BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 21 **FREDAGEN DEN 30 MAJ 2008**

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: Onsdagen den 4 juni kl. 13.00.

Sto-Upp 2008

Detta äger rum onsdagen den 4 juni vid Matematiska institutionen, Uppsala universitet. Se Bråket nr 20 sidorna 14 – 15.

Nästa nummer av Bråket

utkommer torsdagen den 5 juni. Material måste vara red. tillhanda senast den 4 juni kl. 13.00.

Money, jobs: Se sidorna 12 – 13.

SEMINARIER

Fr 05 – 30 kl. 13.15 – 14.00. Seminarium i finansiell matematik. *(Observera dagen och tiden!)* **Joel Hedlund** presenterar sitt examensarbete: *Exposure Model Validation within the Basel II Framework.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

Fortsättning på nästa sida.

Disputation i matematik

Alexander Berglund disputerar på avhandlingen *Minimal models in algebra, combinatorics and topology* tisdagen den 3 juni kl. 10.00 i sal 14, hus 5, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 20 sidan 12.

Alexander har belönats med ett pris. Se sidan 8.

Disputation i statistik

Jessica Franzén disputerar på avhandlingen *Bayesian Cluster Analysis: Some Extensions to Non-standard Situations* onsdagen den 4 juni kl. 10.00 i hörsal 3, hus B, SU, Universitetsvägen 10, Frescati. Se Bråket nr 20 sidan 13.

Disputation i matematik

Teitur Arnarson disputerar vid KTH på avhandlingen *PDE methods for free boundary problems in financial mathematics* torsdagen den 5 juni kl. 14.00. Se sidan 10.

Göran Gustafsson Lectures in Mathematics

Dessa äger rum vid KTH den 2, 3 och 4 juni. Se Bråket nr 20 sidorna 10 – 11.

Risk Modelling in Insurance and Finance

En konferens med denna titel skall äga rum vid KTH fredagen den 13 juni. Se sidorna 8 – 10.

Seminarier (fortsättning)

Må 06–02 kl. 15.15 – 16.00. Seminarium i finansiell matematik. Peter Tram presenterar sitt examensarbete: *Constructing the forward curve for the electricity market.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

Må 06–02 kl. 15.30. Göran Gustafsson Lecture in Mathematics. Professor Weinan E, Princeton University: *Stochastic and Multiscale Modeling. Lecture I: Multiscale modeling in science and engineering.* Sal D2, KTH, Lindstedtsvägen 5, b.v. Kaffe och te serveras från kl. 15.00. Se Bråket nr 20 sidorna 10 – 11.

Ti 06–03 kl. 10.00. Seminarium i statistik. *(Observera dagen och tiden!)* **Professor Jukka Corander,** Åbo Akademi, Finland: *Bayesian unsupervised predictive classification utilizing stochastic partition models and learning with non-reversible parallel MCMC.* Sal B705, Statistiska institutionen, SU, Universitetsvägen 10B, plan 7, Frescati. Se Bråket nr 20 sidan 9.

Professor Corander är opponent vid Jessica Franzéns disputation. Se Bråket nr 20 sidan 13.

Ti 06–03 kl. 10.15. Göran Gustafsson Lecture in Mathematics. Professor Weinan E, Princeton University: *Stochastic and Multiscale Modeling. Lecture II: Mathematical theory of the electronic structure.* Sal D2, KTH, Lindstedtsvägen 5, b.v. Se Bråket nr 20 sidorna 10 – 11.

Ti 06–03 kl. 13.15. Seminar in Theoretical and Applied Mechanics. Docent Karl-Erik Thylwe, Mekanik, KTH: *(Sub)atomic Wave Mechanics — New amplitude-phase method approach to solving the radial Dirac equation.* Seminarierummet, Institutionen för mekanik, KTH, Teknikringen 8. Se Bråket nr 20 sidan 13.

Ti 06–03 kl. 13.15 – 15.00. Algebra and Geometry Seminar. *(Observera dagen!)* **David Rydh:** *Families of cycles.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.

Ti 06–03 kl. 14.00 – 15.00. Mittag-Leffler Seminar — Plurikomplexa seminariet. Feng Rong, University of Michigan, Ann Arbor: *Absolutely isolated singularities of holomorphic maps of C^n tangent to the identity.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 6.

