



BRÅKET



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

NR 34

FREDAGEN DEN 19 OKTOBER 2001

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 25 oktober
kl. 13.00.

Rolf Schock Prizes 2001

Professor emeritus Saul A. Kripke har fått priset i logik och filosofi. Professor Elliott H. Lieb har fått priset i matematik. I samband med priserna äger ett symposium rum den 23 oktober och ges föreläsningar den 24 oktober på Kungl. Vetenskapsakademien. Se Bråket nr 33 sidan 7.

Money, jobs: Se sidorna 6–7.

SEMINARIER

Må 10–22 kl. 11.15. **Seminarium. Enrico Bombieri, IAS, Princeton:** *Intersecting a curve with algebraic subgroups of a linear torus: boundedness and finiteness results.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

Må 10–22 kl. 13.15–14.15. **Potential Analysis Seminar. Nina Uraltseva:** *On the regularity in free boundary problems.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.

Må 10–22 kl. 13.15–15.00. **Algebra and Geometry Seminar. Valentina Barucci, Università di Roma 1:** *On an equivalence relation between algebroid curves.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 33 sidan 6.

Må 10–22 kl. 15.15–17.00. **Seminarium i matematisk statistik. Torkel Erhardsson:** *Strong memoryless times and rare events in stationary Markov renewal processes.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 33 sidan 9.

Ti 10–23 kl. 14.30–15.30. **Mittag-Leffler Seminar. Vincent Beffara, Orsay:** *On the dimension of the trace for SLE_6 .* Institut Mittag-Leffler, Auravägen 17, Djursholm.

Ti 10–23 kl. 15.15–17.00. **Seminarium om beslutsstöd och informationsfusion i ledningssystem. Mats Persson, Försvarshögskolan, och Klas Wallenius, Nada, KTH, och SaabTech Systems AB:** *Enskild och gemensam situationsuppfattning.* Sal E32, KTH, Lindstedtsvägen 3, b.v. Se Bråket nr 33 sidan 8.

Fortsättning på nästa sida.

Svenska Matematikersamfundets höstmöte

Detta äger rum på KTH den 26 oktober. Se sidorna 4–5.

Seminarier (fortsättning)

- Ti 10–23 kl. 16.00–17.00. Mittag-Leffler Seminar. Peter Jones**, New Haven: *Harmonic measure and scaling: Part II*. Institut Mittag-Leffler, Auravägen 17, Djursholm.
- On 10–24 kl. 10.15–12.00. Kombinatorikseminarium. Sergei V. Avgustinovich**, Novosibirsk: *Many-dimensional permanents*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.
- On 10–24 kl. 13.00. Elliott H. Lieb: *The stability of matter and quantum electrodynamics***. Linnésalen, Kungl. Vetenskapsakademien, Lilla Frescativägen 4, Stockholm. Se Bråket nr 33 sidan 7.
- On 10–24 kl. 14.00. Jakob Yngvason: *A fresh look at entropy and the second law of classical thermodynamics***. Linnésalen, Kungl. Vetenskapsakademien, Lilla Frescativägen 4, Stockholm. Se Bråket nr 33 sidan 7.
- On 10–24 kl. 15.00–17.00 (cirka). Saul A. Kripke: *Frege's theory of sense and reference: Some exegetical notes***. Beijersalen, Kungl. Vetenskapsakademien, Lilla Frescativägen 4, Stockholm. Se Bråket nr 33 sidan 7.
- On 10–24 kl. 15.15. Jan Philip Solovej: *The role of Thomas-Fermi theory in mathematical physics***. Linnésalen, Kungl. Vetenskapsakademien, Lilla Frescativägen 4, Stockholm. Se Bråket nr 33 sidan 7.
- On 10–24 kl. 15.15. Seminarium i matematisk statistik. Nader Tajvidi**, Lunds tekniska högskola: *Parametric and nonparametric analysis of temporal trend in extreme values with applications to wind storm losses and temperature data*. Rum 306, Cramérrummet, hus 6, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 33 sidan 9.
- On 10–24 kl. 15.15–16.00. Seminarium i matematik och fysik vid Mälardalens högskola (Västerås). Christos Papahristodoulou**, Mälardalens högskola: *Optimal portfolios*. Lektionssal N24, Mälardalens högskola, Västerås.
- On 10–24 kl. 16.05. Ari Laptev: *Lieb-Thirring inequalities and their applications in mathematical physics***. Linnésalen, Kungl. Vetenskapsakademien, Lilla Frescativägen 4, Stockholm. Se Bråket nr 33 sidan 7.
- To 10–25 kl. 14.00–15.00. Mittag-Leffler Seminar. Olga Kouznetsova**, Volgograd: *Invariant polynomial classes in the Hele-Shaw problem*. Institut Mittag-Leffler, Auravägen 17, Djursholm.
- To 10–25 kl. 15.30–16.30. Mittag-Leffler Seminar. Kurt Johansson**, KTH, Stockholm: *Random matrices: Part II*. Institut Mittag-Leffler, Auravägen 17, Djursholm.
- Fr 10–26 kl. 15.15. Matematiska institutionens kollokvium (Uppsala). Professor Evgeny Shchepin**, Steklov Institute, Moscow: *Arithmetic dimension theory*. Rum 2247, Matematiska institutionen, Polacksbacken, Uppsala universitet. Institutionen bjuder på kaffe, te och kakor kl. 14.45 i personalrummet. Efter föredraget ges möjlighet till diskussion och förfriskningar. Se sidan 4.
- Må 10–29 kl. 13.15–14.15. Potential Analysis Seminar. Jérôme Busca**, Université Paris Dauphine: *Existence and comparison results for fully nonlinear degenerate elliptic equations without zeroth-order term*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

