

SCHEDULE KAUS 2011

FRIDAY:

- 15.15-16.00. **Håkan Persson:** Jensen Measures and Plurisubharmonic Functions on Compact Sets.
16.15-17.00. **Tri Quach:** Conjugate Function Method for Conformal Mappings.
17.15-18.00. **David Witt Nyström:** Analytic test configurations: ~~numerical~~

19.00. DINNER

SATURDAY:

- 10.00-10.45. **Jens Forsgård:** Euler-Mellin integrals.
11.00-11.45. **Janne Gröhn:** New Findings on Bank-Sauer Approach in Oscillation Theory.
12.00-12.45. **Jacob Sznajdman:** A residue calculus approach to the uniform Artin-Rees lemma.

13.00-15.00. LUNCH

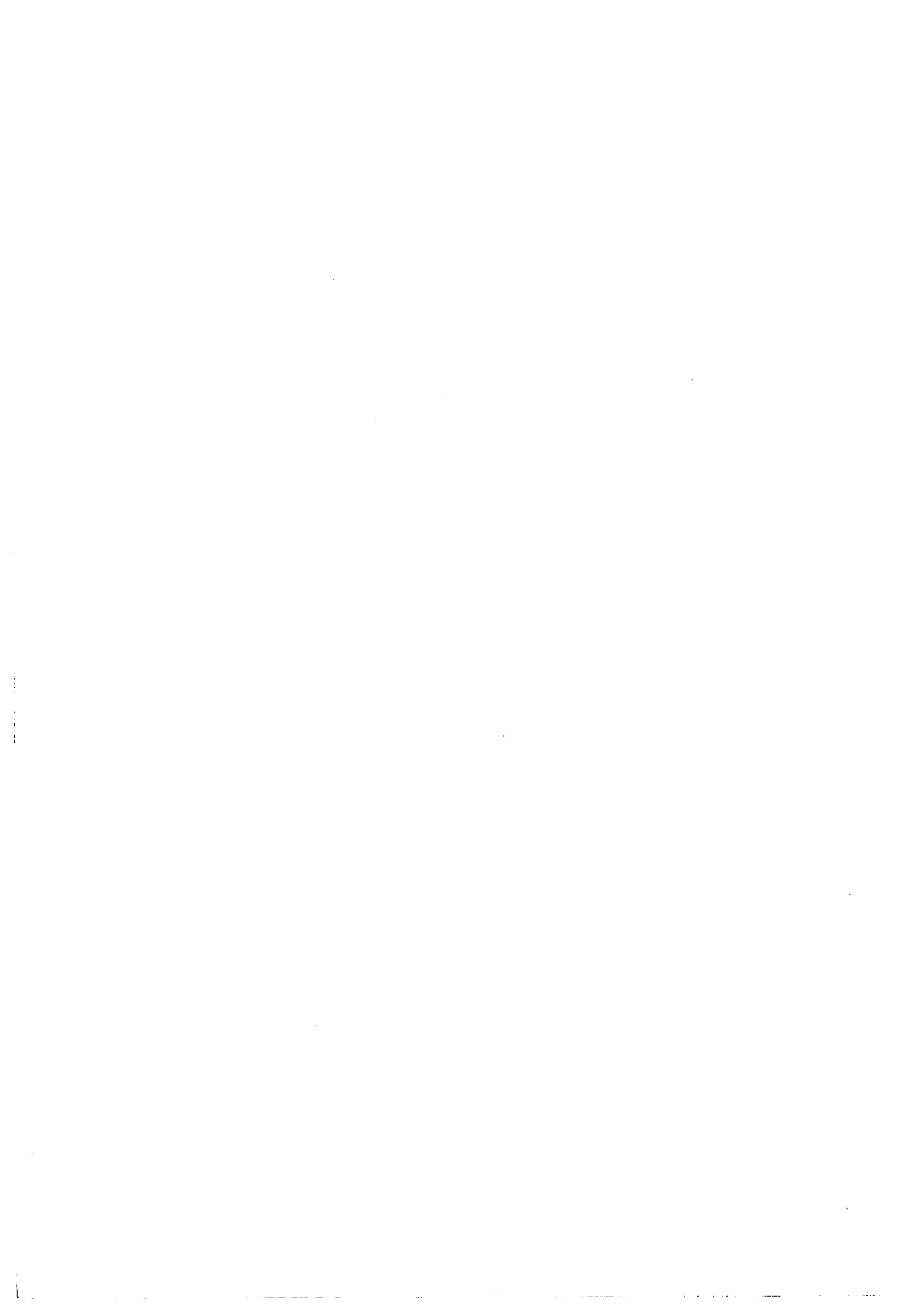
- 14.45-15.30. **Johannes Lundqvist:** A local duality theorem for Cohen-Macaulay ideals.
15.40-16.25. **Benedikt Magnusson:** Applications of ω -psh disc formulas.
16.50-17.20. **Richard Lärkäng:** Quotients of complex manifolds.
17.30-18.00. **Aron Lagerberg:** Mixed Volumes and tropical intersection theory.

