



# BRÅKET



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

NR 32

FREDAGEN DEN 13 OKTOBER 2000

## 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:

gunnark@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 19 oktober

kl. 13.00.

## Quadratic Relations

En konferens med detta namn  
äger rum på SU under tiden 13–16  
oktober. Se sidan 8.

## Kurs

Dmitry Kozlov: Subspace Arrange-  
ments. Se sidan 5.

## MATHS QUIZ 2000

Se Bråket nr 29 sidan 8.

## SEMINARIER

Fr 10–13 kl. 9.00–10.00. Kollokvium i fysik. Speaker  
to be announced: *The Nobel Prize in Physics  
2000*. Sal F01, Fysiska institutionen, KTH, Lind-  
stedtsvägen 24, b.v.

Fr 10–13 kl. 11.00–12.00. Optimization and Systems  
Theory Seminar. Dr Ilya Ioslovich, Faculty of  
Agricultural Engineering, Technion, Haifa, Israel:  
*Upper bounds for duals of positive linear programs  
with box-constrained uncertainties*. Seminarierum  
3721, Institutionen för matematik, KTH, Lind-  
stedtsvägen 25, plan 7. Se Bråket nr 30 sidan 4.

Fr 10–13 kl. 13.00. Docentföreläsning i matematik.  
Benjamin Baumslag: *Subgroups of groups with a  
finite presentation: A sketch of some important  
results in combinatorial group theory*. Seminarierum  
3721, Institutionen för matematik, KTH, Lind-  
stedtsvägen 25, plan 7. Se Bråket nr 30 sidan 4.

Må 10–16 kl. 15.15–16.00. Seminarium i matematisk  
statistik. Torbjörn Uddevik presenterar sitt  
examensarbete: *Trading rules for dynamic liability  
management*. Seminarierum 3733, Institutionen för  
matematik, KTH, Lindstedtsvägen 25, plan 7. Se  
Bråket nr 31 sidan 8.

Ti 10–17 kl. 13.15. Seminar in Theoretical Physics.  
Edwin Langmann, KTH: *Loop groups, anyons,  
and the (elliptic) Calogero-Sutherland model*. Rum  
4731, Fysikum, SU, Vanadisvägen 9. Se sidan 9.

Ti 10–17 kl. 14.00–15.00. Mittag-Leffler Seminar.  
Markus Junker, Freiburg: *Indiscernible sequences,  
topologies and independence*. Institut Mittag-Leffler,  
Auravägen 17, Djursholm. Se sidan 4.

Ti 10–17 kl. 16.00–17.00. Artinian Gorenstein rings  
and Frobenius algebras. Michael Shapiro:  
*Introduction to topological quantum field theories*.  
Sammanträdesrum 3548, Institutionen för mate-  
matik, KTH, Lindstedtsvägen 25, plan 5.

Fortsättning på nästa sida.