Fortsättning på nästa sida.

Seminarier (fortsättning)

Må 10–29 kl. 15.15–17.00. Seminarium i finansiell matematik. Henrik Hult: *Multivariate extremes and dependence in elliptical distributions*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se nedan.

On 10–31 kl. 13.15–14.15. Seminarium i analys och dynamiska system. Greg Lawler, Duke and Cornell Universities: *Conformal invariance, universality, and the dimension of the Brownian frontier*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se nedan.

SEMINARIUM I FINANSIELL MATEMATIK

**Henrik Hult: Multivariate extremes
and dependence in elliptical distributions**

Abstract: In risk management log-returns are often assumed to have a multivariate normal distribution, but the multivariate normal distribution is unable to capture the dependence structure of the tails in most financial data sets. Therefore we need more sophisticated tools for measuring and analysing dependence of tails. In this talk we will focus on dependence measures for elliptical distributions. Elliptical distributions are easy to understand and share many of the tractable properties of the multivariate normal distribution, but they also enable modelling multivariate extremes and other forms of non-normal dependencies. Furthermore, they allow for explicit computation of interesting quantities such as tail dependence coefficients and the spectral measure (which will be introduced in the talk). As an example we will use the spectral measure with respect to the max norm to answer questions like: What is the dependence structure between the components in a d -dimensional random vector given that at least one component is extreme? We will also discuss the relation between dependence measures such as correlation, Kendall’s tau and Spearman’s rho in the case of elliptical distributions.

Tid och plats: Måndagen den 29 oktober kl. 15.15–17.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM

**Greg Lawler: Conformal invariance,
universality, and the dimension of the Brownian frontier**

Abstract: I will discuss work with Oded Schramm and Wendelin Werner proving a conjecture of Mandelbrot that the Hausdorff dimension of the planar Brownian frontier is $4/3$. The proof has two main ingredients: universality — which says that there is only a one parameter family of conformally invariant measures satisfying a certain “restriction property” — and a new process, Stochastic Loewner evolution, which was introduced a few years ago by Schramm. I will also discuss related results about other processes as well as some open questions.

Tid och plats: Onsdagen den 31 oktober kl. 13.15–14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MATEMATISKA INSTITUTIONENS KOLLOKVIUM (UPPSALA)

Evgeny Shchepin: Arithmetic dimension theory

Abstract: This will be an elementary talk about the history of the logarithmical law in dimension theory.

Tid och plats: Fredagen den 26 oktober kl. 15.15 i rum 2247, Matematiska institutionen, Polacksbacken, Uppsala universitet. Institutionen bjuder på kaffe, te och kakor kl. 14.45 i personalrummet. Efter föredraget ges möjlighet till diskussion och förfriskningar.

