

NORDAN 2012

In Honor of Urban Cegrell
In Memory of Mikael Passare

Schedule, Friday

- 14:00 – 15:00 Coffee
- 15:00 – 15:45 Christer Kiselman
Questions inspired by Mikael Passare's mathematics
- 16:15 – 17:00 Sławomir Kołodziej
Complex Hessian equations
- 17:00 – 17:30 Coffee
- 17:30 – 18:15 Benedikt Steinar Magnússon
Quasiplurisubharmonic functions as envelopes of disc functionals
- 19:30 Dinner

Schedule, Saturday

- 09:15 – 10:00 Håkan Samuelsson Kalm
Integral formulas and the $\bar{\partial}$ -equation on singular spaces
- 10:00 – 10:30 Coffee
- 10:30 – 11:15 Elizabeth Wulcan
Realizing Serre duality as a product of currents
- 11:45 – 12:30 Jean-Pierre Demailly
A sharp lower bound for the log canonical threshold
- 12:30 – 14:00 Lunch
- 15:00 – 17:30 Excursion
The Mines of LKAB
- 19:30 Banquet on the Occasion of Urban Cegrell's Retirement

Schedule, Sunday

- 09:15 – 10:00 Barbara Drinovec Drnovšek
Envelopes of disc functionals via holomorphic sprays
- 10:00 – 10:30 Coffee
- 10:30 – 11:15 Aron Lagerberg
Super currents and convexity
- 11:45 – 12:30 Joël Merker
On a conjecture of Shoshichi Kobayashi
- 12:30 – 14:00 Lunch
- 14:00 – 14:45 Erik Löw
Symplectic completion of symplectic m -jets
- 14:45 – 15:15 Coffee

Abstracts

Jean-Pierre Demailly

A sharp lower bound for the log canonical threshold

We prove a sharp lower bound for the log canonical threshold of a plurisubharmonic function φ with an isolated singularity at 0 in an open subset of \mathbb{C}^n . This threshold is defined as the supremum of constants $c > 0$ such that $e^{-2c\varphi}$ is integrable on a neighborhood of 0. We relate $c(\varphi)$ with the intermediate multiplicity numbers $e_j(\varphi)$, defined as the Lelong numbers of $(dd^c \varphi)^j$ at 0 (so that in particular $e_0(\varphi) = 1$). Our main result is that $c(\varphi) \geq \sum e_j(\varphi)/e_{j+1}(\varphi)$, $0 \leq j \leq n-1$. This inequality is shown to be sharp; it simultaneously improves the classical result $c(\varphi) \geq 1/e_1(\varphi)$ due to Skoda, as well as the lower estimate $c(\varphi) \geq n/e_n(\varphi)^{1/n}$ which has received crucial applications to birational geometry in recent years. The proof consists in a reduction to the toric case, i.e. singularities arising from monomial ideals.

Barbara Drinovec Drnovšek

Envelopes of disc functionals via holomorphic sprays

We will discuss recent results on plurisubharmonicity of the envelopes of certain disc functionals on complex spaces, thereby generalizing the corresponding results for complex manifolds. We will present a proof using the method of gluing holomorphic sprays. This is joint work with Franc Forstnerič.

Christer Kiselman

Questions inspired by Mikael Passare's mathematics

Mikael Passare (1959–2011) was a brilliant mathematician. His PhD thesis from 1984 was a breakthrough in the theory of residues in several complex variables. Later he switched to the theory of amoebas and co-amoebas. In discussions with him during the last thirty years many

questions have emerged—not all of them were resolved at the time of his premature death.

The purpose of my talk is to save from oblivion some of the mathematical ideas of Mikael Passare.

Mikael's significance goes much beyond his own research. Many persons have testified to his positive view of life, his humor, and to his genuine interest in people he met. He was an unusually stimulating partner in discussions; listening, inspiring, and supportive, in professional situations as well as private ones.