Ti 06–03 kl. 15.30 – 16.30. Mittag-Leffler Seminar — Plurikomplexa seminariet. Marco Abate, University of Pisa: *Foliations associated to holomorphic maps tangent to the identity.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 6.

On 06–04 kl. 10.00 – 11.00. Presentation av examensarbete i matematik (15 högskolepoäng, påbyggnadsnivå). **Magnus Johansson** och **Kristoffer Sahlin:** *Splines: A theoretical and computational study.* Handledare: **Hans Rullgård.** Sal 21, hus 5, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 20 sidan 15.

On 06–04 kl. 10.00. Licentiatseminarium i matematik. Jonas Kiessling försvarar sin licentiatavhandling: *Cellularity in commutative algebra.* Ämnesgranskare: **Professor Henning Krause,** Universität Paderborn, Tyskland. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 20 sidan 11.

Fortsättning på nästa sida.

Seminarier (fortsättning)

On 06–04 kl. 10.15. Göran Gustafsson Lecture in Mathematics. Professor Weinan E, Princeton University: *Stochastic and Multiscale Modeling. Lecture III: Modeling rare events.* Sal D2, KTH, Lindstedtsvägen 5, b.v. Se Bråket nr 20 sidorna 10 – 11.

On 06–04 kl. 13.15 – 15.00. Algebra and Geometry Seminar. Manuel Blickle, Essen: *Title to be announced.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

On 06–04 kl. 14.00 – 15.00. Mittag-Leffler Seminar. Yasha Eliashberg, Stanford University: *Minicourse.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

To 06–05 kl. 11.00 – 12.00. Extra Algebra and Geometry Seminar. *(Observera dagen, tiden och lokalen!)* **Fabrizio Zanello,** Michigan Technological University, USA: *Interval Conjectures for level Hilbert functions.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

To 06–05 kl. 13.15 – 14.15. Minicourse in Mathematics. Martin Gulbrandsen: *Local aspects of geometric invariant theory. Fourth lecture.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 17 sidan 10.

To 06–05 kl. 13.15 – 15.00. Algebra and Geometry Seminar. *(Observera dagen!)* **Professor Alexandru Suciu,** Northeastern University, Boston, USA: *Topology and combinatorics of polyhedral products.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 20 sidan 12.

Professor Suciu är opponent vid Alexander Berglunds disputation. Se Bråket nr 20 sidan 12.

To 06–05 kl. 14.00 – 15.00. Mittag-Leffler Seminar. Mats Andersson, Chalmers tekniska högskola, Göteborg: *The Briançon-Skoda theorem on a singular variety.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 7.

To 06–05 kl. 14.00. Licentiatseminarium i mekanik. Shervin Bagheri presenterar sin licentiatavhandling: *Stability analysis and control design of spatially developing flows.* Opponent: **Professor Martin Berggren,** Datavetenskap, Umeå universitet. Sal D41, KTH, Lindstedtsvägen 17, 1 tr. Se Bråket nr 20 sidan 11.

To 06–05 kl. 15.15 – 15.45. Redovisning av examensarbete i matematik. Nicklas Löf: *Automatisk detektion och kvantifiering av ikosaedriska virus.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.

To 06–05 kl. 15.15 – 16.15. AlbaNova and Nordita Colloquium in Physics. Professor Ramesh Narayan, Harvard: *Measuring black hole spin.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se Bråket nr 20 sidan 15.

To 06–05 kl. 15.30 – 16.30. Mittag-Leffler Seminar. Burglind Juhl-Jöricke, Institut Mittag-Leffler: *Envelopes of holomorphy and holomorphic discs.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 7.

Må 06–09 kl. 13.15 – 14.15. DNA-seminariet Uppsala-KTH (Dynamical systems, Number theory, Analysis). Rafael de la Llave, University of Texas at Austin: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

Fortsättning på nästa sida.

Seminarier (fortsättning)

Må 06–09 kl. 15.15 – 16.15. CIAM Colloquium. Charles Wampler, General Motors and Adj. Professor at the University of Notre Dame, USA: *Robots, mechanisms, and Algebraic Geometry.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 12.

