



# BRÅKET



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

NR 35

FREDAGEN DEN 5 NOVEMBER 2004

## BRÅKET

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

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Institutionen för matematik  
KTH  
100 44 Stockholm

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Sista manustid för nästa nummer:  
Torsdagen den 11 november  
kl. 13.00.

Money, jobs: Se sidan 6.

## SEMINARIER

Må 11–08 kl. 18.30. Populärvetenskaplig föreläsning i fysik. Professor Håkan Snellman, Teoretisk elementarpartikelfysik, KTH: *Det svänger om neutriner: Om universums svårfångade partiklar*. Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se Bråket nr 34 sidan 7.

Ti 11–09 kl. 13.15. Seminar in Theoretical and Applied Mechanics. Karl-Erik Thylwe, Mekanik, KTH: *Ermakov-Lewis invariants — tools in the Regge-pole analysis of scattering*. Seminarierummet, Institutionen för mekanik, KTH, Teknikringen 8. Se Bråket nr 34 sidan 6.

Ti 11–09 kl. 14.00–15.00. Mittag-Leffler Seminar. Anders Martin-Löf, SU: *Conny Palm and his pioneering work in queueing and teletraffic theory*. Institut Mittag-Leffler, Auravägen 17, Djursholm.

Ti 11–09 kl. 14.00–16.00. Seminar in Statistical Genetics and Bioinformatics. Docent Arne Elofsson, Stockholm Bioinformatics Center, SU: *Protein structure and function prediction by automated distant homology detection*. Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 34 sidan 5.

Ti 11–09 kl. 15.30–16.30. Mittag-Leffler Seminar. Liu Yong, National University of Singapore: *A calculus for stochastic quality of service analysis*. Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 11–10 kl. 13.15–14.15. Seminarium i analys och dynamiska system. Ignacio Uriarte-Tuero, Yale och Helsingfors: *On Marcinkiewicz integrals and harmonic measure*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 34 sidan 1.

Fortsättning på nästa sida.

**Seminarier (fortsättning)**

- On 11–10 kl. 13.15. Algebraseminarium. Cinzia Casagrande:** *On some numerical properties of Fano varieties.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 34 sidan 4.
- On 11–10 kl. 13.15–15.00. Logikseminariet Stockholm-Uppsala. Marko Djordjevic:** *Slumpstrukturer med ändlig rang.* (Det första av två seminarier.) Sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet.
- On 11–10 kl. 15.15. Presentation av examensarbete i matematisk statistik. Hedvig Norlén, SU:** *Approximations to the Distribution of a Test Statistic for Auditing in Nuclear Materials Accountancy.* Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 3.
- On 11–10 kl. 16.15. Seminarium i matematisk statistik. Dr Michael Franklin,** Statistician, Nuclear Safeguards Unit, Institute for the Protection and Security of the Citizen, EU Joint Research Centre, Ispra, Italy: *Statistical problems of auditing of nuclear materials accountancy.* Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 4.
- On 11–10 kl. 15.30. Seminarium i numerisk analys. (Observera dagen, tiden och lokalen!) Professor Börje Johansson,** Institutionen för materialvetenskap, KTH: *Atomistic modelling of materials.* Sal E3, KTH, Osquars Backe 14, 2 tr.
- To 11–11 kl. 14.00–15.00. Mittag-Leffler Seminar. Petteri Mannersalo,** Helsinki University of Technology: *Blinking Poisson Boolean model with applications to latency in networks.* Institut Mittag-Leffler, Auravägen 17, Djursholm.
- Fr 11–12 kl. 10.00. Licentiatseminarium i numerisk analys. Per-Olov Åsén** presenterar sin licentiatavhandling: *A Proof of a Resolvent Estimate for Plane Couette Flow by New Analytical and Numerical Techniques.* Opponent: **Professor Henrik Shahgholian,** Institutionen för matematik, KTH. Sal D41, KTH, Lindstedtsvägen 17, 1 tr. Se sidan 5.
- Må 11–15 kl. 13.15–14.15. DNA-seminariet Uppsala-KTH (Dynamics, Number theory, and Analysis). Jens Marklof,** University of Bristol: *Recent developments in quantum chaos and number theory.* Sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet.
- Må 11–15 kl. 15.15–17.00. Seminarium i matematisk statistik. Professor Aihua Xia,** Department of Mathematics and Statistics, University of Melbourne: *Stein's method: from Poisson approximation to a discrete central limit theorem.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 34 sidan 7.
- Professor Xia är gäst vid avdelningen för matematisk statistik vid KTH under tiden 15–19 november 2004.*
- Ti 11–16 kl. 14.00–16.00. Seminar in Statistical Genetics and Bioinformatics. Universitetslektor Mats Gustafsson,** Institutionen för genetik och patologi, Uppsala universitet: *Bayesian inference and detection of cell cycle periodic genes.* Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 5.
- On 11–17 kl. 10.15. Mathematical Physics Seminar. Dr Jörn Kersten,** DESY Hamburg: *Running neutrino masses and mixings.* Seminarierummet, Roslagstullsbacken 11, AlbaNova universitetscentrum.