Sławomir Kołodziej

Complex Hessian equations

I shall discuss L^∞ and C^1 a priori estimates as well as existence and stability theorems for the solutions of the complex Hessian equations in domains of \mathbb{C}^n and on compact Kähler manifolds. The results come from a joint work with S. Dinew.

Aron Lagerberg

Super currents and convexity

In this talk, I will discuss the notion of super currents. They are objects living on \mathbb{R}^n which share characteristics of currents on complex manifolds. I will consider positive (and closed) super currents, and show that positivity properties of such super currents relate to convexity, in much the same way that closed, positive currents on complex manifolds relate to plurisubharmonicity. Furthermore, I will touch upon the fact that super currents correspond to so called tropical varieties, in much the same way that currents on complex manifolds correspond to analytic subvarieties. I will also consider an intersection product of closed positive super currents and relate this to toric intersection theory.

Erik Löw

Symplectic completion of symplectic m -jets

(Joint work with Han Peters and Erlend Wold) We prove that a symplectic m -jet may be completed to a polynomial symplectomorphism. We also try to minimize the degree of the completion. The proof uses techniques from Andersen–Lempert theory of holomorphic automorphisms. This is a problem with applications in particle accelerator physics.

Benedikt Steinar Magnússon

Quasiplurisubharmonic functions as envelopes of disc functionals

Many of the extremal plurisubharmonic functions studied in pluripotential theory are given as the supremum over a family of plurisubharmonic functions. Disc formulas for some of these extremal functions have been developed in the last two decades. These formulas show the equivalence of the supremum, and the infimum over the values of a suitable disc functional.

The fundamental example is Poletsky’s formula for the largest plurisubharmonic functions dominated by a given upper semicontinuous function. We will see how to formulate and prove the Poletsky theorem in the case of quasiplurisubharmonic (ω -psh) functions, where ω is the difference of two positive, closed $(1, 1)$ -currents.

This result gives a new viewpoint on the classical theory when $\omega = 0$, and even some new results there.

Håkan Samuelsson Kalm

Integral formulas and the $\bar{\partial}$ -equation on singular spaces

I will discuss how weighted integral formulas in \mathbb{C}^N together with residue calculus can be used to obtain integral formulas for $(0, q)$ - and (n, q) -forms on a reduced pure n -dimensional complex space X . These formulas can then be used to define fine sheaves of currents $\mathcal{A}_X^{0,q}$ and (if X is e.g. Gorenstein) $\mathcal{A}_X^{n,q}$ on X such that the corresponding Dolbeault complexes are resolutions of the structure sheaf of strongly holomorphic functions and

Grothendieck's dualizing sheaf respectively. The talk is based on joint work with Mats Andersson and joint work in progress with Jean Ruppenthal and Elizabeth Wulcan. One aim of the talk is to provide some background for Elizabeth's talk.

Elizabeth Wulcan

Realizing Serre duality as a product of currents

I will discuss a joint work in progress with Håkan Samuelsson Kalm and Jean Ruppenthal. Given an analytic space X , we define (by modifying a recent construction by Andersson–Samuelsson Kalm) fine sheaves $\mathcal{A}_X^{0,q}$ of $(0,q)$ -currents that are smooth on the regular part of X and that give a resolution of the structure sheaf \mathcal{O}_X . If X is Gorenstein we also introduce sheaves $\mathcal{A}_X^{n,q}$ of (n,q) -currents that give a resolution of the dualizing sheaf ω_X . The sheaf $\mathcal{A}_X^{*,*}$ has a multiplicative structure; there is a well-defined wedge product $\mathcal{A}_X^{p,q} \times \mathcal{A}_X^{p',q'} \rightarrow \mathcal{A}_X^{p+p',q+q'}$, which gives a pairing $H^{n-q}(X, \mathcal{O}_X) \times H^q(X, \omega_X) \rightarrow \mathbb{C}$ by $([\alpha], [\beta]) \mapsto \int \alpha \wedge \beta$. This pairing is non-degenerate and thus realizes Serre duality on X .

Participants

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Mathematical Reviews

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Map of Kiruna



