

PROGRAMME CIRM AVRIL 06-10, 2010

F. HASLINGER, E. H. YOUSSEFI

Tuesday, April 6

10.00 - 11.00: Bernard Helffer: On maximal hypoellipticity and subellipticity for complex systems.

11.15- 12.00: Maklouf Derridj

13.15- 14.00: Rachid Zarouf: Inégalités type Bernstein pour des fonctions rationnelles

Résumé: Le sujet de l'exposé réside dans l'étude d'inégalités type Bernstein pour des fonctions rationnelles de degré n donné, dont les pôles se trouvent à l'extérieur de \mathbb{D} . Ces inégalités trouvent leurs applications notamment : en analyse matricielle d'une part (données par LeVeque, Trefethen et Spijker et moi-même) et quant aux "théorèmes inverses d'approximation rationnelle" d'autre part (données entre autres par Pekarskii et Peller). Le problème s'énonce brièvement de la façon suivante : étant donné une fonction rationnelle de degré n dont tout les pôles se trouvent à l'extérieur de \mathbb{D} , et étant donné un espace de Banach $(X, \|\cdot\|_X)$ de fonctions holomorphes dans \mathbb{D} , comment majorer de la façon la plus précise possible la norme de la dérivée de f dans X , $\|f'\|_X$, en fonction de la norme de f elle-même soit dans l'espace X , soit dans un espace de Banach $(Y, \|\cdot\|_Y)$ de fonctions holomorphes dans \mathbb{D} tel que $Y \subset X$. Des études générales sur ce problème et certaines de ses variantes sont données par Gonchar et Rusak. On commencera par traiter le cas $X = Y = H^2$ (l'espace de Hardy du disque).

15.00- 15.45: Andy Raich: Heat kernel decay via the Fourier transform

Résumé: I will discuss how to characterize exponential decay via the Fourier transform. Using the characterization, I will show that the weighted dbar-operator on C satisfies the appropriate estimates which we call quantitative smoothness estimates and leads to a new proof that the \square_b heat kernel on polynomial models in \mathbb{C}^2 satisfies Gaussian decay. This work is joint with Al Boggess.

16.00- 16.45: Takeo Ohsawa: A tower of Riemann surfaces whose Bergman kernels jump at the proof.

Résumé: It is shown that, for any Fuchsian group Γ acting on the complex upper half space \mathcal{H} such that \mathcal{H}/Γ is a compact hyperelliptic Riemann surface, there exists a sequence of subgroups $\Gamma_n \subset \Gamma$ ($n = 1, 2, \dots$) satisfying $\Gamma_1 = \Gamma$ and $\bigcap_{n=1}^{\infty} \Gamma_n = \{id\}$ such that the associated sequence of the Bergman kernels of \mathcal{H}/Γ_n , pulled back to \mathcal{H} , does not converge to the Bergman kernel of \mathcal{H} .

17.00- 17.30: Fanciszek Szafraniec. An attempt at defining Hankel operators in unbounded domains

Résumé: Bearing complexity of Hankel operators in typical unbounded domains in mind I intend to propose an axiomatic in a sense approach to their definitions. It is spirit of V. Pták and P. Vrbovaá, Operators of Toeplitz and Hankel type, *Acta Math. Sci. (Szeged)* 52(1988), 117-140 though more analytical in the nature.

Wednesday, April 7

10.00-11.00: Siqi Fu: The d-bar-Neumann Laplacian and the Bergman kernel

Résumé: This lecture has two components. We will first discuss aspects of spectral theory of the d-bar-Neumann Laplacian, in particular, the stability. We will also talk about comparison of the Bergman and Szego kernels on pseudoconvex domains. Part of the talk is based on joint work with Boyong Chen.

11.15- 12.00: Eric Amar : A subordination principle. Applications to Carleson measures and interpolating sequences in convex domains of finite type in \mathbb{C}^n .

Afternoon Excursion.

Thursday, April 8

10.00 - 11.00: Aline Bonami: Hankel operators in Hardy-Orlicz spaces.

11.15-12.15 : Alexander Borichev:

15.00 - 15.30: Joe Perez: A transversal Fredholm property for the $\bar{\partial}$ -Neumann problem on G -bundles

Résumé: Let M be a strongly pseudoconvex complex G -manifold with compact quotient M/G . We provide some conditions on forms α sufficient for the regular solvability of the equation $\square u = \alpha$ and other problems related to the $\bar{\partial}$ -Neumann problem on M . These results generalize to manifolds satisfying a subelliptic estimate and to \square_b , making necessary changes.