19.30-?? DINNER

SUNDAY:

- 09.00-09.45. **Magnus Goffeng:** Mapping degrees and Henkin-Ramirez kernels.
10.00-10.45. **Gunnar Magnusson:** The absence of complex spheres.
11.00-11.45. **Lisa Hed:** Plurisubharmonic extension in analytic polyhedra.

12.00-14.00. LUNCH



TITLES AND ABSTRACTS FOR KAUS 2011

Janne Gröhn: New Findings on Bank-Sauer Approach in Oscillation Theory.

Abstract: In 1988 S. Bank showed that if $\{z_n\}$ is a sparse sequence in the complex plane, with convergence exponent zero, then there exists a transcendental entire $A(z)$ of order zero such that $f'' + A(z)f = 0$ possesses a solution having $\{z_n\}$ as its zeros. Further, Bank constructed an example of a zero sequence $\{z_n\}$ violating the sparseness condition, in which case the corresponding coefficient $A(z)$ is of infinite order. In 1997 A. Sauer introduced a condition for the density of the points in the zero sequence $\{z_n\}$ of finite convergence exponent such that the corresponding coefficient $A(z)$ is of finite order.

In 2010 J. Heittokangas proposed a unit disc counterpart of Bank's first result. In this case, $\{z_n\}$ is a sparse Blaschke sequence in the unit disc and $A(z)$ belongs to the Korenblum space. In this talk, we will introduce and discuss unit disc analogues of the two remaining results due to Bank and Sauer. This is a joint work with J. Heittokangas.

Lisa Hed: Plurisubharmonic extension in analytic polyhedra.

Abstract: Let \mathcal{P} be a non-degenerate analytic polyhedron in \mathbb{C}^n . We will characterize those continuous functions $f : \partial\mathcal{P} \rightarrow \mathbb{R}$ that can be extended to a continuous function on $\bar{\mathcal{P}}$ that is plurisubharmonic on \mathcal{P} . To do this we use the notion of plurisubharmonic functions on compact sets.

Johannes Lundqvist: A local duality theorem for Cohen-Macaulay ideals.

Abstract: In this talk we show how to prove a local duality theorem for Cohen-Macaulay ideals of holomorphic functions. The theorem is due to Anderson and Wulcan but is proved in a different, more algebraic, manner. It can also be seen as a generalization of a previous result of Passare and Dickenstein - Sessa.

Magnus Goffeng: Mapping degrees and Henkin-Ramirez kernels.

Abstract: We use the Henkin-Ramirez kernel on a strictly pseudoconvex domain Ω to express the mapping degree of a Hölder continuous

function $f : \partial\Omega \rightarrow Y$, for some compact manifold Y , in terms of cyclic cohomology. The ordinary approach to mapping degree in terms of de Rham homology requires the function to be smooth, but replacing de Rham homology by the cyclic cohomology of a suitable algebra of continuous functions we can loosen the regularity conditions to Hölder continuity.