**Fortsättning på nästa sida.**

**Seminarier (fortsättning)**

**On 11–17 kl. 13.00. Seminarium i statistik. Mathias Villani:** *Bayesiansk statistik I*. Sal B705, Statistiska institutionen, SU, Universitetsvägen 10B, plan 7, Frescati.

**On 11–17 kl. 13.15–14.15. Seminarium i analys och dynamiska system. Serguei Shimorin, KTH:** *Branching point area theorems for univalent functions*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se nedan.

**Ti 11–23 kl. 14.15. Docentföreläsning i matematik. Mattias Jonsson:** *Singularities and complex dynamics*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

**PRESENTATION AV EXAMENSARBETE  
I MATEMATISK STATISTIK**

**Hedvig Norlén:**

**Approximations to the Distribution of a Test Statistic  
for Auditing in Nuclear Materials Accountancy**

*Abstract:* The author will make a presentation of the results of her work, which is concerned with comparing approximations for the distribution function of specific test statistics used in the auditing of nuclear accountancy. Reasonably reliable computation of tail probabilities is necessary for testing the agreement between accounts and inspector verification measurements. The comparison study includes both methods based on moments and a saddle point method. The work illustrates a general saddle point method being used for a sum of NON-iid variables.

The author has done the thesis work at the Safeguards Unit of the Institute of Protection and Security of the Citizen, Joint Research Centre, Ispra, Italy. The framework of her thesis will be presented by the next speaker, Dr Michael Franklin. See page 4.

*Tid och plats:* Onsdagen den 10 november kl. 15.15 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

**SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM**

**Serguei Shimorin:**

**Branching point area theorems for univalent functions**

*Abstract:* Area methods are a classical tool in the theory of univalent functions. Such topics as Grunsky, Goluzin, or Schiffer-Tammi inequalities are in fact different modifications of the Polynomial Area Theorem, which in turn reduces to an appropriate application of the Green formula.

In the talk, we discuss a new type of area theorems obtained by considering branching point compositions with univalent functions. As a result, we obtain a new series of sharp integral inequalities. We discuss also branching point versions of Grunsky and Goluzin inequalities.

*Tid och plats:* Onsdagen den 17 november kl. 13.15–14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

## SEMINARIUM I MATEMATISK STATISTIK

**Michael Franklin:**

### Statistical problems of auditing of nuclear materials accountancy

*Abstract:* Control of nuclear material throughout the world is based on accountancy that is audited by international inspectorates in IAEA and Euratom Safeguards Office (part of EU Commission). This auditing work has continued regularly for over 30 years. The auditors (known as inspectors) verify that accounts agree with the reality of material present in any location. Agreement with reality is based on independent measurements by the inspectors. Statistical methods are used (a) to translate treaty objectives into technical auditing objectives, (b) to optimize inspector resource allocation, and (c) to elaborate data evaluation procedures for inspector decision making.

