BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 37 **FREDAGEN DEN 13 NOVEMBER 2009**

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 19 november kl. 13.00.

SEMINARIER

Fr 11–13 kl. 13.15 – 14.15. Graduate Student Seminar. Oscar Andersson Forsman: *What is Lie group methods for PDE?* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 36 sidan 6.

Må 11–16 kl. 15.15 – 16.00. Seminarium i finansiell matematik. Anna Bergfast presenterar sitt examensarbete: *Automated Trading using a Dip Searching Strategy.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 3.

Ti 11–17 kl. 18.00. Populärvetenskaplig föreläsning i fysik. Docent Ines Ezcurra, Molekylärgenetik, Skolan för bioteknologi, KTH: *Ta i trä: Om bio-inspiration till framtidens material.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 6.

Fortsättning på nästa sida.

Constructive Mathematics: Proof and Computation

Föreläsningar och seminarier i detta ämne skall ges vid Uppsala universitet den 17 och den 24 november. Se sidan 5.

Disputation i matematik

Jakob Erik Björnberg skall disputera på avhandlingen *Graphical representations of Ising and Potts models: Stochastic geometry of the quantum Ising model and the space-time Potts model* onsdagen den 18 november kl. 13.30 i sal F3, KTH, Lindstedtsvägen 26, b.v. Se Bråket nr 36 sidan 8.

Kurs

Kelly Jabbusch: Positivity in Algebraic Geometry. Se sidan 4.

Miniworkshop in PDE and Potential Theory

Denna skall äga rum vid KTH onsdagen den 18 november. Se Bråket nr 36 sidorna 9 – 10.

PDE afternoon

Denna skall äga rum vid KTH tisdagen den 24 november. Se sidan 8.

Seminarier (fortsättning)

On 11–18 kl. 10.15 – 12.00. Kombinatorikseminarium. Anatol Kirillov, Kyoto: *Tropical Robinson-Schensted-Knuth correspondence.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.

On 11–18 kl. 13.00 – 14.30. Öppen föreläsning anordnad av Institutionen för matematikämnets och naturvetenskapsämnenas didaktik vid SU. Inger Wistedt, Pedagogiska institutionen, SU: *Stöd och utveckling av matematisk förmåga — nationella och internationella perspektiv.* Amelinsalen (A502), Campus Konradsberg.

On 11–18 kl. 13.15 – 15.00. Algebra and Geometry Seminar. Sandra Di Rocco, KTH: *Toric polarized fibrations and Cayley polytopes.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.

On 11–18 kl. 14.00 – 15.00. Institut Mittag-Leffler Seminar. Joan Bagaria, Universitat de Barcelona: *Large cardinals and accessible categories.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 4.

On 11–18 kl. 15.30 – 16.30. Institut Mittag-Leffler Seminar. Philipp Schlicht, Friedrich-Wilhelms-Universität Bonn: *Descriptive set theory at uncountable cardinals.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 5.

On 11–18 kl. 16.00. KTH/SU Mathematics Colloquium. Alexander Gorodnik, University of Bristol: *Arithmetic geometry and dynamical systems.* 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 Bråket nr 36 sidan 7.

To 11–19 kl. 10.15 – 11.00. Guest Lecture. Professor Alberto Isidori, University of Rome, Italy: *A unified design method for output regulation of minimum phase and non-minimum phase systems.* Sal M3, KTH, Brinellvägen 64. Se Bråket nr 36 sidan 6.

To 11–19 kl. 14.00 – 15.00. Institut Mittag-Leffler Seminar. Vera Koponen, Uppsala universitet: *Asymptotic probabilities of extension axioms.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 8.

To 11–19 kl. 15.15 – 16.15. AlbaNova and Nordita Colloquium in Physics. Andreas Trabesinger, Senior editor of Nature Physics: *How to publish in Nature Physics.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 5.

To 11–19 kl. 15.30 – 16.30. Institut Mittag-Leffler Seminar. Kerkko Luosto, University of Helsinki: *Combinatorics of quantifiers.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 4.

Må 11–23 kl. 11.15 – 12.15. DNA-seminariet Uppsala-KTH (Dynamical systems, Number theory, Analysis). Jimi Truelsen, Cambridge: *Title to be announced.* Lokal meddelas senare.

Må 11–23 kl. 15.15 – 17.00. Seminarium i matematisk statistik. Professor emeritus Lars Holst: *Några rekordproblem.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.

Fortsättning på nästa sida.

Seminarier (fortsättning)

Ti 11–24 kl. 13.00–13.50. PDE Seminar. Maria Gualdani, University of Texas, Austin: *Global existence of a free boundary problem with non-standard sources.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 8.

