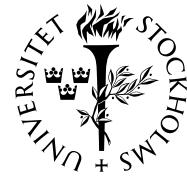




BRÅKET



Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 15

FREDAGEN DEN 21 APRIL 2006

BRÅKET

Veckobladet från
Institutionen för matematik
vid Kungl Tekniska Högskolan
och Matematiska institutionen
vid Stockholms universitet

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Postadress:
Red. för Bråket
Institutionen för matematik
KTH
100 44 Stockholm

Sista manustid för nästa nummer:
Torsdagen den 27 april kl. 13.00.

Disputation i didaktik

Lil Engström disputerar på avhandlingen *Möjligheter till lärande i matematik: Lärares problemformulerings och dynamisk programvara* fredagen den 21 april kl. 9.00 i Dahlströmsalen, Lärarhögskolan i Stockholm, hus D, Rålambsvägen 26 D. Se Bråket nr 13 sidan 5.

Money, jobs: Se sidorna 8–9.

SEMINARIER

Fr 04–21 kl. 9.15–10.00. Seminarium i matematisk statistik. (*Observera dagen och tiden!*) Anna Sörelius presenterar sitt examensarbete: *Generalized K-medians*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 14 sidan 10.

Fr 04–21 kl. 13.15–14.00. Seminarium i numerisk analys. Monica Hanslien, SIMULA Research Laboratory, Oslo: *Analysis of numerical methods for mathematical models of cardiac electrical activity*. Rum 4523, KTH CSC, Lindstedtsvägen 5, plan 5. Se Bråket nr 14 sidan 8.

Fr 04–21 kl. 13.15–14.15. Graduate Student Seminar. Douglas Lundholm, Matematik, KTH: *Conformal geometry using geometric algebra*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 13 sidan 8.

Fr 04–21 kl. 13.30. Hodge Theory Seminar. Wojciech Chacholski, Matematik, KTH: *Lefschetz decomposition*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

Fr 04–21 kl. 15.30. Göran Gustafsson Lecture in Mathematics. Professor Wendelin Werner, Université Paris-Sud och École Normale Supérieure, Paris: *Random planar objects and related questions: Lecture I*. Sal E1, KTH, Lindstedtsvägen 3, b.v. Kaffe och te serveras från kl. 15.00. Se Bråket nr 14 sidan 7.

Fortsättning på nästa sida.

Göran Gustafsson Lectures in Mathematics

Dessa äger rum vid KTH den 21, 24 och 25 april. Se Bråket nr 14 sidan 7.

Seminarier (fortsättning)

Må 04–24 kl. 13.15–14.15. Seminar in Analysis and its Applications. Harold Shapiro: *Malmheden's theorem: A novel solution to the Dirichlet problem.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

Må 04–24 kl. 13.15–14.15. DNA-seminariet Uppsala-KTH (Dynamical systems, Number theory, Analysis). Peter Storm, Stanford University: *Topological lower volume bounds for hyperbolic 3-manifolds.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 14 sidan 10.

Må 04–24 kl. 13.15–14.15 (cirka). Informellt doktorandseminarium i teoretisk datalogi. Kimmo Eriksson, Institutionen för matematik och fysik, Mälardalens högskola: *Ultimatumspel i laboratorium.* Rum 1537, KTH CSC, Lindstedtsvägen 3, plan 5. Se Bråket nr 14 sidan 9.

Må 04–24 kl. 15.15. Göran Gustafsson Lecture in Mathematics. Professor Wendelin Werner, Université Paris-Sud och École Normale Supérieure, Paris: *Random planar objects and related questions: Lecture II.* Sal D2, KTH, Lindstedtsvägen 5, b.v. Se Bråket nr 14 sidan 7.

Må 04–24 kl. 16.15–17.00. Seminarium i finansiell matematik. (*Observera tiden!*) Christian Thulin presenterar sitt examensarbete: *Pricing and Hedging of Basket Options.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.

Må 04–24 kl. 18.30. Populärvetenskaplig föreläsning i fysik. Professor Göran Olofsson, Astronomi, SU: *Odins öga mot rymden: Om satelliten Odins upptäckter efter fem år i bana.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se Bråket nr 14 sidan 8.

Ti 04–25 kl. 10.15. Plurikomplexa seminariet. (*Observera lokalen!*) Rolf Källström, Gävle: *Lifting derivations.* Sal D32, KTH, Lindstedtsvägen 5, entréplanet. Se sidan 5.

Ti 04–25 kl. 13.15. Plurikomplexa seminariet. (*Observera lokalen!*) Vincent Guedj, Toulouse: *Degenerate complex Monge-Ampère equations.* Sal D32, KTH, Lindstedtsvägen 5, entréplanet. Se sidan 6.