On 06–11 kl. 13.15. Algebra and Geometry Seminar. Samuel Boissiere, Nice: *The Cohomological Crepant Resolution Conjecture.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

On 06–11 kl. 16.00 – 17.00. KTH/SU Mathematics Colloquium — CIAM Colloquium. Andrew J. Sommese, Director of the Center for Applied Mathematics and V. Duncan Professor of Mathematics at the University of Notre Dame, USA: *A brief introduction to Numerical Algebraic Geometry.* 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 11.

Fr 06–13 kl. 15.15 – 16.15. CIAM tutorial on the program Bertini. Jon Hauenstein, University of Notre Dame, USA: *Algorithms of Numerical Algebraic Geometry and Bertini.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 11.

SEMINARIUM I FINANSIELL MATEMATIK

Joel Hedlund

presenterar sitt examensarbete:

Exposure Model Validation within the Basel II Framework

Abstract: This master thesis addresses the Basel II bank regulations and its implications for exposure model validation in banks. Model validation is a key requirement of the Basel II accord, and this thesis serves as an example on how exposure models are developed and validated within the Basel II framework. Exposure for two types of products is considered, with different underlying risk factors.

The first type of products is bond repurchase agreements (or bond repos). The model for bond repo exposure is based on Monte Carlo simulation of risk free interest rates, exchange rates and credit spreads. The risk factor paths are simulated up to 7 calendar days to reflect the close out risk that arises when a bank cannot immediately unwind the positions in case of a default. The trades are then priced with the simulated risk factors. The model incorporates netting and scenario consistent aggregation of cash and collateral legs. The model is also extended to a few related products.

The second type of products is equity products. The model for equity products is based on Monte Carlo simulation of three risk factors risk free interest rates, exchange rates and equity prices. The risk factor paths are simulated up to 30 years, to reflect the risk of future counterparty defaults, and the trades are priced with the simulated risk factors. The model incorporates netting and scenario consistent aggregation of interest and equity legs.

Tid och plats: Fredagen den 30 maj kl. 13.15 – 14.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I FINANSIELL MATEMATIK

Peter Tram

presenterar sitt examensarbete:

Constructing the forward curve for the electricity market

Abstract: Electricity has special characteristics compared to other assets. The most distinguishing characteristic is the non-storability, which means that the use of both the cost-of-carry argument and the condition of no arbitrage are not applicable for pricing. Moreover, electricity prices incorporate seasonal patterns, jumps, spikes and high volatility. Due to the above-mentioned characteristics of electricity, the research area of describing and forecasting electricity has become most important for participants on the electricity market.

The aim of this thesis is to find a method for constructing the forward curve for the electricity market. The forward prices provided by the market can only give us a hint of the forward curve. If the settlement period is long, the forward price can hide seasonality. However, power companies have models for predicting the future spot prices taking into consideration the seasonality behaviour among other things. We found a method for constructing a smooth forward curve, where we combined both the observed price information from the market and the information based on different scenarios from a power company.

Tid och plats: Måndagen den 2 juni kl. 15.15 – 16.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

EXTRA ALGEBRA AND GEOMETRY SEMINAR

Fabrizio Zanello:
Interval Conjectures for level Hilbert functions

Abstract: The theory of Gorenstein and level (graded) algebras is an important topic of commutative algebra, because of both its intrinsic interest and the applications it has to several other fields — such as combinatorics, algebraic geometry, invariant theory, and even complexity theory.

One fundamental invariant of graded algebras is the Hilbert function, which counts the dimension of such algebras in each degree.

The goal of this talk is to present and discuss two conjectures I have recently formulated: The "Interval Conjecture" (IC) and the "Gorenstein Interval Conjecture" (GIC).

These conjectures were inspired by the research performed in this area over the last few years. In particular, a number of recent results seem to indicate that it will be nearly impossible to explicitly characterize the sets of all Gorenstein or level Hilbert functions. Therefore, the purpose of the IC and the GIC is to at least provide a very strong — and natural — form of "regularity" in the structure of such important and complicated sets.

Even if I have already proved a few particular cases of the conjectures, we still seem very far from showing them in full generality today.

In this talk I will also discuss the background and the main results obtained so far in this area, as well as the techniques I have employed to begin studying the two conjectures.

Reference: Fabrizio Zanello: *Interval Conjectures for level Hilbert functions,* Journal of Algebra, to appear.

