoinducida de un tubo de vorticidad de sección infinitesimal según las ecuaciones de Euler. En esta aproximación el flujo está determinado por la dirección de la binormal. En la última parte de la charla mencionaré unos resultados de estabilidad obtenidos con Carlos Kenig y Gustavo Ponce para el caso de más de un filamento. En esta situación la interacción entre ellos es el efecto dominante.

- **Archil Gulisashvili** (CRM i Ohio University).
  "On the behavior of Feynman-Kac propagators"
  Dia i hora: 12 de gener de 2004, a les 15.00
  Lloc: Aula 7 de la UB
  Abstract: Propagators are two-parameter families of bounded linear operators on a Banach space satisfying the "flow condition. A special case of a propagator is the Feynman-Kac propagator associated with a nonhomogeneous heat equation. We study the mapping properties of the Feynman-Kac propagator in Lebesgue spaces and spaces of continuous functions on R^n.

- **Nicola Arcozzi** (Universitat de Bologna).
  "Regularity of the distance function in the Heisenberg group".
  Dia i hora: 19 de gener, a les 15.00.
  Lloc: UB.

- **Oliver Dragicevic** (Scuola Normale Superiore di Pisa).
  "Martingales and some estimates for the Ahlfors-Beurling operator".
  Dia i hora: 26 de gener, a les 15.00.
  Lloc: Aula C1/-128 de la UAB.
  Abstract: We will present certain recent results regarding the Ahlfors-Beurling transform T, more precisely, its sharp estimate on spaces with Muckenhoupt weights and some latest findings related to the $(p-1)$-conjecture. The latter consists of proving that the norm of T on (unweighted) space L^p equals to $p-1$. The best known upper estimate is $2(p-1)$. These questions are known to be closely related to the theory of quasiconformal mappings, the regularity problems of certain PDE's and some other areas. In our exposition we will

also mention the role that martingales and martingale transforms play in these results.

- **Linus Carlsson** (UAB).
"Introduction to pseudoconvexity". Dia i hora: 2 de febrer a les 15.00 h.
Lloc: Aula gran del CRM.
Abstract: In the area of several complex variables the notion of pseudoconvexity is a central object. It is the generalisation of domains of holomorphy in one complex variable to domains in several complex variables. As the name suggests, there is a connection to (geometrical) convex domains. We will look at some of the similarities and how we can embed pseudoconvex domains into convex ones.

- **Ana Vargas** (Universitat Autònoma de Madrid).
"Recuperación parcial de un potencial a partir de datos de backscattering".
Dia i hora: 9 de febrer a les 15.00 h.
Lloc: UB.
Abstract: (Alberto Ruiz y Ana Vargas) Dado un potencial q de soporte compacto, se consideran las"autofunciones generalizadas" del operador $-\Delta + q(x)$, es decir, las funciones u, que cumplen $(-\Delta + q(x) - k^2)u = 0$ con $u = u_i + u_s$, donde $u_i = e^{ik\theta\cdot x}$ (onda incidente plana) y u_s satisface una cierta condición de radiación (de Sommerfeld). A partir de los valores u_s en el infinito, la llamada "amplitud de scattering" $u_\infty(k, \theta, x)$, se construyen aproximaciones de q. La aproximación de backscattering consiste en tomar $\widehat{q_B}(\xi) = u_\infty(k, \theta, -\theta)$ con $\xi = k(-2\theta)$ como aproximación de $\widehat{q}$. Demostramos que en dimensiones 2 y 3, si $q \in W^{s_0,2}$ para $0 < s_0 < 1$, entonces $q - q_B \in W^{s,2}$, para todo $s < s_0 + 1/2$, es decir, que la información sobre las singularidades de q está en q_B. Existe un resultado previo más débil en dimensión 2, debido a Ola, Päivärinta y Serov.

- **Sorina Barza** (Universitat de Karlstad).
"Multidimensional rearrangement and Lorentz spaces". Dia i hora: 16 de febrer a les 15.00 h.
Lloc: UB.
Abstract: We will present some functional properties of the weighted Lorentz spaces defined in terms of the two-dimensional iterated decreasing rearrangement. We shall also discuss some embedding results between these spaces, the classical Lorentz and mixed normed spaces.

- **Jan van Casteren** (University of Antwerp).
  "A Hamilton-Jacobi-Bellmann equation and its viscosity solution".
  Dia i hora: 18 de febrer a les 15.00 h.
  Lloc: Aula petita del CRM.
  Abstract: The Lagrangian action, which may be phrased in terms of a non-linear Feynman-Kac formula, coincides under rather generous hypotheses with the unique viscosity solution to the Hamilton-Jacobi-Bellmann equation. The method of proof is based on martingale theory and Jensen inequality. If time permits, then a version of the stochastic Noether theorem, as well as its complex companion, will be discussed.