Ti 11–24 kl. 14.00–14.50. PDE Seminar. Richard Tsai, University of Texas, Austin: *Adaptive and greedy algorithms for inverse point source discovery in complicated domains.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 8.

Ti 11–24 kl. 18.00. Populärvetenskaplig föreläsning i fysik. Kambiz Fathi, Astrofysik, SU: *Supermassiva svarta hål i universum: Om så kallade monster i centrum av galaxer.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 6.

On 11–25 kl. 13.15–14.15. Seminarium i analys och dynamiska system. Niel Dobbs, KTH: *A random walk in exponential dynamics.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 9.

On 11–25 kl. 13.15. Algebra and Geometry Seminar. Roy Skjelnes, KTH: *Quotients by equivalence relations of schemes.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

On 11–25 kl. 15.15. Seminarium i matematisk statistik. Dmitrii Silvestrov, SU: *Optimal Stopping and Convergence for American Type Options.* Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 7.

Fr 11–27 kl. 13.15–14.15. Graduate Student Seminar. Kathrin Vorwerk: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I FINANSIELL MATEMATIK

Anna Bergfast

presenterar sitt examensarbete:

Automated Trading using a Dip Searching Strategy

Abstract: The purpose of this thesis is to create algorithmic trading strategies based on the idea that the OMXS30 index will behave in a certain way like a dip in the market. These strategies are created because one wants to find a way of making profit on the OMXS30 index. To build the strategies, a thorough study of the index has been made, and then different statistical methods are used when designing the strategies. All of the four strategies generate a profit when they were tested, the net results are different for each strategy.

The conclusions drawn in this thesis are that there are many ways of creating algorithmic strategies, but when using a strategy which becomes active after a dip, there is potential profit to be made.

Tid och plats: Måndagen den 16 november kl. 15.15–16.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MINICOURSE IN MATHEMATICS

Kelly Jabbusch:
Positivity in Algebraic Geometry

Kelly Jabbusch, new postdoc at the Department of Mathematics, KTH, will give a minicourse with the title given above.

Abstract: In this minicourse we will investigate different notions of positivity in algebraic geometry. The first lecture will start with the classical theory of positivity for divisors and line bundles on schemes. In subsequent lectures we will generalize these notions of positivity to vector bundles of higher rank and see how positivity of certain bundles can aid in the classification of varieties.

Time and place: Mondays, November 16, 23, 30 and December 7, at 11.00 in seminar room 3733, Department of Mathematics, KTH, Lindstedtsvägen 25, floor 7.

Welcome!
Carel Faber

INSTITUT MITTAG-LEFFLER SEMINAR

Joan Bagaria:
Large cardinals and accessible categories

Abstract: Many natural questions in category theory depend on set theory. A typical example is whether every full limit-closed subcategory of a given complete category is reflective. While there are counterexamples involving the category of topological spaces and continuous functions, if the given category is locally-presentable, then the question is equivalent to the large cardinal notion known as Vopenka's Principle (VP). We shall present an analysis of the large cardinal hierarchy ranging from supercompact cardinals to VP which can be used to show, for example, that for definable full limit-closed subcategories of locally-presentable categories, reflexivity follows from much weaker large-cardinal assumptions than VP.

Tid och plats: Onsdagen den 18 november kl. 14.00 – 15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

INSTITUT MITTAG-LEFFLER SEMINAR

Kerkko Luosto:
Combinatorics of quantifiers

Abstract: The motivation to study generalized quantifiers is mostly applicative: quantifiers are commonly used tools in theoretical computer science and linguistics. Here, I like to take another point of view, taking a look at quantifier definability problems and related mathematics. To tackle these problems, one needs mostly combinatorial tools.

Sometimes pigeonhole principle and elementary counting suffice, but usually one needs something stronger, e.g., Ramsey theory or some kind of combinatorics of words. In this vein, I shall survey some of the results of the field.

Tid och plats: Torsdagen den 19 november kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

CONSTRUCTIVE MATHEMATICS: PROOF AND COMPUTATION

Hajime Ishihara from Japan Advanced Institute of Science and Technology is visiting Uppsala and Institut Mittag-Leffler as part of the Marie Curie research staff exchange program CONSTRUMATH. He will give lectures on November 17 and 24. In connection with this further lectures and seminars associated to the CONSTRUMATH project will be given. All lectures and seminars will take place at Ångströmlaboratoriet, Polacksbacken, Uppsala University. See http://www.math.uu.se/~palmgren/trimester-uppsala.html for more information.

Tuesday, November 17

13.15 – 15.00 **Hajime Ishihara,** JAIST, Japan: *Constructive reverse mathematics: an introduction.* The first of two lectures. Room Å12167.

