NORDAN 2013

PROGRAM

May 24

16:00-16:45 Taflin: Equidistribution toward attracting sets
17:00-17:45 Sznajdman: The Briancon-Skoda number of planar curves

May 25

09:00-09:45 Øvrelid: L^2-theory of the $\overline{\partial}$-equation on singular spaces.
10:00-10:45 Hed: Approximation of plurisubharmonic functions
11:00-11:45 Abate: Toeplitz operators and Carleson measures in strongly pseudoconvex domains.

12:00-15:30 Lunch and break.

15:30-16:15 Soukhov: Polynomially convex hulls of singular Lagrangian manifolds
16:15-16:45 Coffee and snack break
16:45-17:30 Witt Nystrøm: Hele Shaw Flow and Moduli of Holomorphic Discs
17:45-18:30 Fornæss: Exposing points.

19:00- Dinner

May 26

09:00-09:45 Leiterer: On the Gauss algorithm for continuous and holomorphic matrices.

Date: May 22, 2013.

Titles and Abstracts

Speaker: Abate, Marco

Title: Toeplitz operators and Carleson measures in strongly pseudoconvex domains.

Abstract: We study mapping properties of Toeplitz operators associated to a finite positive Borel measure on a bounded strongly pseudoconvex domain. In particular, we give sharp conditions on the measure ensuring that the associated Toeplitz operator maps the Bergman space A^p into A^r with $r > p$, generalizing and making more precise results by Cuckovic and McNeal. To do so, we give a geometric characterization of Carleson measures and of vanishing Carleson measures of weighted Bergman spaces in terms of the intrinsic Kobayashi geometry of the domain, generalizing to this setting results obtained by Kaptanoglu for the unit ball. (Joint work with J. Raissy and A. Saracco).

Speaker: Fornæss, John Erik

Title : Exposing points.

Abstract: This is joint work with Klas Diederich and Erlend Wold. We discuss the problem of mapping a domain U to a convex domain C such that a given boundary point of U is mapped to a boundary point of C. The map should be $1-1$ and holomorphic.

Speaker: Hed, Lisa

Title: Approximation of plurisubharmonic functions

Abstract: In this talk I will discuss approximation of plurisubharmonic functions. More precisely, if Ω is a bounded domain in $\mathbb{C}^n$ we will discuss when a function in the class $\mathcal{PSH}(\Omega) \cap C(\bar{\Omega})$ can be approximated by functions that are plurisubharmonic and continuous on neighborhoods of $\bar{\Omega}$. Poletsky has shown that there is a strong connection between this kind of approximation and the theory of plurisubharmonic functions on compact sets. I will give a very brief introduction to plurisubharmonic functions on compact sets and then discuss how we can use this theory to learn more about approximation. I will also introduce a stronger notion of hyperconvexity, on which the problem of approximation is reduced to solving a Dirichlet type problem for plurisubharmonic functions on $\bar{\Omega}$. The results are joint work with Håkan Persson.

Speaker: Leiterer, Jürgen

Title: On the Gauss algorithm for continuous and holomorphic matrices.

Abstract: Let $SL(2,\mathbb{C})$ be the group of 2×2-matrices with determinant 1, and let $SL_+(2,\mathbb{C})$ and $SL_-(2,\mathbb{C})$ be its subgroup of matrices of the form

$$\begin{pmatrix} 1 & a \\ 0 & 1 \end{pmatrix}$$

and

$$\begin{pmatrix} 1 & 0 \\ a & 1 \end{pmatrix}$$

respectively. Using the Gauss algorithm, each matrix from $SL(2,\mathbb{C})$ can be written as the product of 4 matrices from these groups.

Now we consider the groups $\mathcal{C}^{SL(2,\mathbb{C})}(\mathbb{R}^n)$, $\mathcal{C}^{SL_+(2,\mathbb{C})}(\mathbb{R}^n)$, $\mathcal{C}^{SL_-(2,\mathbb{C})}(\mathbb{R}^n)$ of continuous functions on $\mathbb{R}^n$ with values in the respective groups, as well ass the accordingly defined groups of holomorphic functions $\mathcal{O}^{SL(2,\mathbb{C})}(\mathbb{C}^n)$, $\mathcal{O}^{SL_+(2,\mathbb{C})}(\mathbb{C}^n)$, $\mathcal{O}^{SL_-(2,\mathbb{C})}(\mathbb{C}^n)$.