Ti 04–25 kl. 14.00–15.00. Mittag-Leffler Seminar. (*Observera dagen!*) Steffen Sagave, Universität Bonn: *Toda brackets of ring spectra and realizability.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 6.

Ti 04–25 kl. 15.15. Göran Gustafsson Lecture in Mathematics. Professor Wendelin Werner, Université Paris-Sud och École Normale Supérieure, Paris: *Random planar objects and related questions: Lecture III.* Sal D2, KTH, Lindstedtsvägen 5, b.v. Se Bråket nr 14 sidan 7.

Ti 04–25 kl. 15.30–16.30. Mittag-Leffler Seminar. (*Observera dagen!*) Gunnar Carlsson, Stanford University: *Persistent homology and the topology of point clouds.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 7.

On 04–26 kl. 10.30–12.15. Logikseminariet Stockholm-Uppsala. Ieke Moerdijk, Utrecht och Institut Mittag-Leffler: *Dendroidal sets.* Sal 3513, hus 3, MIC, Polacksbacken, Uppsala universitet. Se sidan 4.

Fortsättning på nästa sida.

Seminarier (fortsättning)

- On 04–26 kl. 13.15–14.15. Seminarium i analys och dynamiska system.** Tero Kilpeläinen, Jyväskylä: *Removable sets for p -Laplacian type equations*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 14 sidan 7.
- On 04–26 kl. 13.15–14.15. Algebra- och geometriseminarium.** Jesper Funch Thomsen, Aarhus: *Geometry of Borel orbit closures in equivariant embeddings*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.
- On 04–26 kl. 15.00–15.45. Seminarium i matematisk statistik.** Anders Öberg, Matematiska institutionen, Uppsala universitet: *Uniqueness of g -measures and criteria for absolute continuity of measures*. Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 5.
- On 04–26 kl. 16.00–17.00. KTH/SU Mathematics Colloquium.** Professor Gunnar Carlsson, Stanford University: *Algebraic topology and high-dimensional data*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Kaffe/te serveras kl. 15.30 i pausrummet, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4. Se Bråket nr 14 sidan 5.
- Fr 04–28 kl. 10.00. Licentiatseminarium i datalogi.** Irem Aktug presenterar sin licentiatavhandling: *State Space Representation for Verification of Open Systems*. Opponent: Professor Parosh Abdulla, Institutionen för informationsteknologi, Uppsala universitet. Sal V3, KTH, Teknikringen 72, 2 tr. Se Bråket nr 14 sidan 6.
- Fr 04–28 kl. 11.00–12.00. Optimization and Systems Theory Seminar.** Michael Rotkowitz, Automatic Control, Department of Signals, Sensors and Systems, KTH: *Tractable problems in optimal decentralized control*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 14 sidan 9.
- Fr 04–28 kl. 13.00. Licentiatseminarium i statistik.** (*Observera dagen och lokalen!*) Ellinor Fackle-Fornius försvarar sin licentiatavhandling: *Optimal Design of Experiments for the Quadratic Logistic Model*. Opponent: Carl-Fredrik Burman. Sal B419, Statistiska institutionen, SU.
- Fr 04–28 kl. 13.15–14.15. Graduate Student Seminar.** Ole Andersson, Matematik, Uppsala: *A geometric classification of locally stable maps $S^3 \rightarrow \mathbb{R}^4$* . Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 14 sidan 8.
- Ti 05–02 kl. 13.15. Seminarium i teoretisk datalogi.** Docent Patrik Jansson, Institutionen för data- och informationsteknik, Chalmers tekniska högskola, Göteborg: *CoverTranslator — from Haskell to First Order Logic*. Rum 1537, KTH CSC, Lindstedtsvägen 3, plan 5. Se sidan 8.
- Ti 05–02 kl. 15.15–16.15. DNA-seminariet Uppsala-KTH (Dynamical systems, Number theory, Analysis).** (*Observera dagen, tiden och lokalen!*) Jean Lafont, Ohio State University: *Simplicial volume of locally symmetric spaces of non-compact type*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.

Fortsättning på nästa sida.

Seminarier (fortsättning)

- On 05–03 kl. 13.00. Seminarium i statistik.** Linda Wänström: *Are past findings of the effects of sibship size and birth of a sibling on cognitive ability spurious? Examining causal links using SEM and the NLSY.* Sal B705, Statistiska institutionen, SU, Universitetsvägen 10B, plan 7, Frescati.
- On 05–03 kl. 16.00. KTH/SU Mathematics Colloquium.** Jean-Louis Loday, Strasbourg: *Algebraic operads.* Sal 14, hus 5, Matematiska institutionen, SU, Kräftriket.
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SEMINAR IN ANALYSIS AND ITS APPLICATIONS

Harold Shapiro:

Malmheden's theorem: A novel solution to the Dirichlet problem

Abstract: In 1934 Harry Malmheden proposed the following novel algorithm for solving Dirichlet's problem (i.e. finding a harmonic function in a given domain D of Euclidian space \mathbb{R}^d taking prescribed values on the boundary ∂D of the domain), in the special case where D is a ball:

Let f be a given real-valued continuous function on ∂D , and y a point in D . Consider a chord of D through y which meets the boundary in points x and x' , and compute the value at y of the linear function of the parameter measuring length along the chord which is equal to f at x and x' . This quantity, averaged over all directions of the chord, is the value at y of the harmonic function in D that assumes the boundary values f .