- **Diego Córdoba** (CSIC).
  "Existencia de soluciones de la ecuación quasi-geostrófica".
  Dia i hora: 1 de març a les 15.00 h.
  Lloc: Aula gran del CRM.
  Abstract: En los últimos años ha habido un intenso interés científico en entender el comportamiento de las ecuaciones quasi-geostróficas, por ser un posible modelo para explicar la formación de frentes de masas de aire caliente y frío. En otra dirección, P. Constantin, A. Majda y E. Tabak exhibieron que la ecuación quasi-geostrófica es un modelo bidimensional de la ecuación de Euler en tres dimensiones. Y que los Teoremas que se verifican para una ecuación lo hacen también con la otra. No obstante, la existencia de singularidades para las dos ecuaciones es un problema que sigue abierto. En este seminario se abordarán algunos resultados recientes en este tema.

- **Evgeniy Pustylnik** (Technion, Haifa).
  "Ultrasymmetric spaces and applications".
  Dia i hora: 5 de març a les 15 h.
  Lloc: UB.

- **Enrique Zuazua** (UAM).
  "Non-harmonic Fourier series, propagation of waves and control".
  Dia i hora: 8 de març a les 15.00 h.
  Lloc: CRM.
  Abstract: In this lecture we shall discuss several topics related with the analysis, numerical simulation and control of models involving wave or wave-like equations. We shall mainly focus on some problems that require the use of tools from the theory of nonharmonic series.

  Control Theory is by now and old subject, ubiquitous in many areas of Science and Technology. There is a quite well-established finite-dimensional theory and many progresses have been done also in the context of PDE (Partial Differential Equations). But gluing

these two pieces together is often a hard task from a mathematical point of view.

This is not a merely mathematical problem. Indeed, it does affect modelling and computational issues. In particular, the following two questions arise: Are finite-dimensional and infinite-dimensional models equally efficient from a control theoretical point of view? Are controls built for finite-dimensional numerical schemes efficient at the continuous level?

Similar questions arise in other closely connected areas like Optimal Design and Inverse Problem Theory.

Fourier Analysis techniques and, in particular, Ingham's inequalities and Beurling-Malliavin's Theorem allow solving these problems for some 1D models.

Many important and difficult mathematical problems are still open in this field. Some of then will be briefly discussed and require of new contributions form Fourier Analysis.

- **Leonardo Colzani** (Università di Milano-Bicocca).
  "Summability of Fourier expansions".
  Dia i hora: 15 de març a les 15.00 h.
  Lloc: UB.
  Abstract: We consider some multidimensional analogues of classical results on the convergence of Fourier series.

- **Pekka Koskela** (Universitat de Jyväskylä).
  "Mappings of finite distortion".
  Dia i hora: 22 març a les 15.00 h.
  Lloc: CRM.
  Abstract: Mappings of finite distortion can be viewed as generalizations of analytic functions. In the planar case, they arise as solutions to the Beltrami equation. I will review some of the most recent results on mappings of finite distortion.

- **Eva Gallardo** (Universidad de Zaragoza).
  "Ciclicidad de operadores de composición".
  Dia i hora: 29 març a les 15.00 h.
  Lloc: UB.
  Abstract: Un operador T lineal y continuo en un espacio de Hilbert $\mathcal{H}$ se dice cíclico si existe un vector $f \in \mathcal{H}$ tal que la variedad lineal engendrada por su órbita $\{T^n f\}_{n\geq 0}$ es densa en $\mathcal{H}$. Después de discutir algunos aspectos relacionados con la ciclicidad y algunas de sus formas fuertes, nos centraremos en el estudio del comportamiento cíclico de los operadores de composición inducidos por transformaciones de Möbius en espacios de Dirichlet. En particular, estableceremos especial hincapié en la relación existente entre los vectores

cíclicos del operador de composición inducido por un automorfismo hiperbólico del disco unidad $\mathbb{D}$ y el *Problema del Subespacio Invariante*.

- **Andreas Seeger** (University of Wisconsin).
  "Averages over curves and Wolff's inequality".
  Dia i hora: 19 d'abril a les 15.00 h.
  Lloc: UB.
  Abstract: We prove that for curves of nonvanishing curvature and torsion in $\mathbb{R}^3$, the analogue of the circular maximal operator is bounded on L^p for large p. We also discuss endpoint L^p Sobolev estimates for averages over curves. The proofs make use of a deep result of Thomas Wolff about decompositions of cone multipliers.

