



BRÅKET



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

NR 11

TORSDAGEN DEN 20 MARS 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:
Torsdagen den 27 mars kl. 13.00.

Disputation i teoretisk fysik

Martin Lindén disputerar vid KTH på avhandlingen *Stochastic modeling of motor proteins* fredagen den 28 mars kl. 10.00 i sal FA32, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se Bråket nr 10 sidan 6.

SEMINARIER

To 03–20 kl. 14.00–15.00. Mittag-Leffler Seminar. David Barrett, University of Michigan, Ann Arbor: *Geometry, Leray transforms and duality for domains in $\mathbb{CP}^2$* . Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 10 sidan 5.

To 03–20 kl. 15.15–16.15. AlbaNova and Nordita Colloquium in Physics. Professor Bryan Gaensler, University of Sydney: *Overview talk on the Square Kilometer Array*. Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se Bråket nr 9 sidan 5.

To 03–20 kl. 15.30–16.30. Mittag-Leffler Seminar. Marco Brunella, Université de Bourgogne, Dijon: *On the normal bundle of Levi-flat hypersurfaces*. Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 10 sidan 4.

Ti 03–25 kl. 14.00–15.00. Mittag-Leffler Seminar — Plurikomplexa seminariet. Dror Varolin, SUNY, Stony Brook: *Simultaneous zeros of pluricanonical sections*. Institut Mittag-Leffler, Auravägen 17, Djursholm.

Ti 03–25 kl. 15.30–16.30. Mittag-Leffler Seminar — Plurikomplexa seminariet. Norman Levenberg, Indiana University: *Weighted pluripotential theory and Bergman asymptotics*. Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 03–26 kl. 9.00–10.00. Logikseminariet Stockholm-Uppsala. Peter Dybjer, Chalmers: *A category-theoretic approach to type-checking dependent types*. Sal Å2002, Ångströmlaboratoriet, Uppsala universitet. Se sidan 5.

Fortsättning på nästa sida.

Logikseminariet Stockholm-Uppsala

fyller 25 år, och detta firas i Uppsala onsdagen den 26 mars. Se sidan 5.

Seminarier (fortsättning)

- On 03–26 kl. 10.15–12.00. Kombinatorikseminarium: *Open Problems Seminar*.** Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 10 sidan 4.
- On 03–26 kl. 10.30–11.30. Logikseminariet Stockholm-Uppsala. Alexandre Buisse,** Chalmers: *Formalizing (categorical models of) type theory inside type theory*. Sal Å2002, Ångströmlaboratoriet, Uppsala universitet. Se sidan 5.
- On 03–26 kl. 11.00. KTH/Nordita/SU Seminar in Theoretical Physics. Torsten Ekedahl,** SU: *Mirror symmetry*. Sal FA32, Roslagstullsbacken 21, AlbaNova universitetscentrum.
- On 03–26 kl. 11.45–12.45. Logikseminariet Stockholm-Uppsala. Richard Garner,** Uppsala: *Two-dimensional models of type theory*. Sal Å2002, Ångströmlaboratoriet, Uppsala universitet. Se sidan 5.
- On 03–26 kl. 13.15–14.15. Algebra and Geometry Seminar. Professor Ciro Ciliberto,** University of Rome 2: *Interpolation and degeneration*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 10 sidan 4.
- On 03–26 kl. 14.30–15.30. Logikseminariet Stockholm-Uppsala. Erik Palmgren,** Uppsala: *Type universes and ramifications*. Sal Å2002, Ångströmlaboratoriet, Uppsala universitet. Se sidan 5.
- On 03–26 kl. 14.30–15.30. KCSE (KTH Computational Science and Engineering Centre) Seminar. Fredrik Bultmark,** Uppsala: *“EXCITING!” — a developer-friendly DFT package*. PDC:s seminarierum, KTH, Teknikringen 14, plan 3. Se sidan 3.
- On 03–26 kl. 15.15. Seminarium i matematisk statistik. Anastassia Baxevani,** Chalmers tekniska högskola, Göteborg: *Spatio-temporal modelling of significant wave height*. Rum 306 (Cramérnummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 6.
- On 03–26 kl. 15.45–16.45. Logikseminariet Stockholm-Uppsala. Thierry Coquand,** Chalmers: *Type theory and functional programming*. Sal Å2002, Ångströmlaboratoriet, Uppsala universitet. Se sidan 5.
- On 03–26 kl. 16.00–17.00. KTH/SU Mathematics Colloquium. Professor Ciro Ciliberto,** University of Rome 2: *Secant varieties: a crossroad of projective geometry, algebra and topology*. 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 10 sidan 6.
- To 03–27 kl. 13.15–14.15. DNA-seminariet Uppsala-KTH (Dynamical systems, Number theory, Analysis). Alexander Fish,** Ohio State University: *Rigidity of invariant measures under the action of a multiplicative semigroup of positive logarithmic density on $\mathbb{T}$* . Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.
- To 03–27 kl. 14.00–15.00. Mittag-Leffler Seminar. Ilya Kossovskyi,** Moscow State University: *Envelopes of holomorphy and automorphism groups of model manifolds*. Institut Mittag-Leffler, Auravägen 17, Djursholm.