### Seminarier (fortsättning)

- On 10–18 kl. 10.15–11.15. Kombinatorikseminarium. Professor Vadim Kaimanovich**, Université de Rennes: *Hyperbolicity and fractals*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.
- On 10–18 kl. 11.00–12.00. Presentation av examensarbete i matematik. Niclas Larsson:** *Första mötet med det abstrakta lineära rummet*. Sal 33, hus 5, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101.
- On 10–18 kl. 13.00. Seminarium i statistik. Dr Marinus Spreen**, Maastricht University, Nederländerna: *On drug abusers and networks*. Rum B705, Statistiska institutionen, SU.
- On 10–18 kl. 13.15–15.00. Seminarium i analys och dynamiska system. Jan Boman**, SU: *The attenuated Radon transform finally inverted*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.
- On 10–18 kl. 14.00–15.00. Mittag-Leffler Seminar. Professor Paul Cohen**, Stanford: *A new proof of Gentzen's theorem, and possible generalizations*. Institut Mittag-Leffler, Auravägen 17, Djursholm.
- On 10–18 kl. 15.15–16.00. Seminarium i matematiska och statistiska tillämpningar inom ekonomi vid Mälardalens högskola (Västerås). Richard Bonner**, Institutionen för matematik och fysik vid Mälardalens högskola: *Computational nature of economic decision*. Rum N24, Mälardalens högskola, Högskoleplan, Västerås. Se sidan 6. Internet-adressen till information om seminariet är [http://www.ima.mdh.se/\\_seminars.htm](http://www.ima.mdh.se/_seminars.htm).
- On 10–18 kl. 15.15. Alain Noullez**, Observatoire de Nice: *Lagrangian methods for passive scalar transport*. Rum 1537, NADA, KTH, Lindstedtsvägen 3, plan 5. Se sidan 3.
- On 10–18 kl. 15.30–16.30. Mittag-Leffler Seminar. Paul Eklof**, Irvine: *Some theorems about Ext*. Institut Mittag-Leffler, Auravägen 17, Djursholm. Se sidan 7.
- To 10–19 kl. 10.30–11.30. Waveletseminarium. (Observera lokalen!) Dr Tatiana Levitina**, Department of Numerical Methods, Computing Center of Russian Academy of Sciences, och **Professor Erkki J. Brändas**, Institutionen för kvantkemi, Uppsala universitet: *On prolate spheroidal wave functions for signal processing*. Rum 1537, NADA, KTH, Lindstedtsvägen 3, plan 5. Se sidan 4.
- To 10–19 kl. 15.15. Dynamiskt systemseminarium. Professor Vadim Kaimanovich**, Université de Rennes: *Measures on laminations associated with rational maps*. Sammanträdesrum 3548, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 5. Se sidan 7.
- To 10–19 kl. 15.15–16.15. Extra kombinatorikseminarium. E.-M. Feichtner**, ETH, Zürich: *Incidence combinatorics of resolutions*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.
- To 10–19 kl. 15.15–17.00. Professor Paul Cohen**, Stanford: *Lecture on Analytic Number Theory*. (Det sjätte föredraget i en serie.) Sal C1, Electrum, Kista. Se Bråket nr 26 sidan 4 och Bråket nr 30 sidan 9.
- Fr 10–20 kl. 9.00–10.00. Kollokvium i fysik. Professor Lars Bergström**, Fysikum, SU: *Matter and energy in the universe*. Sal F01, Fysiska institutionen, KTH, Lindstedtsvägen 24, b.v. Se Bråket nr 31 sidan 7.

**Fortsättning på nästa sida.**

**Seminarier (fortsättning)**

- Fr 10–20 kl. 15.15. Doktorandseminarium. Pelle Salomonsson:** *Residykalkyl*. Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket, Roslagsvägen 101. Se sidan 8.
- Må 10–23 kl. 15.15–17.00. Seminarium i matematisk statistik. Lars Holst:** *Bernoullital, Euler-Maclaurins summationsformel och Stirlings formel*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 9.
- On 10–25 kl. 13.00. Seminarium i statistik. Michael Carlsson och Jan Hagberg,** Statistiska institutionen, SU: *Fiduciella konfidensintervall: En introduktion baserad på en artikel av Wang "Fiducial Intervals: What Are They?", publicerad i The American Statistician, Vol. 54 (No. 2), 2000*. Rum B705, Statistiska institutionen, SU.
- To 10–26 kl. 15.15. Dynamiskt systemseminarium. Professor Francesco Calogero,** Dipartimento di Fisica, Università di Roma "La Sapienza": *Recent results on classical many-body problems amenable to exact treatments*. Sal E36, KTH, Lindstedtsvägen 3, b.v. Se sidan 4.
- Fr 10–27 kl. 9.00–10.00. Kollokvium i fysik. Dr Richard L. Kautz,** NIST Boulder: *Chaotic dynamics of the Tilt-A-Whirl*. Sal F01, Fysiska institutionen, KTH, Lindstedtsvägen 24, b.v.

