
Recent Developments in Complex Analysis and Geometry
Développements récents en analyse complexe et géométrie
(Org: **Alexander Brudnyi** (University of Calgary), **Rasul Shafikov** (Western University) and/et **Mahishanka Withanachchi** (University of Calgary))

HARSHITH ALAGANDALA, Western University

Local Polynomial Convexity at Hyperbolic CR-singularity in $M^n \subset \mathbb{C}^n$

Let M be a smooth manifold of dimension n embedded in $\mathbb{C}^n$. If $T_p M \subset T_p \mathbb{C}^n$ is a totally real subspace for $p \in M$, then M is locally polynomially convex at p . For a generic embedding M , we are interested in assessing polynomial convexity of M at a CR-singularity, i.e., at a point $p \in M$ where $T_p M$ is not totally real. An order one CR-singularity in M can be broadly classified as elliptic and hyperbolic. It is known that elliptic points give obstruction to polynomial convexity. In the case $n = 2$, $M^2 \subset \mathbb{C}^2$ is locally polynomially convex at a hyperbolic complex point. We investigate local polynomial convexity of $M^n \subset \mathbb{C}^n$ at hyperbolic points in higher dimension.

ROBERTO ALBESIANO, Waterloo

TATYANA BARRON, UWO

ILIA BINDER, Toronto

BLAKE BOUDREAUX, Arkansas

ISABELLE CALENDAR, Université Gustave Eiffel

DEBRAJ CHAKRABARTI, Central Michigan University

Restricted type estimates and the Bergman Projection

We obtain (weighted) restricted-type estimates for the Bergman projection operator on monomial polyhedra, a class of domains generalizing the Hartogs triangle. A restricted-type estimate is an estimate in the L^p -norm on an operator, which however holds only on characteristic functions. From these restricted-type estimates, we recapture L^p -boundedness results of the Bergman projection on these domains. On some monomial polyhedra, we show that the Bergman projection could fail to be of weak type (q_*, q_*) , where q_* denotes the right end-point of the interval of L^p -boundedness of the Bergman projection.

DAN COMAN, Syracuse University

Tian's theorem for Grassmannian embeddings and degeneracy sets of random sections

Let (X, ω) be a compact Kähler manifold, (L, h^L) be a positive line bundle, and (E, h^E) be a Hermitian holomorphic vector bundle of rank r on X . We show that the pullback by the Kodaira embedding associated to $L^p \otimes E$ of the k -th Chern class of the dual of the universal bundle over the Grassmannian converges as $p \rightarrow \infty$ to the k -th power of the Chern form $c_1(L, h^L)$, for $0 \leq k \leq r$. As a consequence we show that the limit distribution of zeros of random sequences of holomorphic sections of high powers $L^p \otimes E$ is $c_1(L, h^L)^r$. Furthermore, we compute the expectation of the currents of integration along degeneracy sets of random holomorphic sections. This is joint work with Turgay Bayraktar, Bingxiao Liu and George Marinescu.

JESSE HULSE, Manitoba

LUKA MERNIK, Florida Polytechnic University

PIERRE-OLIVIER, UQTR

ANDY RAICH, University of Arkansas

Tower multitype and compactness of the $\bar{\partial}$ -Neumann operator in complex manifolds

In this talk, I will discuss a new approach to establishing compactness of the $\bar{\partial}$ -Neumann operator on (p, q) -forms on not necessarily pseudoconvex domains in complex manifolds. I will introduce a construction called the tower multitype and use it to build a stratification of the boundary. The stratification implies Property (P_q) which in turn implies compactness of the $\bar{\partial}$ -Neumann operator. I will also provide examples.

The result is joint work with Professor Dmitri Zaitsev of Trinity College Dublin.

DROR VAROLIN, Stony Brook

LIS VIVAS, Ohio State

YUNUS ZEYTUNCU, University of Michigan-Dearborn

Spectral Theory of the Kohn Laplacian on Quotient Manifolds

In this talk, we study the spectrum of the Kohn Laplacian on quotient manifolds. In particular, we relate the asymptotic properties of the Kohn Laplacian's eigenvalues on sphere quotients to the group action.