BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 31 **FREDAGEN DEN 5 OKTOBER 2007**

BRÅKET

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

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

Disputation i matematik

Lars Halvard Halle disputerar på avhandlingen *Stable reduction of curves and tame ramification* fredagen den 12 oktober kl. 13.00 i sal F3, KTH, Lindstedtsvägen 26, b.v. Se Bråket nr 30 sidan 10.

Money, jobs: Se sidorna 11 – 12.

SEMINARIER

Fr 10–05 kl. 11.00. Mittag-Leffler (Post)Graduate Seminar. Teitur Arnarson: *Free boundary regularity close to initial state and applications to finance.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 30 sidan 4 och detta nr sidan 4.

Fr 10–05 kl. 13.15 – 14.15. Graduate Student Seminar. Joakim Arnlind, Matematik, KTH: *Representation theory, graphs and dynamical systems.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 30 sidan 9.

Fr 10–05 kl. 13.15 – 15.00. Seminarium, arrangerat av Avdelningen för säkerhetsforskning, KTH. Lars Olsson, Geostatistik AB: *Risker i byggande.* V:s seminarierum 156, KTH, Teknikringen 78 A, 1 tr. Se Bråket nr 29 sidan 10.

Må 10–08 kl. 11.00. Mittag-Leffler Reading Group. David Siska: *Material from Da Prato & Zabczyk: Stochastic Equations in Infinite Dimensions.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 30 sidan 4.

Må 10–08 kl. 13.15. Seminarium i teoretisk datalogi. Per Austrin, Teorigruppen, KTH CSC: *Beating Semidefinite Programming means beating the Unique Games Conjecture.* Rum 1537, KTH CSC, Lindstedtsvägen 3, plan 5. Se Bråket nr 30 sidan 11.

Fortsättning på nästa sida.

Minisymposium on Domains and Computability

Detta äger rum i Uppsala den 11 oktober. Se sidorna 6 – 7.

Potential Theory and Applications

En konferens med denna titel äger rum vid KTH den 15 – 17 oktober. Se sidan 10.

Seminarier (fortsättning)

Ti 10–09 kl. 14.00 – 15.00. Mittag-Leffler Seminar. Nicolas Bouleau, ENPC, France: *On the propagation of small random errors.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 4.

Ti 10–09 kl. 15.15 – 16.15. AlbaNova and Nordita Colloquium in Physics. *The 2007 Nobel Prize in Physics.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

Ti 10–09 kl. 15.30 – 16.30. Mittag-Leffler Seminar. Jan van Neerven, Technical University Delft, The Netherlands: *Boundedness of Riesz transforms for elliptic operators on abstract Wiener spaces.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 5.

On 10–10 kl. 10.15 – 11.15. Kombinatorikseminarium. Faina I. Solov'eva, Sobolev Institute, Novosibirsk: *On transitive partitions of the n-cube into binary codes.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 30 sidan 10.

On 10–10 kl. 13.15 – 14.15. Seminarium i analys och dynamiska system. Nicolae Mihalache: *Properties of critical orbits related to the geometry of Julia sets.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

On 10–10 kl. 13.15 – 15.00. Algebra- och geometriseminarium. Henrik Strohmayer, SU: *Operads of compatible structures and weighted partitions.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

On 10–10 kl. 14.15. Logikseminariet Stockholm-Uppsala. *(Observera tiden och lokalen!)* **Sara Negri,** Helsingfors universitet: *Proof analysis in temporal logic.* Sal Å4005, Uppsala universitet. Se sidan 5.

On 10–10 kl. 14.30 – 15.30. KCSE (KTH Computational Science and Engineering Centre) Seminar. Mohammad Motamed, NADA, KTH: *Computation of creeping waves on smooth objects.* Rum 4523, KTH CSC, Lindstedtsvägen 5, plan 5. Se Bråket nr 30 sidan 8.

On 10–10 kl. 16.00 – 17.00. KTH/SU Mathematics Colloquium. Björn Birnir, University of California at Santa Barbara, USA: *Uniqueness of solutions to the stochastic Navier-Stokes equation and Kolmogorov's theory of turbulence.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Kaffe/te serveras kl. 15.30 i pausrummet, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4. Se sidan 8.