In 1988 L. Vasserstein proved that each matrix from $\mathcal{C}^{SL(2,\mathbb{C})}(\mathbb{R}^n)$ is a finite product of matrices from $\mathcal{C}^{SL_+(2,\mathbb{C})}(\mathbb{R}^n) \cup \mathcal{C}^{SL_-(2,\mathbb{C})}(\mathbb{R}^n)$. Then in his famous paper on the Oka-Grauert principle from 1989 M. Gromov posed the problem whether each matrix from $\mathcal{O}^{SL(2,\mathbb{C})}(\mathbb{C}^n)$ is the product of a finite number of matrices from $\mathcal{O}^{SL_+(2,\mathbb{C})}(\mathbb{C}^n) \cup \mathcal{O}^{SL_-(2,\mathbb{C})}(\mathbb{C}^n)$. A few years ago this problem was solved affirmatively by F. Kutzschebauch and B. Ivarsson using a deep version of the Oka-Grauert-Gromov principle obtained shortly before by F. Forstnerič.

Surprisingly, in Vasserstein's theorem, no estimate is known for the number of matrices needed. For the holomorphic result of Kutzschebauch and Ivarsson first results on this number were recently obtained by the same authors: 4 if $n = 1$ and 5 if $n = 2$. But in the proofs, again the deep result of Forstneric is used. In the talk, we address the question whether such results can be obtained more directly. As an illustration, we begin with a simple elementary proof for the holo- morphic result of Kutzschebauch and Ivarsson in the case $n = 1$. It seems that also the topological result of Vaserstein can be proved more directly and that this proof gives the estimate $n + 3$ for the number of needed matrices. A complete proof for this conjecture exists at the moment only for $n \leq 3$.

Speaker: Soukhov, Alexandre

Title: Polynomially convex hulls of singular Lagrangian manifolds

Abstract: According to A.Givental, every compact real surface admits a realization as a Lagrangian inclusion, i.e., a Lagrangian immersion to C^2 with a finite number of isolated singularities points of two types: an open Whitney umbrella and a double self-intersection. We study local and global hulls of generic Lagrangian inclusions. This is a joint work with R.Shafikov.

Speaker: Sznajdman, Jacob

Title : The Briancon-Skoda number of planar curves

Abstract: The Briancon-Skoda number of a curve is the smallest integer k such that $|f| \leq |g|^k$ implies that f is divisible by g, where f and g are

analytic functions on the curve. We show how to compute this number and relate it to the Milnor number of the curve.

Speaker: Taflin, Johan

Title: Equidistribution toward attracting sets

Abstract: If f is a holomorphic endomorphism of the projective space, it is a classical result that there exists a unique measure of maximal entropy. Its support, J_k, is in some sense the most chaotic locus for the dynamics. On the other hand, little is known about the dynamics outside J_k. Here, we will consider a class of attracting sets disjoint from J_k for which we are able to obtain interesting equidistribution and ergodic properties.

Speaker: Witt Nystrøm, David

Title: Hele Shaw Flow and Moduli of Holomorphic Discs

Abstract: The Hele-Shaw Flow is a model for describing the propagation of fluid in a cell consisting of two parallel plates separated by a small gap. This model has been intensely studied for over a century, and is a paradigm for understanding more complicated systems such as the flow of water in porous media, melting of ice and models of tumor growth.

In this talk I will describe a new approach to the study of the Hele-Shaw flow developed by Julius Ross and myself. It connects the flow with a moduli space of holomorphic discs attached to a totally real submanifold of $\mathbb{P}^1 \times \mathbb{P}^1$. Using this we prove new short-time existence results that also extend to the case of varying permeability.

Speaker: Øvrelid, Nils

Title: L^2-theory of the $\overline{\partial}$-equation on singular spaces.

Abstract: The talk will survey some results about the $\overline{\partial}$-bar equation on the regular part Reg_X of an analytic space X. We shall concentrate on the case when the singular locus $Sing_X$ is finite, and especially on the relations between the L^2-cohomologies of Reg_X and a desingularization $\tilde{X}$ of X. Some recent joint work with Sophia Vassiliadou will be presented.

PARTICIPANTS

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