Tid och plats: Torsdagen den 5 juni kl. 11.00 – 12.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MITTAG-LEFFLER SEMINAR — PLURIKOMPLEXA SEMINARIET

Feng Rong:
Absolutely isolated singularities of holomorphic maps of C^n tangent to the identity

Abstract: As one of the main ingredients of his proof of the existence of parabolic curves for holomorphic maps of C^2 tangent to the identity with an isolated fixed point, Abate showed how to reduce the "singularities" of such maps to simpler and irreducible ones via blow-ups. We prove similar reduction results for "absolutely isolated singularities" of holomorphic maps of C^n tangent to the identity. We will first give basic definitions, then sketch the proof and finally talk about related dynamical problems.

Tid och plats: Tisdagen den 3 juni kl. 14.00 – 15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

MITTAG-LEFFLER SEMINAR — PLURIKOMPLEXA SEMINARIET

Marco Abate:
Foliations associated to holomorphic maps tangent to the identity

Abstract: In this talk (reporting on a joint work with F. Tovena), I shall describe how to associate a meromorphic connection and at least three foliations (a real foliation of real rank 3, a complex foliation of complex rank 1, and a real foliation of real rank 1) to a germ of holomorphic self-map of C^2 tangent to the identity. I shall also present some properties of these foliations and discuss some pieces of evidence suggesting that the behaviour of these foliations might provide a topological model for the local dynamics of the holomorphic germ (at least generically) in a full neighbourhood of the origin.

Tid och plats: Tisdagen den 3 juni kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

REDOVISNING AV EXAMENSARBETE I MATEMATIK

Nicklas Löf:
Automatisk detektion och kvantifiering av ikosaedriska virus

Sammanfattning: Vanligtvis används automatiserad detektion av viruspartiklar inom virusstrukturanalys, men den typ av bilder de använder skiljer sig mycket från elektronmikroskopibilder av sampel som bäddats in i plast och infärgats, vilken är den vanligaste metoden.

Då frekvens- och kantdetektionsfilter visat dåliga resultat fokuserades i stället på att detektera viruskapsiderna. Först lokaliserades alla kapsidcentra via ett faltningssteg följt av en lokaliserad maxvärdessökning för att hitta även deformerade och avvikande partiklar. Sedan korrigerades elliptiskt deformerade partiklar, och alla partiklar klassificerades via ett klustringssteg.

Metoden visar på lovande överensstämmelse och stora tidsvinster jämfört med en manuell selektion av en erfaren virolog.

Tid och plats: Torsdagen den 5 juni kl. 15.15 – 15.45 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

ALGEBRA AND GEOMETRY SEMINAR

David Rydh: Families of cycles

Abstract: The Chow variety, parameterizing cycles on a projective space, was introduced by Chow and van der Waerden in 1937 but is still not well understood. During the last 30 years, partial functorial descriptions of the Chow functor have been given: Barlet (over reduced analytic spaces), Angéniol (schemes of characteristic zero), Guerra (semi-normal schemes over $\mathbb{C}$), Kollár and Suslin-Voevodsky (semi-normal schemes); but a satisfactory description is still missing.

In this talk I will define a notion of relative cycles over arbitrary schemes, which generalizes the above functors (partly conjectural in one case). This definition is somewhat elusive, but relative multiplicity-free cycles, relative Weil divisors and relative cycles over reduced schemes have more concrete descriptions.

There are natural morphisms from "all" known moduli and parameter spaces (Hilbert, Branch, stable maps, CM, etc.) to the Chow functor. These morphisms are isomorphisms over the open locus of the Chow scheme parameterizing normal subschemes. I will also briefly mention the connection with relative fundamental classes and de Rham cohomology.

This talk is based on parts of my thesis (to be defended on August 11).

Tid och plats: Tisdagen den 3 juni kl. 13.15 – 15.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

MITTAG-LEFFLER SEMINAR

Mats Andersson: The Briançon-Skoda theorem on a singular variety

Abstract: Let Z be a germ of a (reduced) analytic variety of pure dimension at $0 \in \mathbb{C}^n$. I will present an analytic proof of the uniform Briançon-Skoda theorem for the local ring $\mathcal{O}_Z$; this result is previously proved by Huneke by purely algebraic methods. For ideals with few generators we also get sharper results.