On 10–10 kl. 18.00 – 19.00. Offentlig föreläsning på Kungl. Vetenskapsakademien. Föreläsningen består av två delar om vardera 30 minuter. **Professor Svante Janson,** Uppsala universitet: *Slumpgrafer och Internet.* **Professor Anders Björner,** KTH: *Matematiken bakom Google.* Beijersalen, Kungl. Vetenskapsakademien, Lilla Frescativägen 4A, Stockholm. Se Bråket nr 30 sidan 11.

To 10–11 kl. 14.00 – 15.00. Mittag-Leffler Seminar. Annie Millet, Université Paris 1, France: *Large deviations for the Boussinesq model.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 7.

Fortsättning på nästa sida.

Seminarier (fortsättning)

To 10–11 kl. 14.00. Kollokvium i filosofi. Stefano Predelli, University of Nottingham, och **Isidora Stojanovic,** Institut Jean-Nicod: *Relativizing Kaplan: The metasemantic case for relativist semantics.* Rum D255, Filosofiska institutionen, SU.

To 10–11 kl. 15.30 – 16.30. Mittag-Leffler Seminar. Carl Mueller, University of Rochester, USA: *Regularity of the density for the stochastic heat equation.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 7.

Fr 10–12 kl. 11.00. Mittag-Leffler (Post)Graduate Seminar. Harald Oberhauser: *Isoperimetry and rough path regularity.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 30 sidan 4 och detta nr sidan 8.

Må 10–15 kl. 15.15 – 16.00. Seminarium i matematisk statistik. Niklas Hammarström presenterar sitt examensarbete: *Nödvändig mätsträcka — strategi för mätning av fordonsbelastningar.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 9.

Må 10–15 kl. 15.15. Seminarium i teoretisk datalogi. Mikkel Thorup, AT & T Labs Research: *Optimal bounds for predecessor search and the first separation between linear and polynomial space.* Rum 4523, KTH CSC, Lindstedtsvägen 5, plan 5. Se sidan 9.

Ti 10–16 kl. 15.30 – 16.30. Mittag-Leffler Seminar. Nicolai Krylov, University of Minnesota, Minneapolis, USA: *Analytic approach to SPDE's. The first of a series of three lectures.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 10–17 kl. 11.00. Common SU KoF/KTH Theoretical Physics Seminar. Lars Samuelsson, Nordita: *Dynamical modelling of Neutron stars.* Sal FB41, Roslagstullsbacken 21, AlbaNova universitetscentrum.

On 10–17 kl. 13.00. Algebra- och geometriseminarium. Alexander Berglund: *Title to be announced.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

On 10–17 kl. 15.15. Seminarium i numerisk analys. Axel Målqvist, Uppsala universitet: *Adaptive variational multiscale methods.* Rum 4523, KTH CSC, Lindstedtsvägen 5, plan 5. Se sidan 8.

To 10–18 kl. 15.15 – 16.15. Manne Siegbahn Memorial Lecture 2007 — AlbaNova and Nordita Colloquium in Physics. Sidney R. Nagel, University of Chicago: *Topological transitions and singularities in fluids: The life and death of a drop.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 10.

Fr 10–19 kl. 13.15 – 14.15. Graduate Student Seminar. Andreas Strömbergsson, Matematik, KTH: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

Må 10–22 kl. 13.15. Docentföreläsning i matematik. Mattias Dahl: *The Yamabe Problem and the Yamabe invariant.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 11.

MITTAG-LEFFLER (POST)GRADUATE SEMINAR

Teitur Arnarson:
Free boundary regularity close to initial state and applications to finance

Abstract: The choice whether to hold or exercise an American option in finance is determined by a free boundary occurring in the obstacle problem solved by the option pricing function. It is, however, hard to calculate this free boundary numerically close to the option expiry (or initial state for the time reversed problem). The problem of the boundary regularity is well studied and good results are known in the basic one-dimensional Black-Scholes setting. We present a method for determining the free boundary regularity with less precision but in a more general, higher-dimensional, non-linear setting.