Jacob Sznaidman: A residue calculus approach to the uniform Artin-Rees lemma.

Abstract: The Artin-Rees lemma states that given a Noetherian ring A , an ideal I of A , a finitely generated module M over A and a submodule N of M , there exists an integer k such that $I^{k+n}M \cap N \subset I^n N$. There has various uniform versions of this theorem, meaning that k does not depend on I . Most work is however of algebraic nature. The topic of this talk will be how residue currents can be used to obtain a uniform bound in the analytic setting.

Jens Forsgård: Euler-Mellin integrals.

Abstract: One natural generalization of the Mellin transform of a rational function $1/f$ is the Euler-Mellin integral given by

$$M_f(s, t) = \int_{\text{Arg}^{-1}(\theta)} \frac{z^s}{f(z)^t} \frac{dz}{z},$$

here $z^s = z_1^{s_1} \dots z_n^{s_n}$ and $f(z)^t = f_1(z)^{t_1} \dots f_m(z)^{t_m}$, and θ should lie in the complement of the closed coamoeba of f . By multiplying the meromorphic extension of $M_f(s, t)$ by the reciprocals of certain Gamma functions, we get an entire function in (s, t) . Moreover, it is A -hypergeometric in the coefficients of f . In this talk I will try to explain some of the connections between Euler-Mellin integrals, coamoebas and A -hypergeometric functions. This is ongoing work together with C. Berkesch and M. Passare generalizing the paper "Mellin transforms of multivariate rational functions" (arXiv: 1010.5060) by L. Nilsson and M. Passare.

Benedikt Magnusson: Applications of ω -psh disc formulas.

Abstract: I will present a new result about disc formulas for ω -psh functions, generalizing previous results. This also enables us to get some new results about the classical case $\omega = 0$. More specifically it combines two well-know disc formulas into one.

Håkan Persson: Jensen Measures and Plurisubharmonic Functions on Compact Sets .

Abstract: We will present two ideas for how one may define a notion of plurisubharmonicity for functions defined on compact subsets of \mathbb{C}^n . The first idea relies on Choquet theory, whereas the other idea utilizes Poletsky's theory of analytic disk functionals. Finally, we will show why the notions are equivalent.

Gunnar Magnusson: The absence of complex spheres.

Abstract: We have known for some time that the only spheres that can possibly admit a complex structure are S^2 and S^6 . The case of S^2 - or the Riemann sphere - is well known, while the case of S^6 is still open. We will review why these are the only spheres that can potentially admit complex structures, and explain why the existence of such a structure on S^6 would mean the world is stranger than we think.

Tri Quach: Conjugate Function Method for Conformal Mappings.

Abstract: We present a method for numerical computation of a conformal mapping from simply or doubly connected domain onto canonical domains, a rectangle $R_h = \{z \in \mathbb{C} : 0 < \operatorname{Re}(z) < 1, 0 < \operatorname{Im}(z) < h\}$ or an annulus $A_r = \{z \in \mathbb{C} : r < |z| < 1\}$. The method is based on solving numerically the Laplace equation with Dirichlet-Neumann mixed boundary conditions.

Richard Lärkäng: Quotients of analytic spaces.

Abstract: If G is a complex Lie group, which acts on a complex manifold X , then under suitable conditions, the quotient X/G is a complex manifold. I will talk about a classical theorem of Cartan from the 50s about more general conditions when the quotient is not necessarily a complex manifold but an analytic space (i.e. locally an analytic variety).

Aron Lagerberg: Mixed volumes and tropical intersection theory.

Abstract: I will discuss a setting in convex analysis which mimics closely that of positive currents from complex analysis. In this setting, using (and defining) the Monge-Ampère operator, it is easy to realise the intersection theory of tropical geometry as a generalization of mixed volumes.

David Witt Nyström: Analytic test configurations.

Abstract: TBA.