



BRÅKET



*Information om seminarier och högre undervisning
i matematiska ämnen i Stockholmsområdet*

NR 21

FREDAGEN DEN 1 JUNI 2007

BRÅKET

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

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Red. för Bråket
Institutionen för matematik
KTH
100 44 Stockholm

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

StoUpp 2007 och Lars Holst symposiet

Dessa äger rum på KTH den 4
juni. Se Bråket nr 20 sidan 11.

Workshop on Residue Currents and (Co)amoebas

Denna äger rum på SU den 6–7
juni. Se sidan 4.

Money, jobs: Se sidan 8.

SEMINARIER

Fr 06–01 kl. 13.15–14.15. Graduate Student Seminar.
Rikard Olofsson, Matematik, KTH: *Quantum
Chaos from a number theorist's perspective*. Semi-
narierum 3721, Institutionen för matematik,
KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr
20 sidan 6.

Må 06–04 kl. 13.00–14.00. Presentation av examens-
arbete i matematik (10 poäng, påbyggnadsnivå).
(Observera dagen och tiden!) Per Alexanderson:
*Some observations on Fatou sets of rational func-
tions*. Handledare: Jan-Erik Björk. Sal 21, hus
5, Matematiska institutionen, SU, Kräftriket. Se
sidan 3.

Ti 06–05 kl. 10.15. Plurikomplexa seminariet — Licen-
tiatseminarium i matematik. Lisa Nilsson,
SU, presenterar sin licentiatavhandling: *Series
and integrals in several and infinitely many com-
plex variables*. Opponent: Professor Mats
Andersson, Göteborg. Rum 306, hus 6, Mate-
matiska institutionen, SU, Kräftriket. Se sidan 4.

Ti 06–05 kl. 13.15. Seminarium i matematisk statistik.
(Observera dagen och tiden!) Dr Philip O'Neill,
The University of Nottingham: *Bayesian inference
for stochastic epidemic models in structured
populations based on final outcome data*. Rum 306
(Cramérrummet), hus 6, Matematiska institu-
tionen, SU, Kräftriket. Se sidan 3.

Fortsättning på nästa sida.

Provföreläsningar för lektorat i matematisk statistik

Dessa äger rum på KTH den 1 juni. Se Bråket nr 20 sidan 9.

Disputation i matematik

Alexey Shchuplev disputerar vid SU på avhandlingen *Toric
varieties and residues* den 11 juni kl. 10.00. Se sidan 7.

Seminarier (fortsättning)

- Ti 06–05 kl. 14.00–15.00. Mittag-Leffler Seminar. Stephanie Yang**, KTH: *The Fulton-MacPherson space of points on a smooth algebraic variety*. Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 5.
- Ti 06–05 kl. 15.00. Licentiatseminarium i matematisk statistik. (Observera dagen!)** **Mathias Lindholm**, SU, presenterar sin licentiatavhandling: *Stochastic epidemic models for endemic diseases: the effect of population heterogeneities*. Inbjuden diskussionsinledare: **Dr Philip O’Neill**, The University of Nottingham. Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 20 sidan 10.
- Ti 06–05 kl. 15.30–16.30. Mittag-Leffler Seminar. Daniel Larsson**, Institut Mittag-Leffler: *Two versions of Lie algebra deformations*. Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 5.
- To 06–07 kl. 14.00–15.00. Mittag-Leffler Seminar. Martin Olsson**, University of Texas, Austin: *Tame stacks in positive characteristic*. Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 5.
- To 06–07 kl. 14.00–16.00. Kollokvium i filosofi. Barry Smith**, Birkbeck University: *Relativism, Meaning and Truth*. Rum E397, Filosofiska institutionen, SU.
- To 06–07 kl. 15.15–16.15. AlbaNova and Nordita Colloquium in Physics. Kevin J. Webb**, Theoretical Chemistry/School of Biotechnology, KTH, and School of Electrical and Computer Engineering, Purdue University, Indiana: *Medical imaging with light*. Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 6.
- Observera att Kevin J. Webb skall tala vid kollokviet i fysik den 7 juni. I Bråket nr 20 anges fel talare vid detta kollokvium.*
- To 06–07 kl. 15.30–16.30. Mittag-Leffler Seminar. Michael Thaddeus**, Columbia University, New York: *Duality between torsors and gerbes on a torus bundle*. Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 7.
- Fr 06–08 kl. 10.00–11.00. Presentation av examensarbete i matematik (10 poäng, påbyggnadsnivå). (Observera dagen!)** **Kristina Nilsson**: *Baires kategorisats och dess tillämpningar*. Handledare: **Andrzej Szulkin**. Sal 21, hus 5, Matematiska institutionen, SU, Kräftriket. Se sidan 3.
- Fr 06–08 kl. 13.15–14.15. Graduate Student Seminar. Michael Björklund**, Matematik, KTH: *Geometry of Random Walks*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.
- On 06–13 kl. 10.00. Licentiatseminarium i matematisk statistik. (Observera tiden!)** **Shaban Mbare**, SU och University of Dar es Salaam, presenterar sin licentiatavhandling: *Epidemics on networks and early stage vaccination*. Inbjuden diskussionsinledare: **Håkan Andersson**, Swedbank och SU. Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidorna 5–6.
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PRESENTATION AV EXAMENSARBETE I MATEMATIK

