BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 33 **FREDAGEN DEN 19 OKTOBER 2007**

BRÅKET

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

Redaktör: Gunnar Karlsson

Telefon: 08-790 84 79

Adress för e-post: gunnarkn@math.kth.se

Bråket på Internet: http://www.math.kth.se/braaket.html eller http://www.math.kth.se/braket/

Postadress:
Red. för Bråket
Institutionen för matematik
KTH
100 44 Stockholm

- - - - - - -

Sista manustid för nästa nummer:
Torsdagen den 25 oktober kl. 13.00.

Disputation i reglerteknik

Jonas Mårtensson disputerar vid KTH på avhandlingen *Geometric Analysis of Stochastic Model Errors in System Identification* onsdagen den 31 oktober kl. 10.00. Se sidan 9.

Money, jobs: Se sidorna 10 – 11.

SEMINARIER

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 Bråket nr 31 sidan 11.

Må 10 – 22 kl. 15.00 – 17.00. Gästföreläsning. Bernt Øksendal: *Malliavin Calculus.* (Den första av två föreläsningar.) Förhandsanmälan krävs. Rum 342, Handelshögskolan, Sveavägen 65, Stockholm. Se Bråket nr 32 sidan 8.

Må 10 – 22 kl. 15.15 – 17.00. Seminarium i matematisk statistik. Thomas Schön, Institutionen för systemteknik, Linköpings universitet: *An introduction to the particle filter and its applications.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

Ti 10 – 23 kl. 10.15. Seminar in Mathematical Physics. Rémi Léandre, Université de Bourgogne, France: *Connes-Hida calculus in the index theory.* Rum A4:1069, AlbaNova universitetscentrum.

Ti 10 – 23 kl. 10.15. Plurikomplexa seminariet. Vladimir Tkachev, KTH: *The resultant on compact Riemann surfaces, II.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 4.

Ti 10 – 23 kl. 11.00 – 12.00. Joint CIAM and Optimization and Systems Theory Seminar. *(Observera dagen!)* **John S. Baras:** University of Maryland, College Park, USA: *Dynamic iterations on partially ordered semirings with applications to trust evaluation in networks.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

Fortsättning på nästa sida.

CIAM Outreach 2007

Detta äger rum vid KTH den 24 oktober. Se sidan 8.

Seminarier (fortsättning)

Ti 10–23 kl. 14.00–15.00. Mittag-Leffler Seminar. Peter Friz, University of Cambridge, UK: *Gaussian analysis and rough paths.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

Ti 10–23 kl. 15.00–17.00. Gästföreläsning. Bernt Øksendal: *Malliavin Calculus.* (Den andra av två föreläsningar.) Förhandsanmälan krävs. Rum 342, Handelshögskolan, Sveavägen 65, Stockholm Se Bråket nr 32 sidan 8.

Ti 10–23 kl. 15.30–16.30. Mittag-Leffler Seminar. Nicolai Krylov, University of Minnesota, Minneapolis, USA: *Analytic approach to SPDE's. The second of a series of three lectures.* Notes of the course (49 pages) can be downloaded at http://www.mittag-leffler.se/programs/0708f/krylov.pdf. Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 10–24 kl. 10.30. Logikseminariet Stockholm-Uppsala. Johan G. Granström: *A variable free version of the substitution calculus for dependent type theory.* Sal Å11167, Ångströmlaboratoriet, Uppsala universitet. Se sidan 7.

On 10–24 kl. 11.00. Common SU KoF/KTH Theoretical Physics Seminar. Maria Hermanns, SU: *Quantum Hall wave functions on the torus.* Sal FA31, Roslagstullsbacken 21, AlbaNova universitetscentrum.

On 10–24 kl. 13.00. Seminarium i statistik. Professor Johan Bring, Högskolan Dalarna: *Vad är det vi mäter med sammanfattningsmått?* Sal B705, Statistiska institutionen, SU, Universitetsvägen 10B, plan 7, Frescati.

On 10–24 kl. 13.15–14.15. Seminarium i analys och dynamiska system. Annemarie Luger, Wien och Lund: *Generalized Nevanlinna functions as a tool for singular differential operators.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 32 sidan 8.

