



BRÅKET



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

NR 36

FREDAGEN DEN 12 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

Sista manustid för nästa nummer:
Torsdagen den 18 november
kl. 13.00.

Money, jobs: Se sidan 8.

SEMINARIER

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 Bråket nr 35 sidan 5.

Fr 11–12 kl. 10.00–12.00. Högre seminarium i språkfilosofi och logik. **Roussanka Loukanova**: *Minimal Recursion Semantics*. Rum D700, Filosofiska institutionen, SU. Se sidan 7.

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. 10.15. Plurikomplexa seminariet. **Urban Cegrell**, Umeå och Sundsvall: *Boundary values of plurisubharmonic functions*. Sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet. Se sidan 4.

Fortsättning på nästa sida.

Seminarier (fortsättning)

- Ti 11–16 kl. 13.15. Plurikomplexa seminariet.** Joachim Michel, Université du Littoral, Calais: *Type and multi-type considerations on a new class of pseudo-convex domains*. Sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet. Se sidan 3.
- Ti 11–16 kl. 14.00–15.00. Mittag-Leffler Seminar.** Remco van der Hofstad, Eindhoven University of Technology: *Random graphs as Internet models: Finite mean and infinite variance degrees*. Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 4.
- 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 Bråket nr 35 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.
- 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 Bråket nr 35 sidan 3.
- On 11–17 kl. 13.15–15.00. Algebra and Geometry Seminar.** Jan-Erik Roos: *How to measure the deviation of an algebra from being a Koszul algebra*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.
- On 11–17 kl. 16.15. Presentation av examensarbete i matematisk statistik.** (*Observera tiden!*) Frida Saarinen, SU: *Using mixed models in a cross-over study with repeated measurements within periods*. Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 7.
- To 11–18 kl. 14.00–15.00. Mittag-Leffler Seminar.** Dieter Baum, Trier University: *Spatial versions of the batch Markovian arrival process (spatial BMAP's)*. Institut Mittag-Leffler, Auravägen 17, Djursholm.
- To 11–18 kl. 15.30–16.30. Mittag-Leffler Seminar.** Hannu Reittu, VTT Technical Research Centre, Helsinki: *Distance in a power law random graph, some notes on p2p networking*. Institut Mittag-Leffler, Auravägen 17, Djursholm.
- Må 11–22 kl. 13.15. Seminarium i teoretisk datalogi.** Johan Glimming, Nada, KTH: *Difunctorial semantics of object calculus: Towards algebra of objects*. Rum 1537, Nada, KTH, Lindstedtsvägen 3, plan 5. Se sidan 6.
- Må 11–22 kl. 14.15–15.00. Seminarium i numerisk analys.** Jesper Ooppelstrup, Nada, KTH: *Title to be announced*. Rum 4523, Nada, KTH, Lindstedtsvägen 5, plan 5.
- Må 11–22 kl. 18.30. Populärvetenskaplig föreläsning i fysik.** Professor Henrik Cederquist, Atomfysik, SU: *Solvinden och kometer — laddade möten: Om röntgenstrålning från kosmiska snöbollar*. Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 3.

Fortsättning på nästa sida.

Seminarier (fortsättning)

- Ti 11–23 kl. 14.00–16.00. Seminar in Statistical Genetics and Bioinformatics.**
Professor Ola Hössjer, Matematisk statistik, SU: *Multiple testing in genetics and bioinformatics*. Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 5.
- 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 Bråket nr 35 sidan 4.
- On 11–24 kl. 13.15–15.00. Algebra and Geometry Seminar. Alexander Berglund:** *Poincaré series of monomial rings*. Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 6.
- On 11–24 kl. 13.15–15.00. Logikseminariet Stockholm-Uppsala. Marko Djordjevic:** *Slumpstrukturer med ändlig rang*. (Fortsättning från seminariet den 10 november.) Sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet.

PLURIKOMPLEXA SEMINARIET**Joachim Michel:****Type and multi-type considerations
on a new class of pseudoconvex domains**

Abstract: We study a class of non-convex pseudoconvex domains admitting holomorphic support functions. We show for a fixed boundary point that after a biholomorphic transformation the variety type is equal to the linear type, and that the multi-type equals the linear multi-type. Moreover, we discuss the construction of a holomorphic support function with optimal properties with regard to solution operators for the Cauchy-Riemann equations.