- **Manuel D. Contreras** (Universitat de Sevilla).
  "Semigrupos de funciones analíticas".
  Dia i hora: 19 d'abril a les 16.00 h.
  Lloc: UB.
  Abstract: En esta charla presentaremos el concepto de semigrupo (continuo) de funciones analíticas y mostraremos algunos problemas del Análisis Matemático donde aparecen estos semigrupos poniendo especial énfasis en su relación con los siguientes temas:
  - los operadores entre espacios de funciones analíticas;
  - la ecuación del bilaplaciano;
  - los sistemas dinámicos planos.
  Presentamos también la teoría de modelos para estos semigrupos que es la herramienta que permite ver la relación entre los tres bloques antes mencionados.

- **Guy David** (Université de Paris-Sud).
  "Quasiminimal sets and minimization of functionals".
  Dia i hora: 23 d'abril a les 12.00 h.
  Lloc: CRM.
  Abstract: I will try to explain why the notion of quasiminimal set introduced by Almgren can be useful when one tries to minimize a functional with a surface term. I should mostly describe simple situations with a topological constraint, like separation of components.

- **Vicent Caselles** (UPF).
  "Total variation minimization and constrained isoperimetric problems".
  Dia i hora: 26 d'abril a les 15.00 h.
  Lloc: CRM.

Abstract: We discuss the Lagrange multiplier approach to the problem of area minimization with prescribed volume for sets X contained in a convex set. We discuss the solution of this problem in terms of the fixed volume and prove that the sets are convex in a certain range of volumes. This permits us to give explicit solutions of the denoising problem in image processing for certain simple geometric data and compute the explicit evolution of characteristic functions of convex sets bt the minimizing Total Variation flow. Other applications will be discussed.

- **José María Martell** (UAM).
"Pesos de Muckenhoupt, extrapolación y la desigualdad de Coifman".
Dia i hora: 3 de maig a les 15.00 h.
Lloc: UB.
Abstract: La desigualdad de Coifman establece que los operadores regulares de Calderón-Zygmund están controlados por la función maximal de Hardy-Littlewood en los espacios de Lebesgue con pesos de Muckenhoupt. Usando técnicas de extrapolación mostraremos que este control también puede expresarse en espacios de funciones más generales y además mediante desigualdades modulares con peso. Este método permitirá establecer estimaciones vectoriales de forma muy sencilla. Como consecuencia, el estudio de las acotaciones de un operador que satisfaga una desigualdad de tipo Coifman puede hacerse a través de la función maximal de Hardy-Littlewood.

  El contenido de esta charla es parte de trabajos en colaboración con David Cruz-Uribe y Carlos Pérez, y, por otro lado, con Guillermo Curbera, José García-Cuerva y Carlos Pérez.

- **Gord Sinnamon** (Univ. of Western Ontario).
"The Fourier Transform in Weighted Lorentz Spaces".
Dia i hora: 10 de maig a les 15.00 h.
Lloc: UB.
Abstract: We describe a characterization for the embedding of the cone of quasi-concave functions from one weighted Lebesgue space to another. This is used to give a simple necessary and sufficient weight condition for the Fourier transform to be a map between certain weighted Lorentz spaces.

- **Lars Erik Persson** (Luleå University of Technology).
"Weighted Inequalities of Hardy Type"
Dia i hora: 13 de maig a les 15.00 h.
Lloc: UB.
Abstract: First I will present some historical facts and elementary

proofs concerning Hardys inequality and its limiting case (Pólya-Knopps inequality). After that I will discuss some steps of the fascinating development of the theory of weighted inequalities of Hardy type (see e.g. the book [1] and the references given there). I will also mention some very recent results and ideas (see e.g. [2] and [3]) and some open questions will be raised.

[1] A. Kufner and L.E. Persson, Weighted Inequalities of Hardy Type, World Scientific Publishing Co, 2003.

[2] A. Kufner, L.E. Persson and A. Wedestig, A study of some constants characterizing the weighted Hardy inequality, to appear 2004 in Proceedings of the W. Orlicz Centenary Conference and Function Spaces VII.

[3] A. Gogatishvili, A. Kufner, L.E. Persson and A. Wedestig, An equivalence theorem for integral conditions related to Hardys inequality, to appear 2004 in Real Analysis Exchange.