**SEMINARIUM****Alain Noullez:****Lagrangian methods for passive scalar transport**

*Abstract:* The problem of the transport of a passive quantity by a turbulent velocity can be simplified enormously by using a Lagrangian viewpoint. Indeed, in the limit of vanishing diffusivity, the value at any point of the transported quantity can be obtained by integrating the injection of this quantity along the Lagrangian trajectories. This result remains valid for non-zero diffusivities, provided we introduce some “molecular noise” on the trajectories, which mimics the effect of diffusion. This last point is especially important to reproduce the effect of “point-splitting” or “explosive separation” that acts to separate initially coincident particles if the advecting velocity field is not smooth, even in the limit of zero diffusivity. I will show that the Lagrangian formalism can also be used as a powerful numerical method allowing the computation of the structure functions of order  $p$  of the transported quantity as linear combinations of the  $p$ -points correlation functions, evaluated for different initial configurations of the points. These particular combinations have the property of cancelling in the structure functions the leading contributions predicted by dimensional analysis, opening the door to anomalous scaling of these objects. This viewpoint furnishes a different perspective on the link between intermittency, zero-modes and geometry. Implementing the numerical method also implies some interesting problems of integrating numerically stochastic differential equations and generating the turbulent velocity field with prescribed correlations at the particles positions. Results obtained by the numerical method for the Kraichnan model, and their possible generalization to the case of “real turbulence”, will also be presented.

*Tid och plats:* Onsdagen den 18 oktober kl. 15.15 i rum 1537, NADA, KTH, Lindstedtsvägen 3, plan 5.

## MITTAG-LEFFLER SEMINAR

**Markus Junker:**

### **Indiscernible sequences, topologies and independence**

*Abstract:* There is a notion of “closure under indiscernible sequences”, which associates natural closure operators and families of topologies with every structure. I will discuss properties of these topologies and how they are related to properties of the structure. In particular they allow in many cases a topological characterization of (forking) independence.

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

---

## WAVELETSEMINARIUM

**Tatiana Levitina och Erkki J. Brändas:**

### **On prolate spheroidal wave functions for signal processing**

*Abstract:* A spectral window, ideal from the energy concentration viewpoint, is known to be a prolate spheroidal wave function  $S_{0l}(c, \eta)$ . These functions exhibit unique properties that are of special importance in signal processing. However, in the literature they are often being reported as functions too difficult to handle numerically, and they are therefore in practice used much less than they should be. On the other hand, powerful and efficient numerical techniques have been devised to compute the full set of prolate spheroidal wave functions, and they have successfully been applied to various scattering problems in acoustics and electrodynamics. These techniques should be useful to problems in signal processing, both in multiple applications of conventional spheroidal functions and, appropriately modified to compute so-called generalized spheroidal wave functions, in treating signals depending on several variables.

*Tid och plats:* Torsdagen den 19 oktober kl. 10.30–11.30 i rum 1537, NADA, KTH, Lindstedtsvägen 3, plan 5.

---

## DYNAMISKT SYSTEMSEMINARIUM

**Francesco Calogero: Recent results**

### **on classical many-body problems amenable to exact treatments**

*Abstract:* I plan to survey tersely some recent findings. These include: (i) joint work with Mario Bruschi on the identification of integrable systems of unharmonic (quartic) oscillators in multidimensional space [Physics Letters A, in press], and joint work with Jean-Pierre Francoise (ii) on a new integrable many-body system (of Ruijsenaars-Schneider type, but not in the RS class) featuring elliptic interactions [Int. Math. Res. Notes, in press], and (iii) on a many-rotator problem in the plane, encompassing integrable and nonintegrable cases, whose motions are all completely periodic in the integrable case, and which features a lot of periodic trajectories (corresponding to a set of initial data having nonvanishing measure in the phase space) also in the nonintegrable cases [to be submitted to the special issue of Inverse Problems, containing the Proceedings of the RCP264 Workshop convened in June 2000 in Montpellier to celebrate Pierre Sabatier’s 65th birthday].

*Tid och plats:* Torsdagen den 26 oktober kl. 15.15 i sal E36, KTH, Lindstedtsvägen 3, b.v.