Tid och plats: Tisdagen den 16 november kl. 13.15 i sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet.

POPULÄRVETENSKAPLIG FÖRELÄSNING I FYSIK**Henrik Cederquist:****Solvinden och kometer — laddade möten:
Om röntgenstrålning från kosmiska snöbollor**

Sammanfattning: År 1996 observerades röntgenstrålning från kometen Hyakutake, vilket var mycket överraskande. Man kunde helt enkelt inte förklara hur kometen som är kall kunde sända ut energirik röntgenstrålning som i princip förutsätter en hög temperatur. Kort efter den första observationen presenterades en rad mer eller mindre fantasifulla förklaringsmodeller. Man har dock under senare tid kommit underfund med att strålningen med stor sannolikhet skapas genom solvindens växelverkan med frigjorda kometgaser. Vi kommer att diskutera kometer, solvinden, hur röntgenstrålningen genereras, och om man kan använda de nya insikterna för att lära sig mera om vad kometer består av och hur de förångas. Det har också diskuterats att använda röntgenstrålning från kometer för att karakterisera tidsvariationer i solvinden.

Tid och plats: Måndagen den 22 november kl. 18.30 i Oskar Kleins auditorium, Roslags-tullsbacken 21, AlbaNova universitetscentrum.

PLURIKOMPLEXA SEMINARIET

Urban Cegrell:

Boundary values of plurisubharmonic functions

Abstract: In classical potential theory, the Riesz representation theorem says that every negative subharmonic function can be written as a sum of a Green potential and a harmonic function. The harmonic function is of course determined by its behaviour near the boundary, and the smallest harmonic majorant of the Green potential is zero, so it is natural to say that the harmonic term is the boundary values of the subharmonic function.

In pluripotential theory, the reminiscence of the Riesz theorem is an inequality:

$$v \geq u \geq v + f \quad (*)$$

valid for certain negative plurisubharmonic functions u . Here v belongs to the class of so-called maximal plurisubharmonic functions (already studied by Bremermann), and f has zero as smallest maximal plurisubharmonic majorant.

We will discuss when (*) is valid and solve a Dirichlet problem for the complex Monge-Ampère operator with maximal plurisubharmonic functions as boundary data.

Tid och plats: Tisdagen den 16 november kl. 10.15 i sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet.

MITTAG-LEFFLER SEMINAR

Remco van der Hofstad:

Random graphs as Internet models: Finite mean and infinite variance degrees

Abstract: The structure of the Internet as a graph is receiving increasing attention in both the mathematical and the networking community. Measurements have shown fascinating features of the Internet, such as power law degree sequences and “the small world phenomenon”. The small world phenomenon states that typical distances in large complex networks are small, while a complex network has a power law degree sequence when the number of nodes with degree proportional to k decays as an inverse power of k . Internet is an example of a complex network, and many such complex networks share features with the Internet. It is difficult to model the topological structure of such networks, due to the high (and ever increasing) complexity.

We propose a simple model where the number of nodes of the graph with degree k decays as an inverse power of k . We investigate the hopcount, which is the distribution of the distances between pairs of nodes. In this talk, we investigate the case where the exponent in the power law for the degrees is in between 2 and 3, so that the degrees have finite mean and infinite variance. Finally, we compare the model to Internet data such as the number of autonomous systems and/or the number of routers traversed by typical e-mail messages in Internet.

This is joint work with Gerard Hooghiemstra and Dmitri Znamenski, who, in two later talks, will address the cases where the power exponent is above 3 and in between 1 and 2, respectively.