At an operational level, the purpose of the inspection is to assure that no nuclear material is missing and that the accountancy is achieving an adequate precision in representing reality. Both accounts and auditing are based on measurements that have intrinsic measurement error. As a result, the assurance of satisfactory control of nuclear materials is a continuous process of statistical inference. The role of mathematical statistics over the last 30 years has been important in giving political credibility to this inference process.

The talk will describe the auditing problem as a statistical inference problem. This formulation leads to data evaluation procedures for estimation of nuclear material balance and for assessment of accountancy performance.

*Tid och plats:* Onsdagen den 10 november kl. 16.15 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

## DOCENTFÖRELÄSNING I MATEMATIK

**Mattias Jonsson:**

### Singularities and complex dynamics

*Abstract:* I will discuss how algebro-geometric methods can sometimes be used to study objects of nonalgebraic nature, e.g. certain dynamical systems.

In dynamics one is often interested in asymptotic behaviour as time evolves. For instance, given a polynomial map  $F : \mathbf{C}^2 \rightarrow \mathbf{C}^2$  one may ask at what speed the orbit  $p, F(p), F(F(p)), \dots, F^n(p), \dots$  approaches infinity as  $n \rightarrow \infty$  if the original point  $p$  is chosen generically near infinity. This speed is governed by the behaviour of  $\deg(F^n)$ , the degree of the highest order term in  $F^n$ . For example, if  $F(X, Y) = (Y, XY)$ , then  $\deg(F^n)$  gives the Fibonacci numbers, so in a suitable sense, the speed above equals the golden mean.

A classical field of algebraic geometry is the study of singularities, such as the curve in  $\mathbf{C}^2$  parameterized by  $t \mapsto (t^2, t^3)$ , which has a cusp at the origin. It is known that singularities typically can be resolved, i.e. viewed as “shadows” of nonsingular objects; the cusp above is the shadow of the space curve  $t \mapsto (t, t^2, t^3)$ .

As I will explain, it turns out that a dynamic version of resolution of curve singularities can be used to understand the speed of convergence to infinity of polynomial maps of  $\mathbf{C}^2$ . As a consequence, the speed is always a quadratic integer.

*Tid och plats:* Tisdagen den 23 november kl. 14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

LICENTIATSEMINARIUM I NUMERISK ANALYS

Per-Olov Åsén

presenterar sin licentiatavhandling

**A Proof of a Resolvent Estimate for Plane Couette Flow  
by New Analytical and Numerical Techniques**

*Opponent:* **Professor Henrik Shahgholian**, Institutionen för matematik, KTH.

*Abstract:* This thesis concerns stability of plane Couette flow in three space dimensions for the incompressible Navier-Stokes equations. We present new results for the resolvent corresponding to this flow. Previously, analytical bounds of the resolvent have been derived in parts of the unstable half-plane. In the remaining part, only bounds based on numerical computations in an infinite parameter domain are available. Due to the need for truncation of this infinite parameter domain, these results are mathematically insufficient.

We obtain a new analytical bound of the resolvent at  $s = 0$  in all but a compact subset of the parameter domain. This is done by deriving approximate solutions of the Orr-Sommerfeldt equation and bounding the errors made by the approximations. In the remaining compact set, we use standard numerical techniques to obtain a bound. Hence, this part of the proof is not rigorous in the mathematical sense.

In the thesis, we present a way of making also the numerical part of the proof rigorous. By using analytical techniques, we reduce the remaining compact subset of the parameter domain to a finite set of parameter values. In this set, we need to compute bounds of the solution of a boundary value problem. By using a validated numerical method, such bounds can be obtained. In the last part of the thesis, we investigate a validated numerical method for enclosing the solutions of boundary value problems.