Fortsättning på nästa sida.

Seminarier (fortsättning)

- To 03–27 kl. 15.30–16.30. Mittag-Leffler Seminar.** Junjiro Noguchi, University of Tokyo: *Value distribution and distribution of rational points*. Institut Mittag-Leffler, Auravägen 17, Djursholm.
- Fr 03–28 kl. 13.00. Licentiatseminarium i mekanik.** Fredrik Hellström presenterar sin licentiatavhandling: *Numerical computations of the unsteady flow in a radial turbine*. Opponent: **Dr Jonas Bredberg**, Epsilon High Tech AB, Göteborg. Sal E3, KTH, Osquars Backe 14, 2 tr.
- Fr 03–28 kl. 13.15–14.15. Graduate Student Seminar.** Alan Sola, Matematik, KTH: *Random growth models and conformal mapping*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.
- Må 03–31 kl. 13.00. Seminarium i teoretisk datalogi.** Professor Elena Dubrova, ECS/ICT/KTH: *A transformation from the Fibonacci to the Galois Non-Linear Feedback Shift Registers*. Rum 1537, KTH CSC, Lindstedtsvägen 3, plan 5. Se sidan 6.
- On 04–02 kl. 11.00–12.00. KTH/Nordita/SU Seminar in Theoretical Physics.** Davide Meloni, Roma III, Italien: *New physics with neutrino telescopes*. Sal FA31, Roslagstullsbacken 21, AlbaNova universitetscentrum.
- On 04–02 kl. 13.15–14.15. Seminarium i analys och dynamiska system.** Laszlo Lempert, Purdue: *Title to be announced*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.
- On 04–02 kl. 13.15. Algebra and Geometry Seminar.** Jan-Erik Roos, SU: *Title to be announced*. Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.
- To 04–03 kl. 15.15–16.15. AlbaNova and Nordita Colloquium in Physics.** Professor Konstantin Zarembo, Uppsala universitet: *Spin chains and strings in gauge theory*. Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 4.

KCSE SEMINAR

Fredrik Bultmark:

“EXCITING!” — a developer-friendly DFT package

Abstract: Take a look under the hood of your favorite code package. Is there anything you would like to improve? Many PhD students around the world are using code they inherited from their fellow students or supervisors. Not everyone can interpret what is going on deep down in the ancient FORTRAN 66 subroutines written by someone who is now a well respected professor, but back then was a dope-smoking hippie with lots of other things on his mind than documenting and commenting his computer code.

The electronic structure code EXCITING! was written in two years, mainly by one postdoc in Graz, Austria. His task was to implement some simple things in another density functional theory code that was so poorly written that the postdoc decided to write his own program. And this time in a way which would simplify the life of others who wish to make a contribution to the development of electronic structure methods.

Tid och plats: Onsdagen den 26 mars kl. 14.30–15.30 i PDC:s seminarierum, KTH, Teknikringen 14, plan 3.

**DNA-SEMINARIET UPPSALA-KTH
(DYNAMICAL SYSTEMS, NUMBER THEORY, ANALYSIS)**

Alexander Fish:

**Rigidity of invariant measures under the action of a
multiplicative semigroup of positive logarithmic density on $\mathbb{T}$**

Abstract: In 1967 H. Furstenberg proved that any closed, invariant under x^2 and x^3 action subset of the torus is either finite or the whole torus. He posed the following question: Is it true that an (x^2, x^3) -invariant ergodic Borel probability measure on the torus is either Lebesgue or has finite support? The best known result is due to Rudolph: If the entropy of one of the actions with respect to the measure is positive, then the measure is Lebesgue.

We prove that if it is known that ergodic Borel probability measure on the torus is invariant under “many” T_n actions ($T_n(x) = nx \bmod 1$) [the set of n ’s should have positive logarithmic density], then it either has a finite support or it is Lebesgue measure.

The talk is based on joint work with Manfred Einsiedler.

Tid och plats: Torsdagen den 27 mars kl. 13.15–14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

GRADUATE STUDENT SEMINAR

Alan Sola:

Random growth models and conformal mapping

Abstract: Many growth phenomena in physics (such as diffusion limited aggregation or the growth of bacterial colonies) exhibit some sort of randomness and give rise to clusters of a seemingly fractal nature. In two dimensions, the powerful methods of conformal mapping can be used to model and study this kind of random growth in a mathematically rigorous way. In my talk, I plan to describe a random growth model introduced by Hastings and Levitov, where growing clusters are built using random iterations of elementary conformal mappings.