15.30 – 16.15 **Benno van den Berg,** Darmstadt: *On a forcing model for non-standard arithmetic.* Seminar. Room Å13167.

Tuesday, November 24

10.15 – 12.00 **Warwick Tucker,** Uppsala: *An introduction to interval analysis, with an application to dynamical systems.* Lecture. Room Å11167.

13.30 – 14.15 **Hajime Ishihara,** JAIST, Japan: *Constructive reverse mathematics: an introduction.* The second of two lectures. Room Å11167.

14.30 – 15.15 **Inger Sigstam,** Uppsala: *Formal topology and computability.* Seminar. Room Å11167.

15.45 – 16.30 **Anton Hedin,** Uppsala: *Title to be announced.* Seminar. Room Å13167.

16.45 – 17.30 **Jaap van Oosten,** Utrecht: *Homotopy in the effective topos.* Seminar. Room Å13167.

INSTITUT MITTAG-LEFFLER SEMINAR

Philipp Schlicht:
Descriptive set theory at uncountable cardinals

Abstract: I would like to give an introduction to analogues of classical results in descriptive set theory for the space kappa to the kappa. I will mention the perfect set property and the property of Baire and describe what is different from the countable case.

Tid och plats: Onsdagen den 18 november kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

ALBANOVA AND NORDITA COLLOQUIUM IN PHYSICS

Andreas Trabesinger:
How to publish in Nature Physics

Abstract: Following a general overview of the Nature physical sciences titles, this talk discusses what happens to papers submitted to Nature Physics, providing insight into the editorial process and the editors' checkpoints.

Tid och plats: Torsdagen den 19 november kl. 15.15 – 16.15 i Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

POPULÄRVETENSKAPLIG FÖRELÄSNING I FYSIK

Ines Ezcurra:
Ta i trä: Om bioinspiration till framtidens material

Sammanfattning: Biomimetik är ett snabbt växande forskningsområde, som innebär att vi imiterar naturens sätt att skapa material och processer. Det vi nu gör med hjälp av fossila energikällor och miljöbelastande kemikalier gör naturen med hjälp av solens energi och ofarliga enzymer. Genom att utnyttja genetik, bioteknik och materialteknik kan man söka förstå hur vedfibrer bildas och hur deras struktur och egenskaper är beskaffade. Utifrån denna kunskap kan vedfibrer användas som en ”biomimetisk” modell för avancerad materialdesign. De innovativa materialen är baserade på naturlig råvara och är återvinningsbara och bidrar därmed till omställningen till ett hållbart samhälle.

Tid och plats: Tisdagen den 17 november kl. 18.00 i Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

ALGEBRA AND GEOMETRY SEMINAR

Sandra Di Rocco:
Toric polarized fibrations and Cayley polytopes

Abstract: The geometry of a projective toric variety is encoded in the structure of an associated convex integral polytope. Fibrations between toric varieties, embedded in projective space, are associated to certain fibered polytopes. Fibrations between toric varieties, having a projective space as generic fiber, define polytopes called strict Cayley polytopes. It turns out that this class of polytopes encodes exceptional geometrical properties of the corresponding toric embeddings. Batyrev and Nill have recently conjectured a relation between the degree of a convex polytope and the property of having a Cayley-structure. An overview of the geometrical ideas behind the proof of the conjecture for smooth polytopes will be presented.

This is joint work with A. Dickenstein and R. Piene.

Tid och plats: Onsdagen den 18 november kl. 13.15 – 15.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

POPULÄRVETENSKAPLIG FÖRELÄSNING I FYSIK

Kambiz Fathi:
Supermassiva svarta hål i universum:
Om så kallade monster i centrum av galaxer

Sammanfattning: De allra största svarta hålen är supereffektiva maskiner som håller universum igång. Deras oerhörda dragningskraft är allmänt känd — men de är också osannolikt effektiva på att omvandla materia till energi. Ett supertungt svart hål finns troligen i mitten av varje galax — Vintergatan inräknad. Enligt den senaste forskningen verkar de, överraskande nog, styra inte bara galaxernas utan kanske hela det synliga universums utveckling från stora smällen fram till idag.

Tid och plats: Tisdagen den 24 november kl. 18.00 i Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

KOMBINATORIKSEMINARIUM

Anatol Kirillov:
Tropical Robinson-Schensted-Knuth correspondence

Abstract: I will define a certain birational, subtraction free map of the N-dimensional affine space which is compatible with certain actions of the affine symmetric group on the affine space in question. After tropicalization and restriction to the set of Gelfand-Tsetlin patterns, this map becomes the Robinson-Schensted-Knuth bijection. Some applications will be given, if the time will allow.

