BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 30 **FREDAGEN DEN 1 OKTOBER 1999**

BRÅKET

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

Redaktör: Gunnar Karlsson

Telefon: 08-790 84 79

Telefax: 08-790 72 99

Adress för e-post:
gunnark@math.kth.se

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

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Sista manustid för nästa nummer:
Torsdagen den 7 oktober
kl. 13.00.

Disputation i matematik

Jockum Aniansson disputerar vid KTH på avhandlingen *Some integral representations in real and complex analysis. Peano-Sard kernels and Fischer kernels* måndagen den 11 oktober kl. 13.15. Se sid. 4.

Kurser

Lars Bergström, m.fl.: Graduate Course in Astroparticle Physics II. Se sidan 5.

Jan-Erik Roos: Valda problem i algebran. Se sidan 5.

SEMINARIER

Fr 10–01 kl. 9.00–10.00. Kollokvium i fysik. Professor Rosario Fazio, Università di Catania: *Quantum phase transitions in Josephson junction arrays.* Sal F01, Fysiska institutionen, KTH, Lindstedtsvägen 24, b.v. Se sidan 7.

Må 10–04 kl. 13.15–15.00. Algebra- och geometriseminarium. Torsten Ekedahl: *Exponent för torsions-Chernklasser.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101. Se sidan 4.

Ti 10–05 kl. 13.15. Seminarium i fysik. Anders Karlhede: *Dynamics and reconstruction of the $\nu = 1$ quantum Hall edge.* Rum 4809, Fysikum, SU. Se sidan 6.

Ti 10–05 kl. 14.15–15.15. Mittag-Leffler Seminar. Petri Juutinen, Jyväskylä: *Perron's method and viscosity solutions.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 10–06 kl. 10.00–11.45. Logikseminariet Stockholm-Uppsala. Thierry Coquand, Institutionen för datavetenskap, Chalmers tekniska högskola och Göteborgs universitet: *An inductive solution of Borel's measure problem.* Sal 16, hus 5, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101.

On 10–06 kl. 10.15–12.00. Combinatorics Seminar. Dmitry Kozlov: *Rational homology of spaces of complex monic polynomials with multiple roots.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

On 10–06 kl. 10.30–11.30. Analysseminarium. Alexander Isaev, Australian National University, Canberra: *Characterization of hyperbolic complex manifolds by their automorphism groups.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101. Se sidan 3.

Fortsättning på nästa sida.

Seminarier (fortsättning)

On 10–06 kl. 13.00 – 15.00. Seminarium i statistik. Rolf Larsson: *Likelihood-baserad inferens i multivariata panel-kointegrationsmodeller.* Rum B705, Statistiska institutionen, SU. Se sidan 7.

On 10–06 kl. 13.15 – 15.00. Valda problem i algebran. Jan-Erik Roos: *Liealgebror (och Liegrupper).* (Fortsättning från föredragen den 8 och den 22 september.) Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101. Se sidan 5.

On 10–06 kl. 13.15. Dynamiska systemseminariet. Peter Ebenfelt, KTH: *Extrinsic and intrinsic normal forms for real hypersurfaces in complex space.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 3. Internet-adressen till information om seminariet är http://www.math.kth.se/math/research/dynsyst.

To 10–07 kl. 14.15 – 15.15. Mittag-Leffler Seminar. Bianca Stroffolini, Napoli: *Stability of the Hodge decomposition and applications to PDE.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

To 10–07 kl. 15.45 – 16.45. Mittag-Leffler Seminar. Arshak Petrosyan, Stockholm: *A free boundary problem for combustion theory.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

To 10–07 kl. 16.15. Algebraic Geometry Seminar. Helge Maakestad: *Monoidal transformations and embedded resolution of curves in surfaces.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.

Fr 10–08 kl. 9.00 – 10.00. Kollokvium i fysik. Professor Mats Almgren, Institutionen för fysikalisk kemi, Uppsala universitet: *Self-organized fluid structures formed by amphiphilic molecules in water.* Sal F01, Fysiska institutionen, KTH, Lindstedtsvägen 24, b.v.

Fr 10–08 kl. 11.00 – 12.00. Optimization and Systems Theory Seminar. Professor Clyde F. Martin, Department of Mathematics, Texas Tech. University, Lubbock, Texas, USA: *Edge delineation, response surfaces and optimal control.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.

Fr 10–08 kl. 15.15 – 16.15. Potentialanalysseminarium. Professor Daniele C. Struppa, College of Arts and Sciences, George Mason University, Fairfax, Virginia, USA: *Overconvergence phenomena for Dirichlet series and differential operators of infinite order (joint work with T. Kawai from Kyoto).* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

Professor Struppa är fakultetsopponent vid Jockum Anianssons disputation. Se sidan 4.