Tid och plats: Fredagen den 28 mars kl. 13.15–14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

ALBANOVA AND NORDITA COLLOQUIUM IN PHYSICS

Konstantin Zarembo:

Spin chains and strings in gauge theory

Abstract: The dynamics of gauge fields is notoriously complicated and difficult to understand. That is especially true for Quantum Chromodynamics, the theory of strong interactions. It has been anticipated for long time that string theory may give an effective description of strongly interacting gauge fields. A concrete realization of this idea is the gauge/string duality, or the AdS/CFT correspondence. More recently, it was shown that quantum spin chains also naturally arise in gauge theories. I will review the interplay of spin chains and strings in gauge theories and their role in the gauge/string duality.

Tid och plats: Torsdagen den 3 april kl. 15.15–16.15 i Oskar Kleins auditorium, Roslags-tullsbacken 21, AlbaNova universitetscentrum.

LOGIKSEMINARIET STOCKHOLM-UPPSALA

Logikseminariet Stockholm-Uppsala fyller 25 år, och detta firas med nedanstående föredrag onsdagen den 26 mars i sal Å2002, Ångströmlaboratoriet, Uppsala universitet.

9.00 – 10.00 **Peter Dybjer**, Chalmers: *A category-theoretic approach to type-checking dependent types.*

Abstract: An algebraic presentation of Martin-Löf’s logical framework is given, which is based on the notion of a category with families with extra structure. We present a type-checking algorithm for the normal forms of this theory, and sketch how it gives rise to an initial category with families with extra structure. In this way we obtain a purely algebraic formulation of the correctness of the type-checking algorithm which provides the core of proof assistants for intuitionistic type theory.

10.30 – 11.30 **Alexandre Buisse**, Chalmers: *Formalizing (categorical models of) type theory inside type theory.*

Abstract: We investigate the possible formalization of categorical metatheory of constructive type theory in (an extension of) itself, using the notion of “internal type theory”. The model chosen is categories with families, which model the most basic part of dependent type theory. We will discuss how to formalize them inside type theory, and also how to formalize the proof that categories with finite limits, another model of type theory, can be seen as categories with families. The formalization was carried out with the proof assistant coq, and we will present it in detail.

11.45 – 12.45 **Richard Garner**, Uppsala: *Two-dimensional models of type theory.*

Abstract: There is a well-known correspondence between locally cartesian closed categories and extensional type theories with the eta-rule for dependent products. We sketch a way in which this correspondence may be generalized to one between two-dimensional locally cartesian closed categories and certain “two-dimensional” intensional type theories. We also indicate how any intensional type theory gives rise to a two-dimensional intensional type theory by an internal groupoid construction.

14.30 – 15.30 **Erik Palmgren**, Uppsala: *Type universes and ramifications.*

Abstract: We examine the natural interpretation of a ramified type hierarchy into Martin-Löf type theory with an infinite sequence of universes. It is shown that under this interpretation a useful special case of Russell’s reducibility axiom is valid. This is enough to make the type hierarchy usable for development of constructive mathematics.

15.45 – 16.45 **Thierry Coquand**, Chalmers: *Type theory and functional programming.*

SEMINARIUM I MATEMATISK STATISTIK

Anastassia Baxevani:

Spatio-temporal modelling of significant wave height

Abstract: Significant wave height is defined as four times the standard deviation of the vertical displacement of the sea surface and is a measure of the sea variability. In this talk, we construct a homogeneous spatio-temporal model to describe the variability of the significant wave height over small regions of the sea and for short time-periods. Then, the model is extended to a non-homogeneous one that is valid over larger areas of the sea and for time periods up to ten hours.

The proposed model is parametric, and the spatial parameters are estimated applying methodology developed by Baxevani et al. (2006) on the significant wave height estimates for the TOPEX-Poseidon satellite. The temporal dynamics is modelled using buoy measurements and the C-ERA-40 data.

The derived model is validated by reconstructing, under different scenarios, the significant wave height surface over a large area of the North Atlantic and comparing it to the satellite measurements and the C-ERA-40 data.

Tid och plats: Onsdagen den 26 mars kl. 15.15 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

SEMINARIUM I TEORETISK DATALOGI

Elena Dubrova:

A transformation from the Fibonacci to the Galois Non-Linear Feedback Shift Registers

Abstract: Conventional Non-Linear Feedback Shift Registers (NLFSRs) use the Fibonacci configuration, in which the feedback is applied to the first bit only. In this seminar, we show how to transform a Fibonacci NLFSR into an equivalent NLFSR in the Galois configuration, in which the feedback can potentially be applied to every bit. Such a transformation reduces the depth of the circuits implementing feedback functions, thus decreasing the propagation time and increasing the throughput. The practical significance of the presented technique is that it makes possible increasing (in some cases doubling) the keystream generation speed of any Fibonacci NLFSR-based stream cipher with no area penalty.

Tid och plats: Måndagen den 31 mars kl. 13.00 i rum 1537, KTH CSC, Lindstedtsvägen 3, plan 5.