*Tid och plats:* Fredagen den 12 november kl. 10.00 i sal D41, KTH, Lindstedtsvägen 17, 1 tr.

**SEMINAR IN STATISTICAL GENETICS  
AND BIOINFORMATICS**

**Mats Gustafsson:**

**Bayesian inference and detection of cell cycle periodic genes**

*Abstract:* Bayesian inference is starting to become acknowledged as a key player in statistical genetics and bioinformatics, in particular in the process of refining a priori knowledge based on experimental data. In this talk, first I will give a brief historical and theoretical background to Bayesian inference, in particular the Bayesian view of probability theory as extended logic. I will also give examples of recent advances in the use of Bayesian inference in statistical genetics and bioinformatics. This will be followed by an introduction to Bayesian parameter estimation including how to incorporate a priori knowledge and how that prior information is turned into a regularization or penalty term in the final parameter selection step. In the rest of my talk, I will consider the Bayesian approach to optimal model selection and how it can be used to find cell cycle periodic genes in microarray data. This approach will be compared with alternative methods proposed for detection of periodic genes, and we will discuss the general applicability of Bayesian model selection.

*Tid och plats:* Tisdagen den 16 november kl. 14.00–16.00 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

## MONEY, JOBS

*Columnist:* Hans Rullgård, Department of Mathematics, SU. E-mail: [hansr@math.su.se](mailto:hansr@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/~hansr/mj.html>.

Unless stated otherwise, a given date is the last date (e.g. for applications), and the year is 2004. 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://www.su.se/forskning/stipendier/databas.php3>.
6. Umeå site for information on funds: [http://www.umu.se/umu/aktuellt/stipendier\\_fond\\_anslag.html](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

#### *Money, to apply for*

11. Fulbright Grants for Visiting Lecturers and Research Scholars kan sökas för forskning och undervisning i USA 2005/06. Info: 08-534 818 85. Web-info: <http://www.usemb.se/Fulbright/> och [http://www.usemb.se/Fulbright/grants2005\\_6.pdf](http://www.usemb.se/Fulbright/grants2005_6.pdf).

### Old information

#### *Money, to apply for*

12. Karl Engvers Stiftelse har till ändamål att främja vetenskaplig forskning vid KTH genom att i första hand dela ut medel till forskare och lärare vid högskolans institutioner att användas till resor och deltagande i konferenser samt för presentationer av egna forskningsresultat. I andra hand får stiftelsens medel användas till andra projekt som drivs av studenter eller forskarstuderande vid högskolan. Ansökan skickas eller lämnas till KTHs registratorskontor och skall ha kommit in senast den 22 november. Web-info och ansökningsblankett: se punkt 4 ovan.
13. Institut Mittag-Leffler utlyser stipendier för verksamhetsåret 2005/06. Sista ansökningsdag är 31 januari 2005. Info och anmälningsblankett, som kan kopieras, finns på Matematiska institutionens anslagstavla, SU.
14. Från Knut och Alice Wallenbergs Stiftelse ställs anslag till rektors för KTH förfogande för att "i första hand användas till bidrag för sådana resor, som bäst befördrar ett personligt vetenskapligt utbyte till gagn för svensk forskning. Bidrag skall främst beviljas till yngre forskare. Medel kan även — efter rektors bedömning — undantagsvis disponeras för utländska gästforskare." Bidrag kan sökas under hela året. Info: Anette Nyström, 08-790 70 59. Web-info: se punkt 4 ovan.

#### *Jobs, to apply for*

15. Matematiska institutionen vid SU söker en universitetslektor i matematik, 5 november. Info: Clas Löfwall, 08-16 45 16, e-post [clas@math.su.se](mailto:clas@math.su.se), Bibi Pehrson, 08-16 22 92, e-post [bibi.pehrson@natkan.su.se](mailto:bibi.pehrson@natkan.su.se). Web-info: <http://www.insidan.su.se/ledigaanstallningar.php3?jobb=860>.