Per Alexanderson:

Some observations on Fatou sets of rational functions

Handledare: **Jan-Erik Björk.**

Abstract: This thesis is about repeated iterations of rational functions in the complex plane. While exploring some properties of the Fatou set by computer simulations, I encountered an interesting pattern. After generating more data, I became more and more sure that there was a correlation between the Fatou set of a rational function and its derivatives on the iterated functions. Trying to say it in a very long sentence; my research strongly suggests that in most cases, the bounded components of the Fatou set lie in the limit of the points of the absolute value of the derivative of the iterated function, as the number of iterations grows.

Tid och plats: Måndagen den 4 juni kl. 13.00–14.00 i sal 21, hus 5, Matematiska institutionen, SU, Kräftriket.

SEMINARIUM I MATEMATISK STATISTIK

Philip O'Neill:

**Bayesian inference for stochastic epidemic models
in structured populations based on final outcome data**

Abstract: Suppose an epidemic takes place in a population. Data are collected before and after the epidemic itself on some sample of the population. We wish to fit a transmission model to these data, estimating the infection rate parameters in the model (e.g. infection rate within households, or in the community at large). Such a statistical problem is complicated by the fact that the likelihood is intractable. We describe how random graph methods can be used to overcome this and related problems in a Bayesian framework using MCMC methods.

Tid och plats: Tisdagen den 5 juni kl. 13.15 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

PRESENTATION AV EXAMENSARBETE I MATEMATIK

Kristina Nilsson:

Baires kategorisats och dess tillämpningar

Handledare: **Andrzej Szulkin.**

Sammanfattning: Arbetet går ut på att bevisa Baires kategorisats och att redogöra för vissa av dess tillämpningar. Speciellt använder vi denna sats för att visa några klassiska resultat i funktionalanalysen: satsen om den öppna avbildningen, Banachs sats och Banach-Steinhaus sats. Dem tillämpar vi sedan, bl.a. för att visa att de flesta kontinuerliga funktioner inte är kontinuerligt deriverbara, samt att det finns kontinuerliga periodiska funktioner vilkas Fourierserier divergerar i vissa punkter.

Tid och plats: Fredagen den 8 juni kl. 10.00–11.00 i sal 21, hus 5, Matematiska institutionen, SU, Kräftriket.

**PLURIKOMPLEXA SEMINARIET —
LICENTIATSEMINARIUM I MATEMATIK**

Lisa Nilsson

presenterar sin licentiatavhandling:

**Series and integrals in several and infinitely many
complex variables**

Opponent: Professor Mats Andersson, Göteborg.

Abstract: This will be a presentation of my licentiate thesis, which consists of two separate parts.

The first part, on which I will mainly focus, deals with the theory of amoebas and co-amoebas and their connection to hypergeometric functions. We give some motivation for this study by discussing Gauss' classical hypergeometric function and describing how this function can be related to some combinatorics of very simple polytopes and amoebas. We then treat the general several variable case for hypergeometric series and we prove a proposition stating the exact number of series generated by a certain simplex in the GKZ-method. We also present a theorem defining the exact convergence domains for these series. Some words will also be said about the Mellin-Barnes integral representation of hypergeometric functions and the exact convergence domains for these integrals.