On 10–24 kl. 13.15–15.00. Algebra- och geometriseminarium. Alexander Berglund, SU: *A_∞-structures on Koszul algebras.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.

On 10–24 kl. 14.30–15.30. KCSE (KTH Computational Science and Engineering Centre) Seminar. Malin Selleby, Institutionen för materialvetenskap, KTH: *Computational thermodynamics.* PDC:s seminarierum, KTH, Teknikringen 14, plan 3.

On 10–24 kl. 15.00. Seminarium i matematisk statistik. Rolf Sundberg: *Påverkade bygget av Öresundsbron fiskbestånden? Ett konsultuppdrag inför en prövning i Miljööverdomstolen.* Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 8.

On 10–24 kl. 16.00–17.00. KTH/SU Mathematics Colloquium. Nicolai Krylov, University of Minnesota, Minneapolis, USA: *On numerical approximations for linear and fully nonlinear elliptic and parabolic equations.* 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 sidorna 5–6.

To 10–25 kl. 14.00–15.00. Mittag-Leffler Seminar. István Gyöngy, University of Edinburgh, UK: *On approximation of stochastic PDE's.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 4.

Fortsättning på nästa sida.

Seminarier (fortsättning)

To 10–25 kl. 15.15–16.15. AlbaNova and Nordita Colloquium in Physics. Markus Arndt, Universität Wien: *Balls, strings and little elephants: Particles or Waves?* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 6.

To 10–25 kl. 15.15. Seminarium i numerisk analys. Serge Prudhomme, University of Texas at Austin, USA: *Estimation and control of approximation errors for atomistic-to-continuum coupling methods.* Rum 4523, KTH CSC, Lindstedtsvägen 5, plan 5. Se Bråket nr 32 sidan 7.

To 10–25 kl. 15.30–16.30. Mittag-Leffler Seminar. Rémi Léandre, Université de Bourgogne, France: *Applications of the Malliavin calculus of Bismut type without probability.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 6.

Fr 10–26 kl. 13.15–14.15. Graduate Student Seminar. Ole Andersson, Uppsala universitet och Matematik, KTH: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

Må 10–29 kl. 15.15–17.00. Seminarium i matematisk statistik. Martin Ohlson, Matematiska institutionen, Linköpings universitet och tekniska högskola: *The likelihood ratio statistic for testing spatial independence using a separable covariance matrix.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.

Ti 10–30 kl. 15.30–16.30. Mittag-Leffler Seminar. Nicolai Krylov, University of Minnesota, Minneapolis, USA: *Analytic approach to SPDE's. The last of a series of three lectures.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 10–31 kl. 11.00–12.00. Common SU KoF/KTH Theoretical Physics Seminar. Alfonso García-Parrado, Matematiska institutionen, Linköpings universitet: *Causal structure: a new viewpoint.* Sal FA31, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 10.

On 10–31 kl. 13.00. Algebra- och geometriseminarium. Mats Boij, KTH: *Title to be announced.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

On 10–31 kl. 13.15–14.15. Seminarium i analys och dynamiska system. Ioannis Parissis, Georgia Tech: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

On 10–31 kl. 15.00. Docentföreläsning i matematisk statistik. *(Observera lokalen!)* **Esbjörn Ohlsson,** Länsförsäkringar AB: *Dynamic Financial Analysis — en introduktion.* Sal 14, hus 5, Matematiska institutionen, SU, Kräftriket. Se sidan 8.

Fr 11–02 kl. 13.15–14.15. Graduate Student Seminar. Martin Blomgren, Matematik, KTH: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I MATEMATISK STATISTIK

Thomas Schön:
An introduction to the particle filter and its applications

Abstract: During the past 10 years the particle filter has become a very popular and powerful tool in solving the nonlinear state estimation problem in dynamical systems. Many variants of the particle filter have been suggested, and there is by now a huge literature on the subject. However, the basic algorithm is the same and all the different variants correspond to various design choices of this basic algorithm. We will in this seminar explain and derive the basic particle filtering algorithm in detail.

There will also be a thorough introduction to the underlying problem area, i.e., estimation in nonlinear and non-Gaussian dynamical systems. Several successful applications (such as GPS-free positioning of cars and navigation of fighter aircraft) of the theory are also discussed and some recent $L(p)$-convergence results will be given.