Tid och plats: Onsdagen den 18 november kl. 10.15 – 12.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I MATEMATISK STATISTIK

Lars Holst:
Några rekordproblem

Sammanfattning: I en stor population är varje individ antingen bättre eller sämre än andra. Individer dras i slumpmässig ordning och jämförs med de tidigare dragna. Ett rekord sker om en uttagen är bättre än alla tidigare. Betrakta alla delföljder av oavbrutna rekord. Hur många finns i medeltal? Vad är sannolikheten att ingen sådan finns? Vad är sannolikheten att exakt en sådan finns?

Tid och plats: Måndagen den 23 november kl. 15.15 – 17.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I MATEMATISK STATISTIK

Dmitrii Silvestrov:
Optimal Stopping and Convergence for American Type Options

Abstract: The lecture presents a survey of the latest results on optimal option pricing for modulated price processes achieved by the author and his collaborators. These results are: discovery of multi-threshold structure of optimal stopping strategies for American option models with general convex payoffs and formulation of conditions, which implicate multi- and one-threshold structures for optimal stopping strategies; introduction and investigation of new models of multivariate price processes modulated by semi-Markov market indices; obtaining of skeleton approximations, uniform with respect to a perturbation parameter, for continuous- and discrete-time option pricing models; finding of new effective general conditions for convergence of optimal expected reward functionals for American type options for multivariate price processes modulated by semi-Markov market indices; constructing new Monte Carlo algorithms for pricing of options based on information about structure of optimal stopping domains and effective binomial-trinomial approximation algorithms for evaluation of optimal reward functionals for American type options for exponential multivariate diffusion price processes. The latest achievements are connected with stochastic models for reselling of options and optimal option pricing for mean-reverse models used to describe stochastic dynamics of energy prices. New directions for further research studies in the area will also be discussed.

Tid och plats: Onsdagen den 25 november kl. 15.15 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

INSTITUT MITTAG-LEFFLER SEMINAR

Vera Koponen:
Asymptotic probabilities of extension axioms

Abstract: Consider a class K of finite structures, in a finite relational language. We investigate when it is the case that, for every extension axiom Ext, compatible with K, the probability that Ext is true in a member M of K approaches 1 as the cardinality of M tends to infinity; and when, for at least one extension axiom, the probability of it being true remains below some $c < 1$ (possibly approaching 0). First we do this for the uniform probability measure and then for the 'dimension conditional measure', which is more "generous" with respect to satisfiability of extension axioms. From the results obtained we can derive zero-one laws and we get some information about when the Fraisse limit of K, if it exists, is a model of the 'almost sure theory' of K.

Tid och plats: Torsdagen den 19 november kl. 14.00 – 15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

PDE AFTERNOON

The Department of Mathematics and the Department of Numerical Analysis, both at KTH, invite to a PDE afternoon with two speakers from the University of Texas, Austin.

Date and place: Tuesday, November 24, in seminar room 3733, Department of Mathematics, KTH, Lindstedtsvägen 25, floor 7.

Schedule

13.00 – 13.50 **Maria Gualdani:** *Global existence of a free boundary problem with non-standard sources.*

Abstract: We consider a nonlinear free boundary problem, proposed by J. M. Lasry and P. L. Lions in 2006 in the framework of mean field games. The model describes the evolution of a scalar price which is realized as a free boundary of a diffusion equation with evolving sources. The talk focuses on global existence, uniqueness and regularity of solutions. The proof uses tools from non-interacting stochastic particle systems and multiscale analysis. The talk is based on joint work with L. Chayes, M. d. M. Gonzalez and I. Kim.

14.00 – 14.50 **Richard Tsai:** *Adaptive and greedy algorithms for inverse point source discovery in complicated domains.*

Abstract: We consider the inverse problem of discovering the location of point sources from very sparse point measurements in a bounded domain that contains impenetrable obstacles. The sources spread according to a large class of linear equations, including the Laplace, heat, and Helmholtz equations, and limited information of the obstacles may only be estimated from measurement location. For these settings, we present a greedy algorithm for source discovery. The algorithm adaptively adds new measurement locations in order to improve estimates of the sources.

Welcome!

Olof Runborg Henrik Shahgholian

SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM

Niel Dobbs:

A random walk in exponential dynamics

Abstract: Results concerning ergodic properties of maps from the exponential family $f_\lambda : z \mapsto \lambda \exp(z)$ for which the Julia set is the entire complex plane were limited to two classes: Misiurewicz maps, where the orbit of zero is bounded, and maps for which the orbit of zero grows extremely fast. By modelling distributions of successive returns to the left half plane by a random walk, we can view and generalize these results in a common framework.

This work is joint with B. Skorulski.

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