Må 10–11 kl. 15.15. Seminarium i matematisk statistik. Alessandro Juri, Department of Mathematics, ETH Zürich: *Supermodular order and Lundberg exponent.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.

On 10–13 kl. 10.15 – 12.00. Combinatorics Seminar. Bernt Lindström: *Title to be announced.* Rum 21, hus 5, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101.

Fortsättning på nästa sida.

Seminarier (fortsättning)

On 10–13 kl. 13.00 – 15.00. Seminarium i statistik. Esbjörn Ohlsson, Matematisk statistik, SU: *Pps-urval i företagsstatistik.* Rum B705, Statistiska institutionen, SU. Se sidan 8.

Fr 10–15 kl. 9.00 – 10.00. Kollokvium i fysik. Speaker to be announced: *Nobel prize in physics 1999.* Sal F 01, Fysiska institutionen, KTH, Lindstedtsvägen 24, b.v.

Må 10–18 kl. 15.15. Seminarium i matematisk statistik. Dr Mioara Buiculescu, Centre for Mathematical Statistics, Bukarest: *Stationary structures associated with Markov processes.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 8.

ANALYSSEMINARIUM

Alexander Isaev: Characterization of hyperbolic complex manifolds by their automorphism groups

Abstract: The group of holomorphic automorphisms of a Kobayashi-hyperbolic complex manifold is a finite-dimensional Lie group. Typically, this group is very small, and therefore one can hope that those hyperbolic manifolds for which the group is in some sense "large", should be explicitly classifiable. There could be various ways to say that this group is large. We assume that its dimension is sufficiently high. Namely, we completely classify all connected n-dimensional hyperbolic manifolds with automorphism group of dimension n^2+1 or bigger. For smaller automorphism group dimensions there is apparently no hope to obtain an explicit classification.

The work is joint with Steven Krantz (Washington University, St. Louis).

Tid och plats: Onsdagen den 6 oktober kl. 10.30 – 11.30 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101.

DYNAMISKA SYSTEMSEMINARIET

Peter Ebenfelt: Extrinsic and intrinsic normal forms for real hypersurfaces in complex space

Abstract: A complete classification (up to local biholomorphisms) of real hypersurfaces in complex space at Levi nondegenerate points follows from the work of E. Cartan, Tanaka, and Chern and Moser.

In 1974, Chern and Moser (building on earlier work by E. Cartan and Tanaka) gave a complete classification (up to local biholomorphisms) of real hypersurfaces in complex space at Levi nondegenerate points by providing a "normal form" for such objects. The normal form can be described extrinsically as a normal form for the defining equation of a real hypersurface M in $\mathbb{C}^N$, or intrinsically as a normal form for a set of 1-forms on M defining the CR structure inherited from the ambient complex structure. In this talk, I shall discuss normal forms at certain types of Levi degenerate points.

Tid och plats: Onsdagen den 6 oktober kl. 13.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

ALGEBRA- OCH GEOMETRISEMINARIUM

Torsten Ekedahl:
Exponent för torsions-Chernklasser

Sammanfattning: Chernklasserna för Hodgeknippet över modulirummet för principalpolariserade abelska mångfalder är torsionsklasser i kohomologi, eftersom knippet har en integrerbar förbindelse. Genom att använda en metod av Grothendieck skall jag bestämma den exakta ordningen av dem.

Tid och plats: Måndagen den 4 oktober kl. 13.15 – 15.00 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101.

DISPUTATION I MATEMATIK

Jockum Aniansson

disputerar på avhandlingen

Some integral representations in real and complex analysis.
Peano-Sard kernels and Fischer kernels

måndagen den 11 oktober 1999 kl. 13.15 i Kollegiesalen, Administrationsbyggnaden, KTH, Valhallavägen 79. Till fakultetsopponent har utsetts *professor Daniele C. Struppa,* College of Arts and Sciences, George Mason University, Fairfax, Virginia, USA.

Abstract of the thesis

This thesis consists of two parts. The first part deals with some integral representations in n-dimensional real Euclidean space, see I. The second part deals with some integral representations in n-dimensional complex Euclidean space, see II and III.

I. Multi-dimensional Peano-Sard kernels and a divergence representation.
We prove a divergence representation with increased smoothness and control over the support, valid for compactly supported distributions. We then construct multi-dimensional Peano-Sard kernels with optimal regularity. These kernels are used to represent remainder functionals (error functionals) in e.g. numerical quadrature or cubature rules. We also obtain a representation theorem for entire analytic functions of exponential order vanishing at a point.

II. Fischer kernels, and projectors in some spaces of analytic functions.
This paper is concerned with direct sum decompositions of some classical spaces of analytic functions in n complex variables. In some specific constellations we derive concrete forms for reproducing or representing kernels for certain subspaces of functions. After a Fourier transformation this will explicitly give us the Green's function for some characteristic and non-characteristic Cauchy problems.