Tid och plats: Måndagen den 22 oktober kl. 15.15 – 17.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

PLURIKOMPLEXA SEMINARIET

Vladimir Tkachev:
The resultant on compact Riemann surfaces, II

Abstract: This is an independent continuation of a talk given on October 9 on joint work (arXiv: 0710.2326) with Björn Gustafsson. Two main topics will be in focus of the discussion: an interplay between the resultant and the determinants of Toeplitz operators (Szegö's limit theorems, Day's formula, etc.) on one hand, and the relationship between the resultant and the exponential transforms on the other.

The first picture allows, inter alia, to relate the classical addition theorems for trigonometric and elliptic functions to so-called resultant identities. Another side of this picture is the link between the determinantal representations for the resultant and the τ-functions for analytic curves discussed recently by Igor Krichever, Anton Zabrodin et al. The second part of talk is devoted to finding exact receipts for the exponential transform for quadrature domains by using its connection to the elimination function.

Tid och plats: Tisdagen den 23 oktober kl. 10.15 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

MITTAG-LEFFLER SEMINAR

István Gyöngy:
On approximation of stochastic PDE's

Abstract: Stochastic PDE's of parabolic type are considered, and the rate of convergence of the solutions are investigated when the driving processes are approximated almost surely in the supremum norm by processes of bounded variations. The results are applied to the problem of robustness in nonlinear filtering and to accelerating the speed of convergence of numerical schemes.

Tid och plats: Torsdagen den 25 oktober kl. 14.00 – 15.00 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

JOINT CIAM AND OPTIMIZATION AND SYSTEMS THEORY SEMINAR

John S. Baras:
Dynamic iterations on partially ordered semirings with applications to trust evaluation in networks

Abstract: Within the realm of network security, we interpret the concept of trust as a relation among entities that participate in various protocols. Trust relations are based on evidence created by the previous interactions of entities within a protocol. In this seminar, we are focusing on the evaluation of trust evidence in Ad Hoc Networks. Because of the dynamic nature of Ad Hoc Networks, trust evidence may be uncertain and incomplete. Also, no pre-established infrastructure can be assumed. The evaluation process is modelled as a path problem on a directed graph, where nodes represent entities, and edges represent trust relations. We develop a novel formulation of trust computation as linear iterations on ordered semirings. Using the theory of semirings, we analyse several key problems on the performance of trust algorithms. We also analyse the resilience to attacks of the resulting schemes by developing sensitivities of paths to edges and nodes.

Tid och plats: Tisdagen den 23 oktober kl. 11.00 – 12.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

ALGEBRA- OCH GEOMETRISEMINARIUM

Alexander Berglund:
A_∞-structures on Koszul algebras

Abstract: There is a well-known correspondence between A_∞-algebra structures on a graded module V and degree -1 coderivations d on the tensor coalgebra $T_c(sV)$ satisfying $d^2 = 0$, where sV is the suspension of V. One way of interpreting Priddy's work in which Koszul algebras originally were introduced is that, for a Koszul algebra K, a purely quadratic differential on the Koszul dual coalgebra $K^<$ gives rise to a perturbation of the multiplication on K.

In this talk, I will present a result that subsumes these two facts. Namely, if K is a Koszul algebra, then a degree -1 coderivation d on $K^<$ satisfying $d^2 = 0$ gives rise to an A_∞-algebra structure on K, whose multiplication is a perturbation of the original multiplication in K. Specializing to $K^< = T_c(sV)$ and $K = V$ we recover the first, and specializing to a purely quadratic differential the second fact. Explicit formulas for this A_∞-structure are obtained in terms of the maps realizing the algebra K as a strong deformation retract of the cobar construction $\Omega(K^<)$.

Tid och plats: Onsdagen den 24 oktober kl. 13.15 – 15.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

KTH/SU MATHEMATICS COLLOQUIUM

Nicolai Krylov:
On numerical approximations for linear and fully nonlinear elliptic and parabolic equations

Abstract: Fully nonlinear elliptic and parabolic equations appear in numerous applications of partial differential equations, ranging from control theory of random processes to differential geometry.

(Continued on the next page.)