Svenska Matematikersamfundets höstmöte

Höstmötet äger rum fredagen den 26 oktober 2001 i sal E1, KTH, Lindstedtsvägen 3, entréplanet. Se Matematikersamfundets hemsida <http://www.matematikersamfundet.org.se>.

Program

10.00 – 10.45 **Elliott Lieb**, Princeton, Rolf Schock Prize winner 2001: *The Bose gas: A subtle many-body problem.*

Abstract: The properties of the ground state of quantum-mechanical many-body systems (bosons) at low density can now be examined experimentally; this continues to be an active and exciting topic. Mathematically, the problem is extremely quantum mechanical — meaning that the mathematical subtleties of the Schrödinger equation are richly displayed. The simplest question is the ground state energy (lowest eigenvalue) of the Schrödinger operator. Its value was “known”, but it took 40 years to prove it. This will be discussed as well as the (different) solution which was found to hold in two dimensions. With the aid of the methodology developed to prove these results for the homogeneous gas, two other problems have been successfully addressed. One is the fact that the Gross-Pitaevskii equation correctly describes the ground state in the ‘traps’ actually used in the experiments. The other is a very recent proof that Foldy’s theory from 1961 of the high density gas of charged particles correctly describes their ground state.

11.00 – 11.45 **Harry Kesten**, Cornell University and Mittag-Leffler Institute : *Percolation of arbitrary words in $\{0, 1\}^{\mathbb{N}}$.*

Abstract: We consider a generalization of ordinary percolation. Let \mathcal{G} be an infinite connected graph with vertex set \mathcal{V} and let $w = (w_1, w_2, \dots)$ be an element of $\mathcal{W} := \{0, 1\}^{\mathbb{N}}$, the collection of ‘words’ or sequences of zeros and ones. Also let $\{X(v) : v \in \mathcal{V}\}$ be a family of independent random variables with $\Pr\{X(v) = 1\} = 1 - \Pr\{X(v) = 0\} = p$. We say that *the word w is seen from a vertex v* , if there exists an infinite self-avoiding path (v, v_1, v_2, \dots) on \mathcal{G} , starting at v and with $X(v_i) = w_i$, $i \geq 1$. Ordinary percolation occurs if with positive probability the word $(1, 1, 1, \dots)$ is seen from some fixed vertex. So-called AB-percolation occurs if the word $(1, 0, 1, 0, \dots)$ is seen with positive probability from some fixed vertex. Here we investigate for various graphs \mathcal{G} (a) whether $\Pr\{\text{all words are seen from } v\} > 0$ (for a fixed v) and (b) whether $\Pr\{\text{all words are seen from some } v\} = 1$. This is joint work with I. Benjamini, V. Sidoravicius and Y. Zhang.

(Fortsättning på nästa sida.)

13.45 – 14.30 **Michael Loss**, Georgia Institute of Technology, Atlanta: *Many-body aspects of approach to equilibrium*.

Abstract: Kinetic theory and approach to equilibrium are usually studied in the realm of the Boltzmann equation. With a few notable exceptions not much is known about the solutions of this equation and about its derivation from fundamental principles. In 1956 Mark Kac introduced a probabilistic model (Kac’s model) of N interacting particles where the velocity distribution is governed by a Markov semigroup. In the infinite particle limit, the evolution of the single particle marginal is governed by Kac’s equation, a caricature of the spatially homogeneous Boltzmann equation. The talk will explain how Kac’s model and Kac’s equation are related. In particular the approach to equilibrium in these two models are closely connected. This hinges on a recent proof of a conjecture of Mark Kac concerning the gap of the generator of the Markov semigroup. If time permits, similar results about the Maxwell gas will be discussed.

15.00 – 15.45 **Stanislav Smirnov**, KTH and the Royal Swedish Academy of Sciences, Salem Prize and Clay Research Award winner, 2001: *Conformal invariance of critical percolation*.

Abstract: Percolation is perhaps the simplest model in statistical mechanics, which exhibits an interesting phase transition. For a lattice one colours vertices or edges independently black with probability p and white with probability $(1 - p)$, and then studies properties of “clusters” — connected black subgraphs. It is known that there is a (lattice-dependent) parameter p_c such that there exists a “fat infinite cluster” if $p > p_c$ and there are “only small clusters” if $p < p_c$. Critical percolation (i.e. when $p := p_c$) is especially interesting, e.g. it is conjectured to be conformally invariant in the scaling limit (as the mesh of the lattice tends to zero), which allowed physicists to predict many of its properties. We will discuss recent progress in the mathematical understanding of critical percolation and related processes.