III. Harmonic projections in Fischer-Fock space.
In this article we show how to decompose any entire analytic function $f(z_1, \ldots, z_n)$ uniquely as a sum of two entire functions $f = h + g$, where

$$\triangle h = \triangle_Z h = \left(\frac{\partial}{\partial z_1^2} + \cdots + \frac{\partial}{\partial z_n^2} \right) h(z_1, \ldots, z_n) = 0,$$

and the quotient $g(z_1, \ldots, z_n)/(z_1^2 + \cdots + z_n^2)$ is entire. This is most conveniently done using orthogonal projections within the framework of Fischer-Fock space (Bargmann space) by means of the *Fischer kernels* we determine. Fourier transformation then gives us an explicit solution to the characteristic Cauchy problem for the wave equation.

COMBINATORICS SEMINAR

Dmitry Kozlov: Rational homology of spaces of complex monic polynomials with multiple roots

Abstract: We will study rational homology groups of one-point compactifications of spaces of complex monic polynomials with multiple roots. These spaces are indexed by number partitions. A standard reformulation in terms of quotients of orbit arrangements reduces the problem to studying certain triangulated spaces $X_{\lambda,\mu}$.

We will present a combinatorial description of the cell structure of $X_{\lambda,\mu}$ using the language of marked forests. As applications we obtain a new proof of a theorem of Arnold and a counterexample to a conjecture of Sundaram and Welker.

Tid och plats: Onsdagen den 6 oktober kl. 10.15 – 12.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

VALDA PROBLEM I ALGEBRAN

Onsdagen den 6 oktober 1999 kl. 13.15 – 15.00 kommer jag att hålla det *tredje* och sista föredraget med titeln:

Liealgebror (och Liegrupper)

Sammanfattning: I detta tredje föredrag kommer jag att slutföra teorin för Killingformen och visa hur man använder den och Cartanska del-Liealgebror för att klassificera halvenkla Liealgebror.

Förkunskaper: Linjär algebra enligt algebra, fördjupningskurs.

Lokal: Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101.

Jan-Erik Roos

Graduate Course in Astroparticle Physics II (5 p)

Contents: This course, which is an independent sequel to the course "Astroparticle Physics" given in the spring of 1999, will be organized as a series of seminars with active participation of the students (more senior people are also welcome to participate). The first few seminars will be led by Lars Bergström and will deal with the cosmic microwave background radiation, where important experimental results are soon to be expected. We also plan to treat in more depth e.g. determinations of the geometry of the universe, neutrino astrophysics, supernovae, and gamma-ray bursts.

Literature: Excerpts from original articles and reviews.

Lecturers: Lars Bergström, Fysikum, telephone 08-16 46 83 (lbe@physto.se); Ariel Goobar, Fysikum, telephone 08-16 47 25 (ariel@physto.se); Per Olof Hulth, Fysikum, telephone 08-16 46 33 (hulth@physto.se); Claes Fransson, Stockholms Observatorium, telephone 08-16 44 69 (fransson@astro.su.se).

Start: Thursday, October 7, at 10.15 – 12.00 in room 4809, 8th floor, Fysikum, Stockholm University, Vanadisvägen 9. Then one seminar per week.

Examination: Active participation in seminars and some exercises handed out during the course.

Welcome!

SEMINARIUM I FYSIK

Anders Karlhede: Dynamics and reconstruction of the $\nu = 1$ quantum Hall edge

Abstract: The compact ferromagnetic edge of a $\nu = 1$ quantum Hall system has, in addition to the much studied edge charge density wave, an edge spin wave. Both these modes may soften as the potential that confines the system is softened, thereby leading to edge reconstructions to a charge density wave or a spin density wave ("spin texture") groundstate respectively. In the latter the spins are textured as in bulk quantum Hall skyrmions.

Tid och plats: Tisdagen den 5 oktober kl. 13.15 i rum 4809, Fysikum, SU.

OPTIMIZATION AND SYSTEMS THEORY SEMINAR

Clyde F. Martin: Edge delineation, response surfaces and optimal control

Abstract: Based on work with Magnus Egerstedt, problems in edge detection that arise in image processing are formulated and solutions designed. This extends recent work of Peter Hall. In this seminar we will also devise methods to construct response surfaces for data for which there is prior information. These problems arise in experimental toxicology and are in general important in understanding the reaction of organisms to multiple chemical stressors.