Tid och plats: Torsdagen den 5 juni kl. 14.00 – 15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

MITTAG-LEFFLER SEMINAR

Burglind Juhl-Jöricke: Envelopes of holomorphy and holomorphic discs

Abstract: I will present a new description of the envelope of holomorphy of an arbitrary domain in a two-dimensional Stein manifold in terms of equivalence classes of analytic discs.

The approach implies new results. In particular, for each of its points the envelope of holomorphy contains an embedded (non-singular) Riemann surface (and also an immersed analytic disc) passing through this point with boundary projecting into the original domain.

There is a hope that the technique implies further results. The situation of Stein fillings of 3-dimensional contact manifolds is of special interest.

Tid och plats: Torsdagen den 5 juni kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

BELÖNING

Alexander Berglund, som skall disputera vid SU den 3 juni (se Bråket nr 20 sidan 12), har av Naturvetenskapliga fakulteten vid SU belönats med Sigrid Arrhenius stipendium på 65 000 kronor för sina utomordentliga insatser under forskarutbildningen. Ett riktigt varmt grattis till Alexander för denna fina utmärkelse!

Mikael Passare

RISK MODELLING IN INSURANCE AND FINANCE

On Friday, June 13, 2008, the one-day conference *Risk Modelling in Insurance and Finance* in honour of **Jan Grandell's** 65th birthday, will take place at KTH. Participation in the conference is free of charge. You can register by sending an e-mail with subject title "Grandell" to Filip Lindskog (lindskog@kth.se).

There will be only invited talks. We are happy to announce the following distinguished speakers: **Gunnar Andersson, Søren Asmussen, Tomas Björk, Paul Embrechts, Thomas Mikosch, Hanspeter Schmidli.**

Organizing committee: **Boualem Djehiche** and **Filip Lindskog.**

All talks will take place in the auditorium D2, KTH, Lindstedtsvägen 5, ground floor.

Homepage: http://www.math.kth.se/matstat/events/grandell/.

Programme

9.00 – 9.15 **Folke Snickars,** KTH: *Opening.*

9.15 – 10.00 **Paul Embrechts,** ETH Zürich: *Statistics and Quantitative Risk Management.*
Abstract: In Quantitative Risk Management, the aggregation of risks across different risk classes is of great importance. The underlying mathematical problems are very much related to the theory of risk measures (coherence, convex, distortion, . . .). Also related are the concepts of diversification and concentration. In this talk I will review some of the applied issues and discuss the theory necessary in order to understand the scope and limitations of the various approaches available in the literature.

10.00 – 10.30 Coffee break.

10.30 – 11.15 **Thomas Mikosch,** Laboratory of Actuarial Mathematics, University of Copenhagen: *Point process techniques in non-life insurance models.*
Abstract: Point processes are rather natural objects for modelling in non-life insurance. Due to the discrete structure of claim arrivals, claim sizes, delay in reporting and claim settlement, marked point processes, in particular Poisson random measures, are nicely suited for describing the complicated dynamics in an insurance business in a mathematically tractable way. The point process approach has been propagated by Norberg for many years, in particular in his influential article in ASTIN Bulletin in 1993. The aim of the talk is to recall some of the basic theory on point processes, to apply it in some simple non-life situations and to show how the method can be made to work for building of reserves.

The talk is based on my lecture notes for the Master students of Actuarial Mathematics at the University of Copenhagen.

(Continued on the next page.)

11.15 – 12.00 **Gunnar Andersson,** Folksam, CEO KPs pensionsstiftelse: *Biometric assumptions in life insurance with focus on the Swedish market.*

Abstract: Within life insurance there is a long tradition of dealing with biometric risks of different types. We will here discuss mainly mortality and disability risks. Typically, the point when one first calculates the different risks, in order to establish the cost for a specific life insurance product, lies in most cases many years in advance of when a possible claim is registered. Thus, time is an important issue since a continuous stream of medical achievements during a life cycle has a major impact on risks under consideration.

We will consider the assessment of different types of risks, i.e. mortality and disability risks. Crude failure rates of the biological systems we are monitoring are recorded and smoothed with different smoothing techniques.

Different smoothing techniques have different drawbacks. For instance, not including time trends in mortality models have proven to be less efficient when modelling mortality risks. The consequence of which is that the estimates have turned less accurate with different financial effects as result.