An important class of techniques to solve these equations numerically is given by various finite-difference schemes. We will give a brief introduction to these methods, outline some of their strengths and limitations, and then show that very strong error bounds hold for certain types of schemes. These bounds are new even for linear elliptic equations, but in fact also apply to parabolic Bellman equations with Lipschitz coefficients.

Part of the results is obtained in collaboration with Hongjie Dong from Brown University.

Tid och plats: Onsdagen den 24 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.

ALBANOVA AND NORDITA COLLOQUIUM IN PHYSICS

Markus Arndt:
Balls, strings and little elephants: Particles or Waves?

Abstract: Molecular interferometry allows us to explore interesting questions on the foundations of physics and it opens a new window to molecule metrology. Our experiments in Vienna started with fullerene diffraction several years ago and now allow us to play with an increasing number of different particles, with an even higher level of complexity, more and different degrees of freedom: including balls, strings and 'little elephants'. Such experiments are intriguing and challenging since large molecules differ so strongly one from another that a multitude of different methods is required to address the diverse physical aspects and molecular properties. This includes the adaptation of molecular beams sources and detection schemes as well as methods for the preparation of coherence and the investigation of rich decoherence physics. Molecule interferometry can also serve as a new sensing tool for molecular properties, since it is highly sensitive to tiniest perturbations and beam displacements. We shall finally discuss the potential practical or fundamental limits of matter wave interferometry with large things in the future.

Tid och plats: Torsdagen den 25 oktober kl. 15.15 – 16.15 i Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

MITTAG-LEFFLER SEMINAR

Rémi Léandre:
Applications of the Malliavin calculus of Bismut type without probability

Abstract: In the first part, we translate Malliavin calculus of Bismut type in semi-group theory. In the second part, we translate in semi-group theory Varadhan estimates we have got a long time ago by using the Malliavin calculus. In the third part, we translate in semi-group theory the positivity theorem we got with Ben Arous by using the Bismutian procedure and the Bismutian distance. In the fourth part, we translate in semi-group theory some results we got a lot of time ago by using the translation in probability of the Rothschild-Stein inhomogeneous division method. In the fifth part, we translate in semi-group theory the Girsanov formula for jump processes as well as the Malliavin Calculus of Bismut type for Poisson processes.

Tid och plats: Torsdagen den 25 oktober kl. 15.30 – 16.30 vid Institut Mittag-Leffler, Auravägen 17, Djursholm.

LOGIKSEMINARIET STOCKHOLM-UPPSALA

Johan G. Granström:
A variable free version of the substitution calculus for dependent type theory

Abstract: Take one piece of the substitution calculus for dependent type theory [1, 3] and one piece of de Bruijn's notation for lambda-calculus with nameless dummies [2] and stir. Out comes the variable free substitution calculus for dependent type theory. The motivation is that we want to write functions in the old-fashioned way, using variables, but give them meaning by translating them into compositions of projections and primitive functions, keeping in mind the extra complications introduced by dependent types and variable binding operations. Before performing the translation, it must be rigorously defined what a composition of projections and primitive functions is, and this rigorous definition is given by the variable free substitution calculus.

References:

[1] Abadi, M. et al., *Explicit substitution.* In J. Funct. Program., 1(4):375 – 416, 1991.

[2] de Bruijn, N. G., *Lambda calculus notation with nameless dummies, a tool for automatic formula manipulation, with application to the Church-Rosser theorem.* In Indag. Math. (Proc.) 75(5):381 – 392, 1972.

[3] Tasistro, A., *A formulation of Martin-Löf's type theory with explicit substitutions.* Lic. thesis, Chalmers, 1993.

Tid och plats: Onsdagen den 24 oktober kl. 10.30 i sal Å11167, Ångströmlaboratoriet, Uppsala universitet.

SEMINARIUM I MATEMATISK STATISTIK

Martin Ohlson:
The likelihood ratio statistic for testing spatial independence using a separable covariance matrix

Abstract: Spatio-temporal processes like multivariate time series and stochastic processes occur in many applications, for example the observations from functional magnetic resonance imaging (fMRI) or positron emission tomography (PET). It is interesting to test independence between k sets of the variables, that is testing spatial independence.