The second part of the thesis deals with infinite-dimensional complex analysis, and the possibility of obtaining integral representations formulas valid on an infinite-dimensional space. Some background information is provided about holomorphic functions in infinitely many variables, topologies, fully nuclear spaces, and Gaussian (pro)measures. It is then shown that one can extend an integral representation formula known for holomorphic functions in finite dimensions in Fischer-Fock space to the case of entire functions of exponential type on infinite-dimensional spaces that are fully nuclear with a basis.

Tid och plats: Tisdagen den 5 juni kl. 10.15 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

Workshop on Residue Currents and (Co)amoebas

An informal workshop with the above title will take place at the Department of Mathematics of Stockholm University on June 6–7, 2007. The idea is to combine short presentations of ongoing research with free discussions where interested graduate students are particularly encouraged to take active part. The program will be flexible, but here is tentative outline:

Wednesday, June 6, 14.00 – 17.00

Presentation by **Mats Andersson**, Göteborg: *Hypermeromorphic currents*.

Presentation by **Jan-Erik Björk**, SU: *Structure and regularization of Coleff-Herrera currents*.

Thursday, June 7, 10.00 – 13.00

Presentation by **August Tsikh**, Krasnojarsk: *On amoebas of higher codimension*.

Presentation by **Mikael Passare**, SU: *Relations between amoebas and coamoebas*.

All activities take place in room 306, Building 6, Department of Mathematics, SU, Kräftriket.

MITTAG-LEFFLER SEMINAR

Stephanie Yang:
**The Fulton-MacPherson space of points
 on a smooth algebraic variety**

Abstract: In 1994, Fulton and MacPherson defined a compactification of the configuration space of n distinct marked points on a smooth algebraic variety. I will discuss this space and its properties, and describe recent attempts to realize it as a moduli space.

Tid och plats: Tisdagen den 5 juni kl. 14.00–15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

MITTAG-LEFFLER SEMINAR

Daniel Larsson:
Two versions of Lie algebra deformations

Abstract: In this talk I will describe two versions of Lie algebra deformations. The first version is similar in nature to deformation quantization and is a central part of my 2006 thesis. The second version is an adaption to Lie algebras of O. A. Laudal's non-commutative deformation theory. This will enable us to describe in the future the extremely elusive and complicated moduli space of Lie algebras from a non-commutative algebraic-geometric perspective.

Tid och plats: Tisdagen den 5 juni kl. 15.30–16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

MITTAG-LEFFLER SEMINAR

Martin Olsson:
Tame stacks in positive characteristic

Abstract: This is joint work with D. Abramovich and A. Vistoli.

I will discuss a class of Artin stacks, which we call tame Artin stacks, which arguably is an appropriate replacement in characteristic $p > 0$ for Deligne-Mumford stacks in characteristic 0. In particular, for tame Artin stacks cohomology is well-behaved, there are good theories of Hilbert/Quot schemes, as well as twisted stable maps. Time permitting, I will discuss the Katz-Mazur regular models for modular curves from this point of view.

Tid och plats: Torsdagen den 7 juni kl. 14.00–15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

LICENTIATSEMINARIUM I MATEMATISK STATISTIK

Shaban Mbare

presenterar sin licentiatavhandling:

Epidemics on networks and early stage vaccination

Inbjuden diskussionsinledare: **Håkan Andersson**, Swedbank och SU.

Abstract: This thesis consists of two articles.

S. MBARE, M. ANDERSSON, Å. SVENSSON, T. BRITTON (2007): *Social networks, epidemics and vaccination through contact tracing*. (Manuscript.)

(Continued on the next page.)

S. MBARE, M. ANDERSSON, Å. SVENSSON, T. BRITTON (2007): *Network epidemics and early stage vaccination: the effect of latent and infectious periods and their randomness.* (Manuscript.)