When it comes to disability assumptions, the smoothing technique in place has very much been adjusted to the legislation that lies underneath each product sold. This is an old and also today less appropriate smoothing technique. We will discuss how this can be adjusted to a more modern situation.

12.00 – 14.00 Lunch break.

14.00 – 14.45 **Søren Asmussen,** Aarhus University: *Limit theorems for failure recovery in computing and data transmission.*

Abstract: A task such as the execution of a computer program or the transmission of a file has an ideal execution time T with distribution F. However, failures may cause the actual execution time X to be different.

Various schemes for failure recovery have been considered, among with the most notable are REPLACE, RESUME, RESTART and checkpointing. The two first are fairly easy to study, while the RESTART has long resisted detailed analysis. Here the task has to start over if a failure occurs before completion, say the failure time is U with distribution G, and multiple failures may occur.

Based upon Cramér-Lundberg theory, we show that the RESTART total time $X \geq T$ has an exponential tail if F has finite support. Otherwise, X is always heavy-tailed, and the tail behaviour is quantified under various assumptions on F and G.

Two related settings are also studied. In parallel computing, the total task time becomes the maximum of independent copies of X. Classical extreme value theory combined with the RESTART results immediately give the order of the total task time in a simple i.i.d. setting, but we also look into some non-classical triangular array extreme value problems. In checkpointing, the task is split into subtasks, each of which behaves as in the RESTART setting. The tail of the total task time is given for a variety of specific models for the checkpointing.

14.45 – 15.15 Coffee break.

(Continued on the next page.)

15.15 – 16.00 **Hanspeter Schmidli,** University of Cologne: *Cox risk processes and ruin.*
Abstract: More than 100 years ago Filip Lundberg introduced the classical risk model and estimated the probability of ruin. Later, Harald Cramér generalized Lundberg's results. These results apply to the small claims case. This model serves still as a skeleton for more modern models in actuarial science. A first generalization goes back to Hans Ammeter, where the claim intensity becomes random in a period of fixed length. The intensities in different periods are independent. Another generalization goes back to Tomas Björk and Jan Grandell. In their model the length of the periods is random also; and length and intensity may depend on each other. More generally, one can model the intensity as a general positive random process and the claim number process, conditioned on the intensity, as an inhomogeneous Poisson process with the given intensity. In this talk we will review some of these models and give asymptotic results for the ruin probabilities both in the small as well as in the large claim case.

16.00 – 16.45 **Tomas Björk,** Stockholm School of Economics: *Time inconsistent stochastic control.*
Abstract: In this talk we will present some recent work on non-classical stochastic control problems which, in different ways are "time inconsistent" in the sense that they cannot be treated by dynamic programming. We present a game-theoretic approach to such problems and we derive extended versions of the Hamilton-Jacobi-Bellman equation in terms of systems of PDEs for the determination of the associated subgame perfect Nash equilibrium strategies. We also present applications from finance.

The talk is based on joint work with Agatha Murgoci.

DISPUTATION I MATEMATIK

Teitur Arnarson

disputerar på avhandlingen

PDE methods for free boundary problems in financial mathematics

torsdagen den 5 juni 2008 kl. 14.00 i sal F3, KTH, Lindstedtsvägen 26, b.v. Till opponent har utsetts *professor Diogo Gomes,* Departamento de Matemática, Instituto Superior Técnico, Lissabon, Portugal.

Abstract of the thesis

We consider different aspects of free boundary problems that have financial applications. Papers I – III deal with American option pricing, in which case the boundary is called the early exercise boundary and separates the region where to hold the option from the region where to exercise it. In Papers I – II we obtain boundary regularity results by local analysis of the PDEs involved, and in Paper III we perform local analysis of the corresponding stochastic representation.

The last paper is different in its character as we are dealing with an optimal switching problem, where a switching of state occurs when the underlying process crosses a free boundary. Here we obtain existence and regularity results of the viscosity solutions to the involved system of variational inequalities.

KTH/SU MATHEMATICS COLLOQUIUM — CIAM COLLOQUIUM

Andrew J. Sommese: A brief introduction to Numerical Algebraic Geometry

Abstract: Numerical Algebraic Geometry is a new discipline aimed at nonlinear problems, including those that previously were approached using linear algebra methods. The first half of the talk will be an introduction to Numerical Algebraic Geometry and the numerical methods that underly it.