Tid och plats: Fredagen den 5 oktober kl. 11.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

MITTAG-LEFFLER SEMINAR

Nicolas Bouleau:
On the propagation of small random errors

Abstract: We tackle several questions about representation and propagation of small random errors. First of all, in which cases is a purely deterministic error calculus sufficient, dealing only with first order derivatives? Then, we investigate the property of intrinsicness of error calculus formulae. We show that the right geometrization uses the concept of second order tangent vector and related notions. Third, we look at what could be invariant through the propagation of errors: it is the case of symmetry and this leads us to the notion of error structures expressing errors by Dirichlet forms. Eventually we examine the determination of errors by statistical data, and we show the link of the square field operator with the Fisher information matrix.

Tid och plats: Tisdagen den 9 oktober kl. 14.00 – 15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

ALGEBRA- OCH GEOMETRISEMINARIUM

Henrik Strohmayer:
Operads of compatible structures and weighted partitions

Abstract: Let $\mathcal{P}$ be a binary quadratic operad and let V be a vector space over $\mathbb{K}$. A $\mathcal{P}$-algebra structure on V is given by a set of operations $\{\mu_i : V \otimes V \to V\}_{i\in I}$ satisfying axioms encoded by $\mathcal{P}$. If two $\mathcal{P}$-algebras $(V, \{\mu_i\}_{i\in I})$ and $(V, \{\nu_i\}_{i\in I})$ are compatible in a certain sense, then we can define a new $\mathcal{P}$-algebra structure on V given by the operations $\{\eta_i := \alpha\mu_i + \beta\nu_i\}_{i\in I}$, for $\alpha, \beta \in \mathbb{K}$. We show what this compatibility condition translates to in the language of operads. We also define the Koszul dual construction. Then, by using the poset method of Vallette, we show that the operads encoding these kinds of structures are Koszul for a large class of operads. In particular we show that this is true for compatible Lie, associative and pre-Lie algebras.

Tid och plats: Onsdagen den 10 oktober kl. 13.15 – 15.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MITTAG-LEFFLER SEMINAR

Jan van Neerven:
Boundedness of Riesz transforms
for elliptic operators on abstract Wiener spaces

Abstract: Let (E, H, μ) be an abstract Wiener space and let $\underline{H}$ be a Hilbert space. Let $D = VD_H$, where $V : \mathsf{D}(V) \subset H \to \underline{H}$ is a closed operator and D_H denotes the Fréchet derivative in the direction of H, and let B be a coercive operator on $\underline{H}$. We consider the realization in $L^2(E, \mu)$ of the operator $L_B = D^*BD$. Operators of this form arise naturally in connection with parabolic SPDE's with additive white noise. It is shown that

$$\mathsf{D}(\sqrt{L_B}) = \mathsf{D}(D)$$

with equivalence of norms

$$\|\sqrt{L_B} f\|_2 \eqsim \|Df\|_2$$

if and only if the associated operator $\underline{L}_B := DD^*B$ admits a bounded H^∞-functional calculus on $L^2(E, \mu; \underline{H})$. Partial extensions of this result to $L^p(E, \mu)$, $1 < p < \infty$, are discussed and some applications are given.

This is joint work with Jan Maas.

Tid och plats: Tisdagen den 9 oktober kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM

Nicolae Mihalache:
Properties of critical orbits related to the geometry of Julia sets

Abstract: If all recurrent critical orbits in the Julia set of a rational map (without parabolic cycles) are Collet-Eckmann, then all its Fatou components are Holder domains (with good consequences on the geometry of polynomial Julia sets). This generalizes results of [Carleson, Jones, Yoccoz] and [Graczyk, Smirnov] about the geometry of Fatou/Julia sets.

The proof of each aforementioned result will be overviewed during my talk.

Tid och plats: Onsdagen den 10 oktober kl. 13.15 – 14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

LOGIKSEMINARIET STOCKHOLM-UPPSALA

Sara Negri:
Proof analysis in temporal logic

Abstract: The talk will deal with a method for developing well-behaved systems of sequent calculus for linear and branching time temporal logic, with applications to the central problem, namely finitization, for discrete linear time and to a simple uniform proof of completeness. In the end some open problems will be discussed. Part of the content is based on joint work with Bianca Boretti.