Both articles deal with epidemics on social networks and early stage vaccination, and in particular different vaccination strategies in order to prevent a major outbreak. The social structure is described by a random graph having pre-specified degree distribution, from which friends of an infectious individual are traced and a given vaccination strategy is implemented after delay. We compare the effectiveness of the strategies and investigate the effects of the randomness of the latent period, infectious period and detection (delay) time in the dynamics of the disease. Branching process approximations of the early stage of the epidemic make it possible to compute the probability of outbreaks.

Tid och plats: Onsdagen den 13 juni kl. 10.00 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

ALBANOVA AND NORDITA COLLOQUIUM IN PHYSICS

Kevin J. Webb: Medical imaging with light

Abstract: Imaging of scattering media such as tissue using light provides the potential to achieve safe and inexpensive instruments and allows for the use of spectroscopy. I describe some fundamental aspects of optical imaging in scattering media and discuss the information that can be obtained by recording elastically scattered light. I describe two complementary approaches, one based on the coherence properties of light, where speckle occurs, and the other which neglects coherence at optical frequencies and employs diffusion modelling, which forms the basis of optical diffusion tomography. Imaging through many centimeters of tissue is then possible. Optical contrast can be enhanced through fluorescence, and, with targeting, high sensitivity is possible. A clinical instrument would be driven by a disease detection or health monitoring capability not provided by other modalities.

Tid och plats: Torsdagen den 7 juni kl. 15.15–16.15 i Oskar Kleins auditorium, Roslags-tullsbacken 21, AlbaNova universitetscentrum.

GRADUATE STUDENT SEMINAR

Michael Björklund: Geometry of Random Walks

Abstract: The Martin Boundary of a Markov operator is a well-studied object. It is defined in terms of the positive harmonic functions. Under certain natural conditions on the Markov operator and on the geometry of the underlying space, we can identify the Martin boundary with a geometrically given boundary. In various hyperbolic situations this has been done by A. Ancona. I will try to sketch the main ideas in his works. If time permits I will also discuss different discretization procedures due to Ledrappier, Ballman, Sullivan and Lyons.

Tid och plats: Fredagen den 8 juni kl. 13.15–14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MITTAG-LEFFLER SEMINAR

Michael Thaddeus:

Duality between torsors and gerbes on a torus bundle

Abstract: To any family T of abelian groups may be associated the family T^* of Pontrjagin duals. One expects a correspondence between torsors over T and gerbes over T^* banded by the multiplicative group, and vice versa. What this means will be explained in an extremely simple case: that of an ordinary real torus T on which a finite group W acts linearly (that is, by group homomorphisms). This is regarded as a torus bundle over the classifying space BW . The relevant torsors are then liftings of the linear action to an affine action, while the relevant gerbes are equivariant $U(1)$ -bundles over $W \times T$. From this formalism we will see how the classification of projective representations of crystallographic groups may be recovered as a kind of Fourier-Mukai transform. In another direction, we will discover new examples of Calabi-Yau orbifolds, with nontrivial B -fields, that appear to be mirror partners.

Tid och plats: Torsdagen den 7 juni kl. 15.30–16.30 vid Institut Mittag-Leffler, Aura-vägen 17, Djursholm.

DISPUTATION I MATEMATIK

Alexey Shchuplev

disputerar på avhandlingen

Toric varieties and residues

måndagen den 11 juni 2007 kl. 10.00 i sal 14, hus 5, Matematiska institutionen, SU, Kräft-riket. Till opponent har utsetts *professor Alekos Vidras*, University of Nicosia, Cyprus.

Abstract of the thesis

The multidimensional residue theory as well as the theory of integral representations for holomorphic functions is a very powerful tool in complex analysis. The computation of integrals, solving algebraic or differential equations is usually reduced to some residue integral. It is a notable feature of the theory that it is based on few model differential forms. These are the Cauchy kernel and the Bochner-Martinelli kernel. These two model kernels have been the source of other fundamental kernels and residue concepts by means of homological procedures.

The Cauchy and Bochner-Martinelli forms possess two common properties: firstly, their singular sets are the unions of complex subspaces, and secondly, the top cohomology group of the complement to the singular set is generated by a single element. We shall call such a set an atomic family and the corresponding form the associated residue kernel.