Tid och plats: Fredagen den 8 oktober kl. 11.00 – 12.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I MATEMATISK STATISTIK

Alessandro Juri: Supermodular order and Lundberg exponent

Abstract: In the actuarial literature we find models, where in most of the cases the total claim amount at a given time that an insurance company has to face with is given by a compound process. For a wide class of such models, a main result is that the infinite- and the finite-time ruin probabilities show an exponential decay in the initial capital. It is surprising that only a minor attention is given to multivariate processes, which may be used to describe the capital at a given time of insurance companies with more than one line of business, and to models where possible dependencies (e.g. between the claim sizes) are taken into account. It turns out that a special kind of stochastic order for probability measures on $(\mathbb{R}^n, \mathcal{B}(\mathbb{R}^n))$, the so-called supermodular order, is an adequate tool for modelling dependencies.

In this talk we shed some light on how to combine the well-known results for ruin probabilities in the univariate case and the techniques offered by the supermodular order to get results in the multivariate case. More precisely, we consider a multivariate risk process, where each component is a univariate risk process, and we obtain a monotonicity result for the infinite- and finite-time Lundberg exponent of the sum component process. We also use the supermodular order to introduce a dependency structure in the underlying point process and again a monotonicity result is obtained.

Tid och plats: Måndagen den 11 oktober kl. 15.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

KOLLOKVIUM I FYSIK

Rosario Fazio: Quantum phase transitions in Josephson junction arrays

Abstract: Low capacitance Josephson junction arrays are an ideal arena to study a variety of quantum phase transitions. The various phases can be driven by changing either the array parameters (charging energy and Josephson coupling) or by frustrating the system (by means of a magnetic field and/or a gate voltage). Besides the superconducting and the insulating region a new phase, characterized by the coexistence of off-diagonal (superfluid) and diagonal (charge-crystalline) long range order, may appear. This phase is known as the supersolid. I will present various properties of the quantum phase transitions. I will also discuss some characteristic features of electric transport at the superconductor-insulator transition.

Tid och plats: Fredagen den 1 oktober kl. 9.00 – 10.00 i sal F 01, Fysiska institutionen, KTH, Lindstedtsvägen 24, b.v.

SEMINARIUM I STATISTIK

Rolf Larsson: Likelihood-baserad inferens i multivariata panel-kointegrationsmodeller

Sammanfattning: Detta är en presentation av ett gemensamt arbete med Johan Lyhagen, Handelshögskolan. Detta arbete går ut på att skatta kointegrationsrang och testa om kointegrationsrummet är gemensamt för ett antal olika länders ekonomier. Vi föreslår en speciell typ av modellering för beroendet mellan dessa. Panel betyder i detta sammanhang flera parallella multivariata tidsserier.

Föredraget skall inte kräva några speciella förkunskaper om kointegration. Jag skall försöka göra en elementär introduktion till ämnet.

Tid och plats: Onsdagen den 6 oktober kl. 13.00 – 15.00 i rum B705, Statistiska institutionen, SU.

ALGEBRAIC GEOMETRY SEMINAR

Helge Maakestad: Monoidal transformations and embedded resolution of curves in surfaces

Abstract: I will talk about monoidal transformations of nonsingular surfaces over an algebraically closed field and sketch a proof of the following theorem:

Theorem: Let Y be any curve in the surface X. Then there exists a finite sequence of monoidal transformations

$$X' = X_n \to X_{n-1} \to \cdots \to X_0 = X$$

such that if $f : X' \to X$ is their composition, then the total inverse image $f^{-1}(Y)$ is a divisor with normal crossings.

Tid och plats: Torsdagen den 7 oktober kl. 16.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I STATISTIK

Esbjörn Ohlsson:
Pps-urval i företagsstatistik

Sammanfattning: Detta är det föredrag jag höll på Svenska Statistikersamfundets årsmöte i Umeå den 22 september. Seminariet kommer att hållas ”populärt”, på en nivå som bör vara begriplig för alla som läst en grundläggande kurs i urvalsteori (”sampling”).

Jag berättar först litet om grundläggande principer för urval av företag. Därefter diskuteras frågan om hur hjälpinformation om företagens storlek bäst kan användas: storleksstratifiering eller pps-urval (pps = probabilities proportional to size)? Avslutningsvis diskuteras valet av metod för dragning av pps-urval, med tonvikt på de metoder som Bengt Rosén och jag utvecklat under 1990-talet.

Tid och plats: Onsdagen den 13 oktober kl. 13.00 – 15.00 i rum B705, Statistiska institutionen, SU.

SEMINARIUM I MATEMATISK STATISTIK

Mioara Buiculescu:
Stationary structures associated with Markov processes

Abstract: With every excessive measure of a Markov process one associates a stationary measure on an enlarged space, called the Kuznetsov measure. This turns out to be a very important tool in obtaining results for the given Markov process, depending on the considered excessive measure, analogous to the ones obtained for the Brownian motion relative to the Lebesgue measure.

In this context we express in terms of the Kuznetsov structure a property of ergodicity with respect to a conservative measure and study a class of excessive measures of a subprocess of the initial one.

Tid och plats: Måndagen den 18 oktober kl. 15.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.