---

## KOMBINATORIKSEMINARIUM

### Vadim Kaimanovich: Hyperbolicity and fractals

*Abstract:* The talk is devoted to a new link between the theory of fractals and hyperbolic geometry. Namely, fractal sets (like, for example, the Sierpinski gasket) naturally give rise to countable graphs which are hyperbolic in the sense of Gromov. This result is then applied to a study of random walks on the Sierpinski gasket.

*Tid och plats:* Onsdagen den 18 oktober kl. 10.15 – 11.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

## GRADUATE COURSE IN MATHEMATICS

### Dmitry Kozlov: Subspace Arrangements (5 p)

*Time and place:* The course will be given during the second half of the autumn term 2000 and the first half of the spring term 2001, once a week, starting in the week October 23–27, 2000, at the Department of Mathematics, KTH, Stockholm. The precise time of the lectures will be decided after consultation with the presumptive participants. Please write an e-mail message to [kozlov@math.kth.se](mailto:kozlov@math.kth.se) if you want to follow the course.

*Language:* I would like to teach in English. However, Swedish is available if requested.

*Course content:* The course is concerned with studying how the algebraic invariants of the topological structure of very basic geometric objects — arrangements of linear subspaces — are encoded in the associated combinatorial structure. The ambition is to start from elementary definitions and finish with a description of the latest research. A preliminary list of topics:

- Combinatorics of subspace arrangements.
- Topology of order complexes of posets.
- Goresky-MacPherson, Vassiliev, and Ziegler-Zivaljevic formulae.
- The  $K(\pi, 1)$  problem for arrangements.
- Combinatorial stratifications of arrangements.
- The Brieskorn-Orlik-Solomon theorem.
- Cohomology algebra of complex subspace arrangements.
- Cohomology algebra of the braid group.

*Prerequisites:* Basic knowledge of algebra and topology. Knowledge of algebraic topology is not a strict prerequisite as I will explain all the concepts which I will use.

*Source materials:* No book is strictly necessary, although there is a standard overview article *Subspace Arrangements* by A. BJÖRNER and a textbook *Hyperplane Arrangements* by P. ORLIK and H. TERAŌ. Parts of the course will follow research articles, which will be handed out.

*Contact information:* E-mail: [kozlov@math.kth.se](mailto:kozlov@math.kth.se). Telephone: 08-790 66 55. Office: Room 3528, Department of Mathematics, KTH, Lindstedtsvägen 25.

Dmitry Kozlov

**SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM**

**Jan Boman:**

**The attenuated Radon transform finally inverted**

*Abstract:* In so-called Emission Computed Tomography one is led to the inversion of the generalized Radon transform in two dimensions

$$R_\mu f(\omega, p) = \int_{x \cdot \omega = p} f(x) \rho(\omega, x) ds, \quad (\omega, p) \in S^1 \times \mathbf{R}, \quad (1)$$

where  $f$  is a continuous function with compact support,  $ds$  is arc length measure on the line  $x \cdot \omega = p$ , and  $\rho(\omega, x)$  is a weight function defined by

$$\rho(\omega, x) = \exp\left(-\int_0^\infty \mu(x + t\omega^\perp) dt\right); \quad (2)$$

here  $\mu(x)$  is a given function with compact support. Physically  $f(x)$  is a radiation intensity to be determined,  $\mu(x)$  is a known attenuation coefficient, and  $R_\mu f(\omega, p)$  is the measured radiation flux coming out of the body along the (oriented) line  $x \cdot \omega = p$ . If  $\mu = 0$ , then  $R_\mu$  reduces to the classical Radon transform. If  $\mu$  is constant, an inversion formula for  $R_\mu$  has been known for a long time. For about 20 years it has been an open problem whether the transform (1) is always injective if  $\rho(\omega, x)$  has the form (2). In spite of this, the transform has been numerically inverted as a matter of routine for many specific  $\mu$ . On the other hand, it is known that there exist smooth and positive  $\rho(\omega, x)$  — not of the kind (2) — such that the transform  $C_0^\infty \ni f \mapsto \int_{x \cdot \omega = p} f(x) \rho(\omega, x) ds$  is not injective.