Tid och plats: Onsdagen den 10 oktober kl. 14.15 i sal Å4005, Uppsala universitet.

MINISYMPOSIUM ON DOMAINS AND COMPUTABILITY

This will take place at Uppsala University on Thursday, October 11, 2007. All talks will be given in room Å2002.

Schedule

9.00 – 10.00 **Dag Normann,** Universitetet i Oslo: *External and internal density theorems for limitspace-interpretations of some types.*

Abstract: Traditional density theorems often have the format that the total objects in some domain form a dense subset of the domain in question, while classical applications of density theorems, like Kreisel's Representation Theorem, can be carried out without reference to the underlying domains or other external structures. In this talk, we will first discuss limitations to possible traditional density theorems for domains representing spaces of continuous functions from one separable metric space to another. Then we will see how we may construct dense countable subsets of some types interpreted in the category of Kuratowski Limit Spaces. The talk will be a report on ongoing research.

10.00 – 10.30 Coffee.

10.30 – 11.30 **Ulrich Berger,** Swansea University: *A domain-theoretic characterization of strong normalization.*

Abstract: We present a domain-theoretic model for the untyped lambda-calculus with pattern matching and term rewriting with the property that a term is strongly normalizing if and only if its value is not bottom.

11.40 – 12.40 **Peter Hertling,** Universität der Bundeswehr München: *Computability and non-computability results for the topological entropy of shift spaces.*

Abstract: The topological entropy, a numerical quantity assigned to a continuous function from a compact space to itself, is invariant under topological conjugacy and serves as a tool for classifying dynamical systems. Therefore, computing the topological entropy is an important problem in dynamical systems theory. We discuss several recent positive and negative results concerning the computability of the topological entropy of shift dynamical systems.

12.40 – 14.15 Lunch.

14.15 – 15.15 **Warwick Tucker,** Universitetet i Bergen: *Auto-validating numerical methods.*

Abstract: We will present a modern class of numerical methods, based on set-valued computations. Such methods allow for a sought quantity to be enclosed rather than approximated in the traditional sense. Done correctly, this approach provides rigorous error bounds for all intermediate calculations, which can be used adaptively within the numerical method. The end product is a mathematically correct statement, often in terms of verified inequalities.

Despite the underlying theory being known since the sixties, it is only now that these methods are gaining a wider use — both within academia and industry. Set-valued computations appear to have most impact for non-linear global problems of reasonable size. We will present concrete examples where these methods work well, and end by discussing computational environments that support the underlying mathematics.

15.25 – 16.25 **Jens Blanck,** Swansea University: *Computably stable algebras.*

(Continued on the next page.)

16.25 – 16.45 Coffee.

16.45 – 17.45 **John V. Tucker,** Swansea University: *Computability: algorithmic procedures versus experimental procedures.*

Abstract: In this lecture I will survey some old and new results that try to answer these questions:

1. What are the functions computable by experimental procedures applied to different physical systems?
2. How do they compare with the functions computable by algorithms?
3. Do there exist physical systems that exhibit behaviour not algorithmically computable?
4. What are the physical limits to computation?

MITTAG-LEFFLER SEMINAR

Annie Millet:
Large deviations for the Boussinesq model

Abstract: Let $\phi^\epsilon = (u^\epsilon, \theta^\epsilon)$ denote the pressure and temperature of a field, which satisfy coupled two-dimensional Navier-Stokes and one-dimensional heat transport equations, and are submitted to a random influence as follows:

$$d_t u^\epsilon(t) + u^\epsilon(t).\nabla u^\epsilon(t) - \nu\Delta u^\epsilon(t) + \nabla p(t) = \theta(t)^\epsilon e_2 + \sqrt{\epsilon}\sigma_1(t,\phi^\epsilon(t))\,dW_t^1,$$
$$\mathrm{div}\, u^\epsilon(t) := \nabla.u^\epsilon(t) = 0,$$
$$d_t\theta^\epsilon(t) + u^\epsilon(t).\nabla\theta^\epsilon(t) - u_2^\epsilon(t) - \kappa\Delta\theta^\epsilon(t) = \sqrt{\epsilon}\sigma_2(t,\phi^\epsilon(t))\,dW_t^2.$$