This talk deals with the problem of testing spatial independence for dependent observations. The sample observation matrix is assumed to follow a matrix normal distribution with a separable covariance matrix, in other words it can be written as a Kronecker product of two positive definite matrices. The main results in this talk are the computations of the maximum likelihood estimators and the null distribution of the likelihood ratio statistic. Two cases are considered, when the temporal covariance is known and when it is unknown. When the temporal covariance is known, the maximum likelihood estimators are computed and the asymptotic null distribution is shown to be similar to the independent observation case. In the case when the temporal covariance is unknown, the maximum likelihood estimators of the parameters are found by an iterative alternating algorithm.

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

CIAM Outreach 2007

CIAM Outreach 2007 will give a comprehensive presentation of the projects that are carried out at the Center for Industrial and Applied Mathematics (CIAM). Presentations are given by graduate students. Everyone interested is welcome. In particular, the aim is to attract an audience from academia as well as from industry.

CIAM Outreach 2007 will take place in the afternoon (it begins at 13.00) on Wednesday, October 24, 2007. The presentations will be held in in room room D2, KTH, Lindstedtsvägen 5, ground floor.

In the evening of Wednesday, October 24, a buffet will be served at the Department of Mathematics at 18.00. Invitations have been sent out to CIAM affiliates, and seats have been reserved for those who have asked for it. Some extra seats may be available. If you are interested, please contact Marie Lundin (malund@kth.se).

General information about CIAM can be found at http://www.ciam.kth.se/. A complete program for CIAM Outreach 2007 can be found at http://www.ciam.kth.se/program.pdf.

SEMINARIUM I MATEMATISK STATISTIK

Rolf Sundberg:
Påverkade bygget av Öresundsbron fiskbestånden?
Ett konsultuppdrag inför en prövning i Miljööverdomstolen

Sammanfattning: Jag utförde under augusti ett konsultuppdrag, som gick ut på att göra en oberoende statistisk värdering av tidigare studier och av parternas ståndpunkter beträffande frågan, ifall Öresundsbrobygget påverkat invandringen av glasål till Östersjön och beståndet av torsk där. Jag kunde knappast göra en grundlig värdering utan att också göra en egen statistisk analys av data, förstås. Jag kommer att tala kring svårigheterna i ett sådant uppdrag och problematiken med den typ av data som man har (från design av BACI-typ, Before-After, Control-Impact). Mycket av diskussionen handlar om hur man skall välja referensområde. En komplikation är den allmänna minskning av glasål som skett under perioden.

Tid och plats: Onsdagen den 24 oktober kl. 15.00 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

DOCENTFÖRELÄSNING I MATEMATISK STATISTIK

Esbjörn Ohlsson:
Dynamic Financial Analysis — en introduktion

Sammanfattning: Vi beskriver hur man i Dynamic Financial Analysis (DFA) kan beräkna kapitalbehovet för ett försäkringsbolag genom simulering av försäkringsmatematiska modeller. Vårt fokus ligger på modeller för försäkringsrisker och vi går inte närmare in på andra riskslag inom DFA. Vi kommer även att nämna något om förhållandet till klassisk riskteori/ ruinteori.

Anmärkning: En docentföreläsning är ett lärarprov, inte ett vetenskapligt seminarium. Föreläsningen skall ges på en nivå som skall motsvara den gamla C-nivån; i detta fall är den tänkt att motsvara ett extra seminarium på kursen Sakförsäkringsmatematik I.

Tid och plats: Onsdagen den 31 oktober kl. 15.00 i sal 14, hus 5, Matematiska institutionen, SU, Kräftriket.

DISPUTATION I REGLERTEKNIK

Jonas Mårtensson

disputerar på avhandlingen

Geometric Analysis of Stochastic Model Errors in System Identification

onsdagen den 31 oktober 2007 kl. 10.00 i sal F3, KTH, Lindstedtsvägen 26, b.v. Till opponent har utsetts *professor Michel Gevers.*

Abstract of the thesis

Models of dynamical systems are important in many disciplines of science, ranging from physics and traditional mechanical and electrical engineering to life sciences, computer science and economics. Engineers, for example, use models for development, analysis and control of complex technical systems. Dynamical models can be derived from physical insights, for example some known laws of nature, (which are models themselves), or, as considered here, by fitting unknown model parameters to measurements from an experiment. The latter approach is what we call system identification. A model is always (at best) an approximation of the true system, and for a model to be useful, we need some characterization of how large the model error is. In this thesis we consider model errors originating from stochastic (random) disturbances that the system was subject to during the experiment.