16.00 – Det ajournerade årsmötet fortsätter.

POTENTIAL ANALYSIS SEMINAR

Jérôme Busca: Existence and comparison results for fully nonlinear degenerate elliptic equations without zeroth-order term

Abstract: We prove a comparison result between viscosity sub- and supersolutions of fully nonlinear, possibly degenerate, elliptic equations without zeroth-order term under rather general and natural assumptions. This result applies in particular to the p - and infinite Laplacian and to the minimal surface equations. As a by-product it implies the existence and uniqueness of continuous solutions for the Dirichlet boundary value problems associated to these equations under suitable conditions on the boundary of the domain.

The talk is based on joint work with Guy Barles, Université de Tours.

Tid och plats: Måndagen den 29 oktober kl. 13.15 – 14.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

POTENTIAL ANALYSIS SEMINAR

Nina Uraltseva:

On the regularity in free boundary problems

Abstract: Success in the study of nonlinear boundary problems for elliptic and parabolic equations is mainly based on the a priori estimates for their solutions. But there are problems where singularities of solutions can occur and it is unlikely that explicit estimates for their solutions can be obtained. The theory of minimal surfaces, quasilinear elliptic and parabolic systems, and free boundary problems give us examples of such kind. A different approach based on rescaling and blow-up-technique turned out to be more appropriate for the investigating of the regularity of solutions in such situations. Besides, monotonicity formulas are very important to control the properties of rescaled solutions. It will be shown in the talk how to use such an approach to study the regularity in some elliptic and parabolic free boundary problems.

Tid och plats: Måndagen den 22 oktober kl. 13.15–14.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

KOMBINATORIKSEMINARIUM

Sergei V. Avgustinovich:

Many-dimensional permanents

Abstract: The exact formula for the number of different binary perfect codes with distance 3 in terms of many-dimensional special matrix permanents is given.

Tid och plats: Onsdagen den 24 oktober kl. 10.15–12.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MONEY, JOBS

Columnist: Pär Holm, Department of Mathematics, SU. E-mail: pho@matematik.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.

Unless stated otherwise, a given date is the last date (e.g. for applications), and the year is 2001. A number without an explanation is a telephone number.

Standard information channels

1. A channel to information from Vetenskapsrådet: <http://www.vr.se/NaturTeknik/naturvetenskap.htm>.
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>.

(Continued on the next page.)

New information

Money, to apply for

11. Matematisk-naturvetenskapliga fakulteten vid SU utlyser Ivar Bendixsons stipendium till docenter inom fakulteten, för främjande av forskning, 19 oktober. Info: BBSU.

Jobs, to apply for

12. Institutionen för numerisk analys och datalogi (NADA) vid KTH söker minst en doktorand i numerisk analys, 22 oktober. Info: Ingrid Melinder, 08-790 7798, melinder@nada.kth.se, Katarina Gustavsson, 08-790 62 28, katarina@nada.kth.se, eller Eva-Lena Åkerman, 08-790 91 06, ela@nada.kth.se. Web-info: http://www.kth.se/aktuellt/tjanster/Anst/Dokt_NADA.html.
13. Matematikcentrum vid Lunds universitet utlyser ett vikariat som universitetslektor i matematik, 29 oktober. Info: Lars-Christer Böiers, 046-222 85 62, Lars-Christer.Boiers@math.lth.se. Web-info: <http://www.maths.lth.se/JobsInLund/svindex.html>.

Old information

Money, to apply for

14. Anslag ställs, från Knut och Alice Wallenbergs Stiftelse, 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." Ansökan om resebidrag skall ställas till rektors kansli. Bidrag kan sökas när som helst under året. Info: se punkt 4 ovan.
 15. Wenner-Gren Stiftelserna utlyser gästföreläsaranslag, avsedda att möjliggöra för svenska forskare eller institutioner att inbjuda utländska gästföreläsare. Anslag sökes av den inbjudande forskaren eller institutionen. Ansökan kan inlämnas när som helst under året. Web-info: <http://www.wenner-grenstift.a.se>.
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