This elegant result seems to have received very little attention. In the talk I will, besides presenting the theorem, prove the converse in the two-dimensional case (this is new; it is not known whether the converse is true in the higher-dimensional cases). Our presentation is based on ongoing joint work with Mark Agronovsky.

Biographical note: Harry Malmheden was a pupil of Marcel Riesz at Lund. According to information supplied by Jaak Peetre, he was something of a black sheep and had trouble obtaining his doctorate. He wound up teaching at a gymnasium in Uppsala, where his courses were generally feared by pupils because of their advanced level. On the other hand (still according to Peetre) the late Lars Inge Hedberg was inspired by Malmheden's teaching, and attributed to it the inspiration to devote his studies to mathematics.

Tid och plats: Måndagen den 24 april kl. 13.15–14.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

LOGIKSEMINARIET STOCKHOLM-UPPSALA

Ieke Moerdijk: Dendroidal sets

Abstract: I will discuss a particular example of a presheaf topos, based on a category of finite trees. This presheaf topos is closely related to the theory of operads or multi-categories (close to algebraic theories and to linear logic), and to weak higher categories (presumably needed for modelling intentional type theories).

Tid och plats: Onsdagen den 26 april kl. 10.30–12.15 i sal 3513, hus 3, MIC, Polacksbacken, Uppsala universitet.

HODGE THEORY SEMINAR

Wojciech Chacholski: Lefschetz decomposition

Abstract: In the talk I will present a so-called hard Lefschetz theorem and its consequences.

Tid och plats: Fredagen den 21 april kl. 13.30 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

PLURIKOMPLEXA SEMINARIET

Rolf Källström: Lifting derivations

Abstract: Let $\pi: A \hookrightarrow B$ be an injective homomorphism of local Noetherian domains of characteristic 0, such that the extension of fraction fields $K(B)/K(A)$ is finite (algebraic). In complex analysis π arises from a map of complex analytic spaces. The derivations of A and B are denoted T_A and T_B , respectively (sections of tangent vector fields on the underlying spaces of A and B). We have $T_A \subset T_{K(A)} \subset T_{K(R)}$, and $T_B \subset T_{K(R)}$, so it makes sense to put $T_A^\pi = T_A \cap T_B$. Elements in T_A^π are the *liftable* derivations of A . In case π is finite, it is well-known that $T_A^\pi = T_A(I_D)$, where $T_A(I_D)$ are the derivations that preserve the ideal of the discriminant D (derivations that are logarithmic along D) of π (Zariski, Arnold, Scheja-Storch). I will explain how T_A^π can be computed also when π is not assumed finite, using the notion of π -logarithmic derivations

$$T_A^\pi = T_A(\log^\pi I_D),$$

described in the talk. If $T_A^\pi = T_A(I_D)$, we say that π is *differentially ramified*. If $T_A^\pi = T_A$, so all derivations lift to derivations of B , we say that π is *weakly submersive*. I will describe important cases when π is weakly submersive, and how to determine if π is differentially ramified also when π is not finite. Finally, time allowing, we consider the case of birational morphisms, so $K(A) = K(B)$, when π is presented as the blow-up of an ideal I of A . Here the liftable derivations are the same as those that preserve the Ratliff-Rush hull \hat{I} of I , so $T_A^\pi = T_A(\hat{I})$.

Tid och plats: Tisdagen den 25 april kl. 10.15 i sal D32, KTH, Lindstedtsvägen 5, entréplanet.

SEMINARIUM I MATEMATISK STATISTIK

Anders Öberg:

**Uniqueness of g -measures
and criteria for absolute continuity of measures**

Abstract: Using criteria for absolute continuity of measures developed by Shiryaev and his co-authors, I present recent developments in the theory of dynamical systems with specifications (transition probability functions for the inverse dynamics). In particular I discuss uniqueness of invariant measures with respect to such specifications, i.e., uniqueness of the stationary distribution with respect to transition probability functions. Continuity of these functions is not sufficient, but weaker conditions such as square summability of the variations are, if the weights are positive.