Stochastic model errors, known as variance-errors, are usually analysed under the assumption of an infinite number of data. In this context the variance-error can be expressed as a (complicated) function of the spectra (and cross-spectra) of the disturbances and the excitation signals, a description of the true system, and the model structure (i.e., the parametrization of the model). The primary contribution of this thesis is an alternative geometric interpretation of this expression. This geometric approach consists in viewing the asymptotic variance as an orthogonal projection on a vector space that to a large extent is defined from the model structure. This approach is useful in several ways. Primarily, it facilitates structural analysis of how, for example, model structure and model order, and possible feedback mechanisms, affect the variance-error. Moreover, simple upper bounds on the variance-error can be obtained, which are independent of the employed model structure.

The accuracy of estimated poles and zeros of linear time-invariant systems can also be analysed using results closely related to the approach described above. One fundamental conclusion is that the accuracy of estimates of unstable poles and zeros is little affected by the model order, while the accuracy deteriorates fast with the model order for stable poles and zeros. The geometric approach has also shown potential in input design, which treats how the excitation signal (input signal) should be chosen to yield informative experiments. For example, we show cases when the input signal can be chosen so that the variance-error does not depend on the model order or the model structure.

Perhaps the most important contribution of this thesis, and of the geometric approach, is the analysis method as such. Hopefully the methodology presented in this work will be useful in future research on the accuracy of identified models; in particular non-linear models and models with multiple inputs and outputs, for which there are relatively few results at present.

COMMON SU KOF/KTH THEORETICAL PHYSICS SEMINAR

Alfonso García-Parrado: Causal structure: a new viewpoint

Abstract: The notion of "causal structure" has been used in General Relativity most of the time in connection with "conformal structure" or "conformal equivalence". Although these concepts of causal structure have proven themselves quite useful, there are cases in which two spacetimes have similar causal properties but no conformal mapping between each other exists (e.g. two weak perturbations of Minkowski spacetime). To remedy this, the concept of "causal map" is introduced.

Causal maps generalize conformal maps, and we show how they can be used to define a new concept of causal structure which contains the traditional one based on conformal equivalence as a particular case. Causal structures can be sorted by means of a partial order, and we show the extent to which this ordering generalizes the classification of spacetimes according to the "standard hierarchy of causality conditions". We also put forward the concept of stability and instability of the causal structure and explain how it can be applied to examples as relevant as Minkowski or de Sitter spacetimes.

The causal structure of other well-known spacetimes (Schwarzschild, pp-waves) is also studied with our techniques.

Tid och plats: Onsdagen den 31 oktober kl. 11.00 – 12.00 i sal FA31, Roslagstullsbacken 21, AlbaNova universitetscentrum.

MONEY, JOBS

Columnist: Johannes Lundqvist, Department of Mathematics, Stockholm University. E-mail: johannes@math.su.se.

Info = information. This will be given and repeated until obsolete. Rely on other sources as well.
BBKTH = Bulletin Board at the Department of Mathematics, KTH.
BBSU = Bulletin Board at the Department of Mathematics, SU.
The following information, with links, is also available at http://www.math.su.se/~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

Money to apply for

11. Stiftelsen P. E. Lindahls fond utlyser två stipendier om vartdera 150 000 kronor för vetenskapliga studier eller fortsatt praktisk utbildning i naturvetenskapliga ämnen inom eller utom Sverige. Sökande skall ha avlagt doktorsexamen år 2002 eller senare eller vara behörig att antagas till forskarutbildning och får inte inneha tjänst hos stat eller kommun. Tidigare har prioritering givits till nydisputerade forskare samt seniora forskare som är i behov av bidrag till fortsatt utbildning, exempelvis i form av resa/vistelse vid annat universitet. Sista ansökningsdag är den 17 december. Web-info: http://www.kva.se/KVA_Root/swe/awards/scholarships/detail_scholarships.asp?grantsId=15.

Old information

Jobs to apply for

12. 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.
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.