This equation, which models convection systems appearing for examples in phenomena of weather and climate dynamics, is defined for the space parameter $x = (x_1, x_2) \in D = (0, l) \times (0, 1)$. The random forcing term is directed by a pair of $L^2(D)$-valued independent Brownian motions (W^1, W^2) with trace-class covariance. In a joint work with J. Duan, we prove an LDP for this stochastic Bénard equation in the space $C([0,T], L^2(D)) \cap L^2((0,T], H^1(D))$. The proof is based on the convergence in law of solutions to equations similar to the previous ones, shifting the Wiener processes by random elements h^ϵ of their RKHS.

Tid och plats: Torsdagen den 11 oktober kl. 14.00 – 15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

MITTAG-LEFFLER SEMINAR

Carl Mueller:
Regularity of the density for the stochastic heat equation

Abstract: We study the smoothness of the density of a semilinear heat equation with multiplicative spacetime white noise. Using Malliavin calculus, we reduce the problem to a question of negative moments of solutions of a linear heat equation with multiplicative white noise. Then we settle this question by proving that solutions to the linear equation have negative moments of all orders.

This is joint work with D. Nualart.

Tid och plats: Torsdagen den 11 oktober kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

KTH/SU MATHEMATICS COLLOQUIUM

Björn Birnir:
Uniqueness of solutions to the stochastic Navier-Stokes equation and Kolmogorov's theory of turbulence

Abstract: The problem of understanding and analysing turbulence has occupied scientists and enginneers for at least 500 years. Some of the most relevant observations of turbulence were made by Leonardi da Vinci, and turbulence is still holding back some of the most pressing problems of modern technology. In this lecture we will discuss why it is essential to formulate the description of turbulent fluids as a noise-driven process. We will explain recent result showing that the Navier-Stokes equation driven by turbulent noise has unique solutions and a unique invariant measure. This allows one to formulate a statistical theory of turbulence and prove Kolmogorov's theory of turbulence that he developed during the second world war. We will explain why these developments should lead to improved numerical methods that may make possible the solution of most problems in turbulence.

Tid och plats: Onsdagen den 10 oktober kl. 16.00 – 17.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Kaffe/te serveras kl. 15.30 i pausrummet, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4.

MITTAG-LEFFLER (POST)GRADUATE SEMINAR

Harald Oberhauser:
Isoperimetry and rough path regularity

Abstract: I will give a short introduction to rough path theory and talk about recent work (joint with Peter Friz) concerning regularity properties of Gaussian rough paths and the associated stochastic areas.

Tid och plats: Fredagen den 12 oktober kl. 11.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

SEMINARIUM I NUMERISK ANALYS

Axel Målqvist:
Adaptive variational multiscale methods

Abstract: We present an adaptive multiscale method for solving elliptic partial differential equations. The method is based on numerical solution of decoupled local fine scale problems on patches. Critical parameters such as fine and coarse scale mesh size and patch size are tuned automatically by an adaptive algorithm based on a posteriori error estimates. We extend the method to a mixed formulation of the Poisson equation and to a convection dominated convection-diffusion problem. In both cases we derive error estimates and present adaptive algorithms. We apply the method mixed to an elliptic problem that arises in oil reservoir simulation and show promising results.

Tid och plats: Onsdagen den 17 oktober kl. 15.15 i rum 4523, KTH CSC, Lindstedtsvägen 5, plan 5.

SEMINARIUM I MATEMATISK STATISTIK

Niklas Hammarström

presenterar sitt examensarbete:

Nödvändig mätsträcka — strategi för mätning av fordonsbelastningar

Bakgrund: Belastningsmätningar på fordon i fält är långa, tidskrävande och dyra. Osäkerheten i resultaten avtar när mätningens längd ökar. Hur lång mätsträcka är nödvändig? Utredningen baseras på befintliga mätningar från Brasilien och Europa. Tre signaler studeras: hjulrörelse, ramacceleration och hyttkrängning.