- **Alicia Cantón** (UAB).
  "Funciones holomorfas y conjuntos de Borel"
  Dia i hora: 17 de maig a les 15.00 h.
  Lloc: CRM.
  Abstract: ¿Cuándo la extensión radial de una función holomorfa en el disco preserva conjuntos de Borel en la frontera? En un trabajo junto con Granados y Pommerenke se resuelve esta cuestión para ciertas clases de funciones holomorfas. Nuestros resultados se basan en la caracterización de Lusin y Purves de las funciones medibles que preservan conjuntos de Borel.

- **Elena Prestini** (Tor Vergata, Roma).
  "Singular integrals with variable coefficients on product spaces".
  Dia i hora: 24 de maig a les 15.00 h.
  Lloc: CRM.
  Abstract: Recent progress in the theory of singular integrals on product spaces will be presented, motivated by open problems of almost everywhere convergence of double Fourier series.

- **Richard Laugesen** (Univ. of Illinois at Urbana-Champaign).
  "Spanning and sampling in Lebesgue and Sobolev spaces" Dia i hora: 24 de maig a les 16.00 h.
  Lloc: CRM.
  Abstract: It is well known that if a function has constant periodization (meaning its integer translates form a partition of unity) then the collection of integer translates and dilates of the function spans L^p.

  We prove that this constant periodization condition is unnecessary. The key is a new kind of average sampling formula that relies

on cancellation of errors at different scales, and which applies to more-or-less arbitrary generating functions and signals.

For spanning Sobolev space, the corresponding result is that the Strang-Fix condition can be reduced by one order from existing results.

[Work is joint with H.-Q. Bui, Univ. of Canterbury].

- **Anton Baranov** (Saint Petersburg University).
"Stability of bases and frames of reproducing kernels in model subspaces".
Dia i hora: dimarts 1 de juny a les 15.00 h.
Lloc: UB.
Abstract: We study the bases and frames of reproducing kernels in the so-called model (shift-coinvariant) subspaces $K_\Theta = H^2 \ominus \Theta H^2$ of the Hardy class H^2 in the upper half-plane. The main problem under consideration is the stability of a basis of reproducing kernels $k_{\lambda_n}(z) = (1 - \Theta(z)\overline{\Theta(\lambda_n)})/(z - \overline{\lambda}_n)$ with respect to small perturbations of the points λ_n. We propose an approach to this problem based on the recently obtained estimates of the derivatives in the spaces K_Θ and produce estimates of admissible perturbations generalizing certain results of W.S. Cohn and E. Fricain.

- **David Drasin** (Purdue University).
"Invariant functions on T-automorphic domains and function theory on a torus".
Dia i hora: 7 de juny a les 15.00 h.
Lloc: CRM.
Abstract: The talk will describe a recent generalization of the Levin-Pfluger class of entire functions of completely regular growth. The significance of this class for the theory of entire and meromorphic functions will be described, and we then discuss the new class, developed by the speaker with V. Azarin and P. Poggi-Corradini, in which the existence of a limit is replaced by the existence of a limit only on a suitable sequence.

- **Alexander Helemskii** (Mocow State University).
"Homology for *algebras in analysis*, and its connections with operator theory and harmonic analysis". Dia i hora: 14 de juny a les 15.00 h.
Lloc: CRM.

- **Pascal Auscher** (Univ. de Paris-Sud).
"New Calderón-Zygmund theory for L^p estimates".
Dia i hora: 14 de juny a les 16.00 h.
Lloc: CRM.

Abstract: In this talk, I will explain some new developments in the L^p theory for "singular non-integral operators" by myself and others. This goes beyond the classical work of pionners, Calderón-Zygmund, Hörmander, Fefferman-Stein, Coifman, Weiss and others. The objective is to obtain L^p bounds in absence of bounds for kernels. They are replaced by decay measured in some $B(L^p, L^q)$ norm. The L^p bounds are obtained for arbitrary ranges of p. I also discuss the extension to weigthed norm inequalities.

In the case of $-div(A\nabla)$ elliptic operators, this technology gives optimal results for H^∞ functional calculi, boundedness of some Littlewood-Paley-Stein type functional, boundedness of the Riesz transforms....

This also applies to some questions related to Riemannian manifolds.

- **Marianna Csornyei** (University College of London).
"Structure of exceptional sets and related problems of geometric measure theory".
Dia i hora: 15 de juny a les 15.00 h.
Lloc: CRM.
Abstract: We will study various approaches to decompositions of planar null sets, respectively small sets, into sets null, respectively small, in given directions. Two main approaches are based on the Erdos-Szekeres theorem and on the greedy algorithm. We show how these decomposition theorems can be used to answer a question of Laczkovich, and we will discuss some partial results in higher dimension. This is a joint work with G. Alberti and D. Preiss.