Tid och plats: Tisdagen den 16 november kl. 14.00–15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

ALGEBRA AND GEOMETRY SEMINAR

Jan-Erik Roos:

How to measure the deviation of an algebra from being a Koszul algebra

Abstract: There are many examples of Koszul algebras “in nature” and they have nice homological properties (the exact definitions will be recalled in the lecture). Examples: The canonical ring of a general projective curve is Koszul. The homogeneous coordinate ring of Grassmannians, the rings of curves of genus g embedded by a complete series of degree $\geq 2g + 2$ and the rings of abelian varieties embedded by n times an ample divisor with $n \geq 4$ are also Koszul. But there are even more examples of *non*-Koszul algebras. I will therefore introduce and study an explicit homological measure of how a graded algebra A can differ from being a Koszul algebra. From this measure one can deduce a number $n(A)$ which is 0 if the algebra is a Koszul algebra, 1 if it is “rather” close, etc. Note that Fröberg and Löfwall have proved that the quotient of a polynomial ring in n generators by r generic quadratic forms is *non*-Koszul exactly when $n < r < n^2/4 + n/2$, and it is of interest to study what happens for these r . Here is another very explicit example from algebraic geometry: Let E be the elliptic curve defined in \mathbf{P}^2 be the homogenization of the equation $y^2 = x^3 + x$. It is possible (L. Ein, S. Katz, D. Eisenbud) to embed E in \mathbf{P}^5 so that the graded ideal of E in the polynomial ring $R = k[X_1, X_2, X_3, X_4, X_5, X_6]$ is generated exactly by five quadratic polynomials and two cubic polynomials. Furthermore the two cubic polynomials lie in the radical defined by the ideal generated by the five quadratic polynomials, so that $E \subset \mathbf{P}^5$ is “scheme-theoretically” the intersection of five quadratic hypersurfaces, but its homogeneous ideal needs two more cubic generators. For the corresponding quotient rings A we have $n(A) = 2$ (for the quadratic ideal) resp. $n(A) = 1$ (for the whole ideal). In particular the whole ideal has “better homological properties”. I will also study algebras which are quotients of an exterior algebra and I will formulate (and prove in some special cases) a conjecture about the deviations mentioned above.

Tid och plats: Onsdagen den 17 november kl. 13.15–15.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINAR IN STATISTICAL GENETICS AND BIOINFORMATICS

Ola Hössjer:

Multiple testing in genetics and bioinformatics

Abstract: There are many methods in bioinformatics and genetics that involve a large number of hypothesis tests, such as gene hunting (linkage, association and microarray analysis) and sequence alignment. It is important to adjust for the large number of tests performed in order to avoid too many false positives. At the same time, the classical Bonferroni bound is too conservative. In this talk I will review some general multiple testing techniques (Bonferroni, familywise error rate, false discovery rate, Bayesian approach). I will also give examples from linkage analysis and sequence alignment, where much is known (or assumed) about the dependency structure of the tests and tools from extreme value theory of stochastic processes can be used.

Tid och plats: Tisdagen den 23 november kl. 14.00–16.00 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

SEMINARIUM I TEORETISK DATALOGI

Johan Glimming:

Difunctorial semantics of object calculus:

Towards algebra of objects

Abstract: I will give an introduction to Abadi and Cardelli's object calculus, a typed system similar to simply typed lambda calculus but where objects, rather than functions, are the primitive syntactic entities. I give a denotational model for the first order object calculus (without subtyping) in the category pCpo of cpos and partial maps. The key novelty of this new model is its extensive use of recursively defined types, supporting self-application, to model objects. At a technical level, this entails using some sophisticated techniques such as Freyd's algebraic compactness to guarantee the existence of the denotations of the object types. The key feature/complexity is the mixed variance functors which are needed to model object types.

I will show that a canonical recursion operator is inherent in this semantics. This operator can be useful in object-oriented programming: both in algebraic/coalgebraic formal methods and in capturing recurring abstractions in actual programs. The usefulness of the operator is witnessed by giving a straightforward translation of algebraic datatypes into so-called wrapper classes. The talk concludes by comparing with Abadi and Cardelli's per semantics and by discussing current and future work.

The work reported here is joint work with Neil Ghani at the University of Leicester.

Tid och plats: Måndagen den 22 november kl. 13.15 i rum 1537, Nada, KTH, Lindstedtsvägen 3, plan 5.