We will briefly discuss some recent work of J. Hauenstein, B. Hu, and A. Sommese applying Numerical Algebraic Geometry to the solution of diffusion equations. The polynomial systems that arise, which easily have over 50 equations, are beyond the capability of any other polynomial solver besides the new program Bertini, developed by D. Bates, J. Hauenstein, A. Sommese, and C. Wampler.

As time permits we will also discuss some recent advances:

a) regeneration, a new equation-by-equation method, developed by J. Hauenstein, A. Sommese, and C. Wampler;
b) a local dimension algorithm, developed by D. Bates, J. Hauenstein, C. Peterson, and A. Sommese; and
c) an algorithm, developed by D. Bates, J. Hauenstein, C. Peterson, and A. Sommese, to decompose the algebraic set where a matrix of polynomials has rank less than or equal to k, where k is any nonnegative integer.

Tid och plats: Onsdagen den 11 juni 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.

CIAM TUTORIAL ON THE PROGRAM BERTINI

Jon Hauenstein: Algorithms of Numerical Algebraic Geometry and Bertini

Abstract: Developed by D. Bates, J. Hauenstein, A. Sommese and C. Wampler, Bertini is a software package which implements many of the algorithms of Numerical Algebraic Geometry. In this talk, we will discuss some of the algorithms of Numerical Algebraic Geometry and how to utilize them in Bertini, including:

a) homotopy continuation,
b) Numerical Irreducible Decomposition, and
c) finding non-singular isolated solutions using Regeneration.

We will also discuss generating and solving large polynomial systems resulting from diffusion equations and methods for computing the multiplicity structure numerically for isolated solutions of a polynomial system.

Tid och plats: Fredagen den 13 juni kl. 15.15 – 16.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

CIAM COLLOQUIUM

Charles Wampler:
Robots, mechanisms, and Algebraic Geometry

Abstract: The most basic model of a robot or mechanical linkage consists of rigid bodies connected by simple joints: hinges, ball-and-socket, etc. Kinematics studies the motion capabilities of such devices, answering questions such as "What volume can this robot reach?" or "How many ways can the robot reach a given hand position?". For the most common types of robot joints, the kinematic equations can be written as systems of multivariate polynomials, and thus these questions fall into the domain of algebraic geometry. We will discuss this problem area with particular attention to how the relatively young field of numerical algebraic geometry is providing computational tools to find the answers.

Tid och plats: Måndagen den 9 juni kl. 15.15 – 16.15 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://www2.math.su.se/~johannes/mj.html.
Unless stated otherwise, a given date is the last date (e.g. for applications), and the year is 2008. 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.

New information

Jobs to apply for

11. KTH söker en lektor i matematik med inriktning mot matematisk analys. Sista ansökningsdag är den 15 juni. Web-info: http://www.kth.se/aktuellt/tjanster/2/ShowAdd.aspx?ID=124487.
12. KTH söker två lektorer i matematik med inriktning mot nätbaserad pedagogik. Sista ansökningsdag är den 15 juni. Web-info: http://www.kth.se/aktuellt/tjanster/2/ShowAdd.aspx?ID=124317.

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13. Uppsala universitet söker två eller tre doktorander med placering vid Matematiska institutionen (ämnen: matematik, tillämpad matematik, matematisk statistik och matematisk logik). En av doktorandtjänsterna är avsedd för ett forskningsprojekt i teoretisk statistik. Den matematiska inriktningen för övriga tjänster är öppen. Sista ansökningsdag är den 9 juni. Web-info: http://www.personalavd.uu.se/ledigaplatser/1354dorand.html.

Old information

Jobs to apply for

14. Linköpings universitet söker en universitetslektor i matematisk statistik. Sista ansökningsdag är den 9 juni. Web-info: http://www.liu.se/jobbdb/show.html?2500.

15. Institutionen för matematik vid KTH utlyser två industridoktorandtjänster inom finansiell matematik till två projekt som kommer att drivas tillsammans med AB Svensk Exportkredit. Sista ansökningsdag är den 5 juni. Web-info: http://www.math.kth.se/IDannons.pdf.