Now, inspired by arguments from classical scattering theory, Roman G. Novikov has given an explicit inversion formula for  $R_\mu$  for arbitrary Hölder continuous  $\mu$ , thus in particular proved injectivity. Slightly later Frank Natterer has given a similar formula with a simpler proof. In the talk I will sketch the history of this problem and describe Natterer's result.

*Tid och plats:* Onsdagen den 18 oktober kl. 13.15–15.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

**SEMINARIUM I MATEMATISKA OCH STATISTISKA  
TILLÄMPNINGAR INOM EKONOMI  
VID MÄLARDALENS HÖGSKOLA (VÄSTERÅS)**

**Richard Bonner:**

**Computational nature of economic decision**

*Abstract:* In classical economic theory, an agent is thought to pick from an abundant basket of decisions, the cost of which is rarely an issue. By contrast, in artificial intelligence, where electronic computers can be agents and all is explicitly computed, computation costs of decisions are of central interest. As a step towards a merger of the two views, one may start looking closer at decision costs and (computational) resource limitations of decision processes. With this motivation, I will discuss the basic “decision tree model” with limited access to decision criteria and bounded tree size.

The talk is based on joint work with V. Galant, sponsored by the ML2000 project.

*Tid och plats:* Onsdagen den 18 oktober kl. 15.15–16.00 i rum N24, Mälardalens högskola, Högskoleplan, Västerås.

## MITTAG-LEFFLER SEMINAR

### Paul Eklof: Some theorems about Ext

*Abstract:* We will survey some results about the vanishing and non-vanishing of the functor Ext in which set-theoretic methods are used, either to prove independence results or, in some cases, theorems of ZFC. We will include basic definitions, and old, as well as new, results.

*Tid och plats:* Onsdagen den 18 oktober kl. 15.30–16.30 i Institut Mittag-Leffler, Aura-vägen 17, Djursholm.

---

## DYNAMISKT SYSTEMSEMINARIUM

### Vadim Kaimanovich:

#### Measures on laminations associated with rational maps

*Abstract:* Affine and hyperbolic laminations associated with rational maps were recently introduced by Lyubich and Minsky. They provide the rational dynamics with a 3-dimensional object analogous to the hyperbolic 3-space in the theory of Kleinian groups.

The talk is based on a joint work with Lyubich and is devoted to a construction of natural geometric measures on these laminations: conformal measures on the affine laminations and harmonic measures on the hyperbolic laminations. The construction involves a number of associated geometric objects on the laminations: the Busemann cocycles, currents, the Poincaré series,  $\lambda$ -harmonic functions.

*Tid och plats:* Torsdagen den 19 oktober kl. 15.15 i sammanträdesrum 3548, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 5.

---

## EXTRA KOMBINATORIKSEMINARIUM

### E.-M. Feichtner:

#### Incidence combinatorics of resolutions

*Abstract:* The construction of smooth models for arrangement complements by DeConcini & Procesi has been a crucial step for describing cohomology algebras of complex subspace arrangements. Moreover, the arrangement models are instances of wonderful compactifications that have appeared at many places since. Inspired by the combinatorial notions used by DeConcini & Procesi, we define building sets and nested sets for arbitrary meet-semilattices on a purely order-theoretic level. We define combinatorial blowups of meet-semilattices and show that a sequence of such combinatorial blowups, prescribed by a building set, transforms the original meet-semilattice into the face poset of the simplicial complex of nested sets. Specializing to the arrangement context, the combinatorial blowups serve to trace the incidence combinatorics of stratifications through every step of the DeConcini-Procesi model construction. Much more general, they provide a common abstract framework for the incidence combinatorics occurring in seemingly unrelated situations in algebraic geometry, e.g., simplicial resolutions of toric varieties.

This is joint work with Dmitry Kozlov.

*Tid och plats:* Torsdagen den 19 oktober kl. 15.15–16.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

---

## QUADRATIC RELATIONS

The conference *Quadratic Relations* will take place at the Department of Mathematics, Stockholm University, from Friday, October 13, to Monday, October 16, 2000.