15.45 - 16.15: Mehmet Celik: Compactness of the Dbar-Neumann Problem and Hankel Operators

Résumé: We will present some relations between Compactness of the Dbar-Neumann problem and Compactness of the Hankel operators. (work in progress, joint with Sonmez Sahutoglu)

16.00-16.30 : Mahmood SHABANKHAH: Some results concerning composition operators in function spaces

Résumé: Let φ be a holomorphic self-map of the unit disc D , and let X be a Banach space of holomorphic functions on D . The composition operator C_φ on X is given by $C_\varphi(f) = f \circ \varphi$, where $f \in X$. In this talk we will discuss some spectral properties (e.g. continuity, compactness, etc) of C_φ by relating them to the function-theoretic properties of the inducing map φ . Special attention will be paid to the case when X is the classical Dirichlet space. The talk is based on a joint work with O. El-Fallah, K. Kellay and H. Youssfi.

16.45-17.15: E.S. Dubtsov: Multipliers of fractional Cauchy transforms.

Résumé: Let B_n denote the unit ball in \mathbb{C}^n , $n \geq 1$. Given an $\alpha > 0$, let $\mathcal{K}_\alpha(n)$ denote the class of functions defined for $z \in B_n$ by integrating the kernel $(1 - \langle z, \zeta \rangle)^{-\alpha}$ against a complex Borel measure on the sphere $\{\zeta \in \mathbb{C}^n : |\zeta| = 1\}$. We study properties of the holomorphic functions g such that $fg \in \mathcal{K}_\alpha(n)$ for all $f \in \mathcal{K}_\alpha(n)$.

17.30 - 18.00: Klaus Gansberger: The canonical solution operator to $\bar{\partial}$ in weighted spaces on \mathbb{C} .

Résumé: We prove an abstract functional analytic criterion for a locally elliptic operator to have compact resolvent. This generalizes a known result for Schrödinger operators and we use it to characterize existence and compactness of a canonical solution operator to $\bar{\partial}$ in weighted L^2 -spaces on \mathbb{C}^1 in terms of the Laplacian of the weight function. By the same method, we obtain necessary and sufficient conditions for the same problem in \mathbb{C}^n , $n \geq 2$.

Friday , April 9

10.00-11.00: Miroslav Engliš: Analytic continuation of weighted Bergman kernels

Résumé: We show that the Bergman kernel $K_\alpha(x, y)$ on a strictly pseudoconvex domain with respect to the weight r^α , where $-r$ is a defining function and $\alpha > -1$, extends meromorphically in α to the entire complex plane, and study the pole-set of this function. Extensions to more general weight functions r , as well as the boundary behaviours of the analytic continuations of the kernels, are also studied.

11.15-11.45: Jean Ruppenthal: Local L2-solvability of the dbar-equation on singular spaces

Résumé: Let X be a singular complex space of pure dimension n . We will present the proof of the crucial fact that the dbar-equation is locally solvable in the L2-sense for (n, q) -forms with values in a positive line bundle which is essentially due to Pardon-Stern. The essential tool is a very useful but not so well-known apriori estimate due to Donnelly-Fefferman and Ohsawa which implies solvability of the $\bar{\partial}$ -equation on complete Kahler manifolds outside the middle degree.

14.00-14.30: Jocelyn Gonessa: A Sharp Norm Estimate for Weighted Bergman Projections on the Minimal Ball in \mathbb{C}^n

Résumé: We show that, for $1 < p < \infty$, the norm of the weighted Bergman projection $\mathbb{P}_{s, \mathbb{B}_*}$ on $L^p(\mathbb{B}_*, |z \bullet z|^{\frac{p-2}{2}} dv_s)$ is comparable to $\csc(\pi/p)$, where \mathbb{B}_* is the minimal unit ball in \mathbb{C}^n .

14.45- 15.15: A.Vasin, Boundary interpolation in weak Lipschitz classes

Résumé: Let E be a subset of the unit circle T , and let $\omega(t)$ be a modulus of continuity. Let $\Lambda_\omega(E)$ be the corresponding Lipschitz space and let A_ω be the subclass of $\Lambda_\omega(T)$ of all functions which admit an analytic extension to the unit disc D . We call the set E interpolating for ω if the restriction map $A_\omega \rightarrow A_\omega|_E = \Lambda_\omega(E)$ is surjective. We discuss conditions necessary and sufficient for interpolation for weak moduli of continuity. These conditions look like the known porosity condition important for interpolation in Hölder classes.

Also we give examples of non-porous sets where one can interpolate Lipschitz functions with the fixed modulus of continuity (e.g. the sequence $1/n$ is interpolating for $\omega(t) = 1/(\log 1/t)^\alpha$).

15.30- 16.00: Stéphane Charpentier: Spectre et dynamique des opérateurs de composition hyperboliques sur la boule

Résumé: Après avoir donné une classification à automorphismes près des homographies de type hyperboliques de la boule de \mathbb{C}^N , je montrerai en quoi celle-ci se révèle efficace pour étudier les propriétés géométriques de telles applications, ainsi que le spectre et la dynamique des opérateurs de composition associés, sur les espaces de Hardy de la boule. Je parlerai rapidement d'une extension possible des résultats obtenus à des opérateurs de composition qui ne sont plus associés à des homographies.