Metod: Datamängderna är mycket stora, statistisk analys är lämplig. Först undersöks hur signalerna kan komprimeras. Därefter undersöks relativt fel i delskadeintensitet (utmattning per körsträcka). Ett analytiskt uttryck för felet som funktion av spridningen i mätningen och mätningens längd härleds. Då mätningarna görs kortare behövs en robust metod för att extrapolera till längre sträckor. Metoden POT (Peak Over Threshold) studeras och uttryck för största belastning och förväntat antal genomslag utvecklas. Metoder för att skatta osäkerheten i extrapoleringarna utvärderas också.

Resultat: Hjulrörelsen är den signal som genomgående visar störst spridning inom respektive mätning. Detta beror troligtvis på att de övriga analyserade signalerna är mätta längre upp i fordonet och är därmed filtrerade av fordonets dynamik. Mot bakgrund av resultaten ovan kan en rekommendation för mätsträckans längd ges. Längre sträckor än rekommendationen ger inte lönsam minskning av osäkerheterna. Extrapolering av extremvärden och genomslag bedöms fungera bra.

Tid och plats: Måndagen den 15 oktober kl. 15.15 – 16.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I TEORETISK DATALOGI

Mikkel Thorup:

Optimal bounds for predecessor search and the first separation between linear and polynomial space

Abstract: We develop a new technique for proving cell-probe lower bounds for static data structures. Previous lower bounds used a reduction to communication games, which was known not to be tight by counting arguments. We give the first lower bound for an explicit problem which breaks this communication complexity barrier. In addition, our bounds give the first separation between polynomial and near linear space. Such a separation is inherently impossible by communication complexity.

Using our lower bound technique and new upper bound constructions, we obtain tight bounds for searching predecessors among a static set of integers. We determine the optimal query time for any combination of space and word size w. In particular, we show that the classic van Emde Boas search time of $O(\log w)$ cannot be improved, even if we allow randomization. This is a separation from polynomial space, since Beame and Fich [STOC'99] give a predecessor search time of $O(\log w/\log\log w)$ using quadratic space.

The talk is based on joint work with Mihai Patrascu from STOC'06 and SODA'07.

Tid och plats: Måndagen den 15 oktober kl. 15.15 i rum 4523, KTH CSC, Lindstedtsvägen 5, plan 5.

POTENTIAL THEORY AND APPLICATIONS

A Conference in Honour of Björn Gustafsson's 60th Birthday, KTH, October 15 – 17, 2007

This conference is in honour of Björn Gustafsson and his contributions to analysis. Björn began at KTH as an undergraduate engineering student, and subsequently studied mathematics under Harold Shapiro. His research has mainly been within pure mathematics, but with a strong view towards applications and physics. Topics in which he has made significant contributions include quadrature domains, partial balayage (intimately connected with Hele-Shaw flow, for instance), mother bodies and the exponential transform.

Björn has collaborated successfully with researchers from many parts of the world, from Japan in the east to the United States of America in the west and many nations in between. In recent times his work has turned out to be intimately related to topics under intense study in mathematical physics, such as Laplacian growth problems. Thus his research continues to be as vibrant and relevant as ever.

Organizing Committee:
Henrik Shahgholian, henriksh@math.kth.se,
Tomas Sjödin, (Contact Person), tomas@math.kth.se,
Alexander Vasiliev, alexander.vasiliev@uib.no.

The conference begins on Monday, October 15, at 10.00. The last seminar will be given on Wednesday, October 17, at 12.15 – 13.05, and the conference ends with a lunch the same day at 13.05 – 14.35.

A complete (preliminary) schedule for the conference can be found at
http://www.math.kth.se/potentialtheory07/program.html.