Tid och plats: Onsdagen den 26 april kl. 15.00–15.45 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

PLURIKOMPLEXA SEMINARIET

Vincent Guedj:
Degenerate complex Monge-Ampère equations

Abstract: We study some degenerate complex Monge-Ampère equations on compact Kähler manifolds. These equations arise naturally in the dynamical study of rational mappings, as well as in the search of singular Kähler-Einstein metrics on compact manifolds. We will present some recent results obtained in our joint work with Philippe Eyssidieux and Ahmed Zeriahi (see <http://arxiv.org/pdf/math.AG/0603431>).

Tid och plats: Tisdagen den 25 april kl. 13.15 i sal D32, KTH, Lindstedtsvägen 5, entréplanet.

MITTAG-LEFFLER SEMINAR

Steffen Sagave:
Toda brackets of ring spectra and realizability

Abstract: Given a module over the homotopy groups $\pi_*(R)$ of a ring spectrum R , one can ask whether it can be realized by the homotopy groups of an R -module spectrum. This has to do with Toda brackets of R , as I will explain in the case of the real K -theory spectrum.

The general study of this realizability question leads to the *universal Toda bracket* of a ring spectrum. This invariant of R is an element in a Mac Lane cohomology group of $\pi_*(R)$, and it determines the first obstruction of the realizability problem for every $\pi_*(R)$ -module M .

A second kind of information detected by the universal Toda bracket of R is the first k -invariant of the space $BGL_n R$. I will indicate how to compute the universal 4-fold Toda bracket of the complex K -theory spectrum.

Tid och plats: Tisdagen den 25 april kl. 14.00–15.00 vid Institut Mittag-Leffler, Auroravägen 17, Djursholm.

ALGEBRA- OCH GEOMETRISEMINARIUM

Jesper Funch Thomsen:
Geometry of Borel orbit closures in equivariant embeddings

Abstract: An equivariant embedding of a reductive algebraic group G is a normal variety X admitting an action by $G \times G$ and containing G as an open dense subset in such a way that the induced action on G is by left and right translation. When G is a torus, then an equivariant embedding is the same as a toric variety associated with G .

Fix a Borel subgroup B of G . In this talk I will concentrate on the geometry of closures of $B \times B$ orbits in X . In particular, I will discuss why such orbit closures are normal, Cohen-Macaulay, and have rational singularities. By considering specific examples of equivariant embedding we will see that this implies the equivalent (and well-known) statements for Schubert varieties and toric varieties.

Finally I will briefly touch upon the proof of the above-mentioned statement. The proof uses positive characteristic techniques such as tight closure and Frobenius splitting.

This is joint work with Xuhua He and also, partly, with Michel Brion.

Tid och plats: Onsdagen den 26 april kl. 13.15–14.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I FINANSIELL MATEMATIK

Christian Thulin

presenterar sitt examensarbete:

Pricing and Hedging of Basket Options

Abstract: The aim of this thesis is to investigate the pricing and hedging of currency basket options. We start by examining the moment matching method as a way to approximate the price of the basket option. This method is compared to a Monte Carlo simulation.

A basket option could be hedged by trading in the underlying currencies and their options. We use the numerically obtained option Greeks in order to form four different hedging portfolios. These strategies are evaluated using three procedures.

We start by testing the hedging strategies against simulated exchange rates. In this case the volatilities and correlations are assumed to be constant. This allows for the assessment of the hedging strategies under the same assumptions as in the Black & Scholes option model. However, before putting any of the proposed hedging strategies in practice, it is necessary to verify the performance of these hedges under more realistic conditions. We proceed by testing the hedging strategies by historical simulation. Historical data over exchange rates and implied volatilities are used.

Finally we investigate how the relationship between the value of the hedge-portfolios and the basket option is developing over the life of the contract. We consider historical data and examine the correlation and the deviations between the two.

Tid och plats: Måndagen den 24 april kl. 16.15 – 17.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MITTAG-LEFFLER SEMINAR

Gunnar Carlsson:

Persistent homology and the topology of point clouds

Abstract: Persistent homology is just the study of the homology of directed systems of spaces. It is particularly useful in the problem of inferring topological invariants of spaces embedded in \mathbb{R}^n , as well as a number of other problems arising in applications. I will discuss the theory and survey a number of examples.

Tid och plats: Tisdagen den 25 april kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auroravägen 17, Djursholm.

DNA-SEMINARIET UPPSALA-KTH (DYNAMICAL SYSTEMS, NUMBER THEORY, ANALYSIS)

Jean Lafont:

Simplicial volume of locally symmetric spaces of non-compact type

Abstract: I will define simplicial volume of a topological manifold, and motivate the interest in the positivity of this invariant. I will then outline a proof that the simplicial volume of locally symmetric spaces of non-compact type is in fact positive.

This was joint work with Ben Schmidt.

Tid och plats: Tisdagen den 2 maj kl. 15.15 – 16.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