ALGEBRA AND GEOMETRY SEMINAR

Alexander Berglund:

Poincaré series of monomial rings

Abstract: Let k be a field and let I be an ideal in $Q = k[x_1, \dots, x_t]$ minimally generated by a set of monomials M . We derive a formula for the multigraded Poincaré series

$$P_k^R(\mathbf{x}, z) = \sum_{i \geq 0, \alpha \in \mathbf{N}^t} \dim_k \text{Tor}_{i, \alpha}^R(k, k) x^\alpha z^i,$$

of the monomial ring $R = Q/I$, in terms of the homology of certain simplicial complexes associated to M . The homology groups occurring in the formula can be interpreted as the homology groups of the lower intervals in a meet-subsemilattice of 2^M .

As a corollary we obtain a new proof of a result by Avramov that the series

$$P_k^R(1, \dots, 1, z)$$

only depends on the embedding dimension of R and on the combinatorial data encoded by the partially ordered graph L_I , which is the set of least common multiples of subsets of M partially ordered by divisibility and with edges between monomials having a non-trivial common factor. Another consequence is a combinatorial criterion for a monomial ring to be Golod.

Tid och plats: Onsdagen den 24 november kl. 13.15–15.00 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

HÖGRE SEMINARIUM I SPRÅKFILOSOFI OCH LOGIK

**Roussanka Loukanova:
Minimal Recursion Semantics**

Abstract: Minimal Recursion Semantics (MRS) has emerged as an approach to semantic representation that is suitable for large scale computational grammars of natural language. Its major target is underspecification of semantic representations of natural language expressions without distorting information provided by the grammatical structure of those expressions. This allows resolving underspecified distinctions when needed. I will introduce MRS and its current implementation in Head-Driven Phrase Structure Grammar (HPSG) from the perspective of possibilities for its logical formalization. My introduction of MRS is based on a paper by ANN COPESTAKE, DAN FLICKINGER, CARL POLLARD, and IVAN A. SAG, *Minimal Recursion Semantics: An Introduction*.

The paper can be downloaded as a pdf file from Ivan A. Sag's web site, <http://lingo.stanford.edu/sag/publications.html>. It can also be obtained from <http://www.philosophy.su.se/texter/copestake.pdf>.

Tid och plats: Fredagen den 12 november kl. 10.00–12.00 i rum D700, Filosofiska institutionen, SU.

PRESENTATION AV EXAMENSARBETE I MATEMATISK STATISTIK

**Frida Saarinen:
Using mixed models in a cross-over study
with repeated measurements within periods**

Abstract: A general linear model has a response variable and a number of possible explaining variables. The explaining variables can either be fixed effects that can be estimated or random effects that come from a distribution. Often a study includes both fixed and random effects, and the model fitted is then called a linear mixed model. When an effect is included as random the measurements within the same effect cannot be considered independent, and the correlation between measurements has to be considered in some way. This thesis is a study of mixed models and their use in repeated measurements. An example of repeated measurements is a cross-over study where at least two different treatments are given to each individual. The individual effects can then be included in the model but since the patients will probably be a random sample from a bigger population, the individual effects can be fitted as random. We will look at a cross-over study where the measurements are repeated within periods and within days within periods and how we can use mixed models to analyse data in this study.

Tid och plats: Onsdagen den 17 november kl. 16.15 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.

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.
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. The Faculty of Exact and Natural Sciences at Universidad de Antioquia, Colombia, opens a public competition of merits, national and international, in order to hire five (5) full time tenure track faculty (open rank) with PhD degree, in the following areas: (i) Algebra or Theory of Numbers, (ii) Numeric Analysis or Optimization, (iii) Mathematical Analysis or Functional Analysis, (iv) Logic or Theory of Groups, and (v) Differential Equations. Info: luisfer@matematicas.udea.edu.co, heragis@matematicas.udea.edu.co. Web-info (in Spanish): <http://www.udea.edu.co/consulta/publico>.

Old information

Money, to apply for

12. Fulbright Grants for Visiting Lecturers and Research Scholars kan sökas för forskning och undervisning i USA 2005/06. Info: 08-53481885. Web-info: <http://www.usemb.se/Fulbright/> och http://www.usemb.se/Fulbright/grants2005_6.pdf.
13. 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.
14. 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.
15. 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, 08-7907059. Web-info: se punkt 4 ovan.