MANNE SIEGBAHN MEMORIAL LECTURE 2007 — ALBANOVA AND NORDITA COLLOQUIUM IN PHYSICS

Sidney R. Nagel: Topological transitions and singularities in fluids: The life and death of a drop

Abstract: The exhilarating spray from waves crashing into the shore, the distressing sound of a faucet leaking in the night, and the indispensable role of bubbles dissolving gas into the oceans are but a few examples of the ubiquitous presence and profound importance of drop formation and splashing in our lives. They are also examples of a liquid changing its topology. Although part of our common everyday experience, these transitions are far from understood and reveal delightful and profound surprises upon careful investigation. For example in droplet fission, the fluid forms a neck that becomes vanishingly thin at the point of breakup. This topological transition is thus accompanied by a dynamic singularity in which physical properties such as pressure diverge. Singularities of this sort often organize the overall dynamical evolution of nonlinear systems. I will first discuss the role of singularities in the breakup of drops. I will then discuss the fate of the drop when it falls and eventually splashes against a solid surface.

Tid och plats: Torsdagen den 18 oktober kl. 15.15 – 16.15 i Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

DOCENTFÖRELÄSNING I MATEMATIK

Mattias Dahl:
The Yamabe Problem and the Yamabe invariant

Abstract: A fundamental question in differential geometry is to find a "natural" geometric structure on a given manifold. For surfaces it is a classical fact that every Riemannian metric can be conformally changed to a metric of constant curvature. This gives canonical models for all surfaces. However, such a simple picture cannot be expected in higher dimensions.

The Yamabe problem asks if a metric on a manifold of dimension ≥ 3 can always be conformally changed to one of constant scalar curvature (a much weaker condition than constant curvature). This has been proved, the proof required the work of several mathematicians and displays a subtle interplay of geometry and analysis. In this talk I will try to explain the background of the problem and the main points of the proof.

The Yamabe invariant appears in the proof and is in a sense a measure of how much positive curvature a given differentiable manifold allows. This invariant is quite mysterious and has been computed explicitly only in special situations. I will try to explain what is known and what is conjectured about the Yamabe invariant.

Tid och plats: Måndagen den 22 oktober kl. 13.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MONEY, JOBS

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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/~johannes/mj.html.en.
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.

(Continued on the next page.)

New information

Jobs to apply for

11. Umeå universitet söker en doktorand i matematisk ekologi (ledande till doktorsexamen antingen i tillämpad matematik eller teoretisk ekologi). Sista ansökningsdag är den 15 november. Web-info: http://www.math.umu.se/Aktuellt/Vacancies/DoktorandMatematiskEkologi2007.pdf.

Old information

Money to apply for

12. Stiftelsen för internationalisering av högre utbildning och forskning (STINT) har inrättat ett nytt program: STINT Institutional Grants for Younger Researchers. Programmet riktar sig till yngre forskare som tidigt i sin karriär — inom sju år från disputationen — vill bygga upp internationellt samarbete med andra yngre forskare. Sista ansökningsdag är den 15 oktober. Web-info: http://www.stint.se/index.php?articleId=137.

Jobs to apply for

13. Göteborgs universitet söker en doktorand i matematik med inriktning mot algebraiska strukturer i fysiken. Sista ansökningsdag är den 15 november. Web-info: http://ledig-anstallning.adm.gu.se/#.
14. Göteborgs universitet söker en doktorand i matematik med inriktning mot numerisk analys av atomära beräkningar. Sista ansökningsdag är den 15 november. Web-info: http://ledig-anstallning.adm.gu.se/#.
15. Lunds universitet söker en doktorand i matematisk statistik. Sista ansökningsdag är den 26 oktober. Web-info: http://www3.lu.se/info/lediga/admin/document/PA%202007-3454.pdf.
16. Örebro universitet söker en universitetslektor i matematik med inriktning mot matematikens didaktik. Sista ansökningsdag är den 8 oktober. Web-info: http://www.oru.se/templates/oruextAdViewer.aspx?id=2303&adPageID=43383.
17. Högskolan i Kalmar söker en universitetslektor/-adjunkt i matematik med inriktning mot matematikens didaktik. Sista ansökningsdag är den 8 oktober. Web-info: http://www.hik.se/jobs/cgi-bin/Free_Jobs.exe.