A large class of atomic families is provided by the construction of toric varieties. The extensively developed techniques of toric geometry have already produced many explicit results in complex analysis. In the thesis, we apply these methods to the following two questions of multidimensional residue theory: simplification of the proof of the Vidras-Yger generalisation of the Jacobi residue formula in the toric setting; and construction of a residue kernel associated with a toric variety and its applications in the theory of residues and integral representations. The central role in our construction is played by the theorem stating that under some assumptions a toric variety admits realisation as a complete intersection of toric hypersurfaces in an ambient toric variety.

MONEY, JOBS

Columnist: Eric Emtander, Department of Mathematics, SU. E-mail: erice@math.su.se.

Info = information. This will be given and repeated until obsolete. Rely on other sources as well.

BBKTH = Bulletin Board at the Department of Mathematics, KTH.

BBSU = Bulletin Board at the Department of Mathematics, SU.

The following information, with links, is also available at <http://www.math.su.se/~erice/mj.html>.

Unless stated otherwise, a given date is the last date (e.g. for applications), and the year is 2007. A number without an explanation is a telephone number.

Standard information channels

1. A channel to information from Vetenskapsrådet: <http://www.vr.se/naturteknik/index.asp>.
2. A channel to information from the European Mathematical Society: <http://www.emis.de>.
3. A channel to information from the American Mathematical Society: <http://www.ams.org>.
4. KTH site for information on funds: <http://www.kth.se/aktuellt/stipendier>.
5. Stockholm University site for information on funds: <http://www2.su.se/forskning/stipendier/databas.php3>.
6. Umeå site for information on funds: http://www.umu.se/umu/aktuellt/stipendier_fond_anslag.html.
7. Job announcement site: <http://www.maths.lth.se/nordic/Euro-Math-Job.html>. This is run by the European Mathematical Society.
8. Stiftelsen för internationalisering av högre utbildning och forskning (STINT) site for information on funds: <http://www.stint.se>.
9. Nordisk Forskerutdanningsakademi (NorFA) site for information on funds: <http://www.norfa.no>.
10. Svenska institutet (SI) site for information on funds: <http://www.si.se>.

New information

Jobs to apply for

11. Högskolan i Kalmar utlyser två doktorandtjänster i matematik: en med inriktning mot dynamiska system och en med inriktning mot differentialgeometri och global analys. Sista ansökningsdag är den 18 juni. Web-info: http://www.hik.se/jobs/cgi-bin/Free_Jobs.exe.

Old information

Money to apply for

12. Sverige-Amerika Stiftelsen utlyser stipendier för master-, doktorand- och postdoktorala studier i USA och Kanada. Stipendier kan sökas för 6–12 månaders studie-/forskningsvistelse. Sista ansökningsdag är den 14 september. Web-info: <http://www.sweamfo.se>.
13. Letterstedtska föreningen utdelar anslag för att befordra gemenskapen mellan de fem nordiska länderna på industrins, vetenskapens och konstens områden. Ansökan om anslag skall insändas före den 15 september. Web-info: <http://www.letterstedtska.org/>.
14. Sweden-Japan Foundation utlyser stipendier för studier, forskning samt examensarbete och praktik på högskolenivå i Japan. Ansökningsdagar är den 1 mars och den 1 oktober. Web-info: <http://www.swejap.a.se/>.
15. Wenner-Gren Stiftelserna delar ut stipendier för att möjliggöra för svenska disputerade forskare att verka vid utländsk vetenskaplig institution. Sista ansökningsdag är den 1 oktober. Stipendierna beviljas för en tid av lägst 1 och högst 12 månader med möjlighet till förlängning till högst 24 månader. Web-info: <http://www.swgc.org/index.aspx?pageID=14>.

Jobs to apply for

16. Blekinge Tekniska Högskola söker två doktorander inom matematik med tillämpningar. Den ena tjänsten har refnr 07447 och sista ansökningsdag den 1 juni. Den andra tjänsten har refnr 07449 och sista ansökningsdag den 18 juni. Web-info: <http://www.bth.se/for/tjanster.nsf/lediga/>.