The conference is organized in order to celebrate the 65th birthday of *Professor Jan-Erik Roos*.

### Schedule

#### Friday, October 13

- 9.00 – 9.45 **Steve Halperin:** *Loop spaces and Ext algebras.*
- 10.00 – 10.45 **Mike Stillman:** *Local equations of the toric Hilbert Scheme.*
- 11.15 – 12.00 **Jürgen Herzog:** *Homological properties of Rees rings.*
- 14.00 – 14.45 **Aldo Conca:** *Koszul algebras and cubic forms.*
- 15.00 – 15.45 **Volkmar Welker:** *Discrete Morse theory for cellular resolutions.*
- 16.15 – 16.35 **Gert Almkvist:** *The chromatic polynomial is a Hilbert polynomial.*

#### Saturday, October 14

- 9.00 – 9.45 **Jan-Erik Roos:** *Theorems and conjectures in homological algebra inspired by computer calculations.*
- 10.00 – 10.45 **Kathryn Hess:** *Hochschild and cyclic homology of cocommutative Hopf algebras.*
- 11.15 – 12.00 **Hans Baues:** *Quadratic endofunctors of the category of groups.*
- 14.00 – 14.45 **Irena Peeva:** *Toric Koszul algebras.*
- 15.00 – 15.45 **Larry Lambe:** *A new structure theorem for Hopf algebras.*
- 16.15 – 17.00 **Luchozar Avramov:** *Finite regularity and Koszul algebras.*

#### Monday, October 16

- 9.00 – 9.45 **Idun Reiten:** *Hereditary categories.*
- 10.00 – 10.20 **Victor Ufnarovski:** *Gröbner bases, resolutions and coalgebras.*
- 10.20 – 10.45 **Gustaf Lindencrona, President of the University.**
- 11.15 – 12.00 **Arnfinn Laudal:** *Non-commutative algebraic geometry and invariant theory.*
- 14.00 – 14.45 **Ragnar Buchweitz:** *Hochschild cohomology, Atiyah classes and the centre of the derived category.*
- 15.00 – 15.45 **Askar Dzhumadil'daev:** *Novikov algebras, Arnold algebras and Leibniz algebras.*
- 16.15 – 17.00 **Leonid Positselski:** *Koszul duality for DG modules.*

All lectures will be held in room 14, building 5, Department of Mathematics, SU, Kräft-  
riket, Roslagsvägen 101.

Organizers of the conference are Ralf Fröberg and Clas Löfwall.

The schedule of the conference can also be found at <http://www.matematik.su.se/events/roos-conf/>.

## DOKTORANDSEMINARIUM

### Pelle Salomonsson: Residykalkyl

*Sammanfattning:* Vi tänker försöka återuppliva doktorandseminariet. Denna gång blir det residykalkyl på en komplex mångfald. Integrering över singulära polyskivor ger upphov till ett komplex som förefaller ge en ganska klar intuition, med en rent simplicieell formalism.

*Tid och plats:* Fredagen den 20 oktober kl. 15.15 i rum 306, hus 6, Matematiska institutio-  
nen, SU, Kräftriket, Roslagsvägen 101.



**SEMINAR IN THEORETICAL PHYSICS****Edwin Langmann: Loop groups, anyons,  
and the (elliptic) Calogero-Sutherland model**

*Abstract:* I describe the construction of a simple quantum field theory model of anyons on the circle and an anyon Hamiltonian, which can be interpreted as a second quantized Calogero-Sutherland (CS) Hamiltonian, and which can be used to solve the CS model in terms of anyons correlation functions. At zero temperature, this construction provides an alternative derivation of the known solution of the trigonometric CS model (= Sutherland model). At finite temperature we obtain a novel algorithmic method to solve the elliptic CS model, for arbitrary particle number and couplings.

*Tid och plats:* Tisdagen den 17 oktober kl. 13.15 i rum 4731, Fysikum, SU, Vanadisvägen 9.

---

**SEMINARIUM I MATEMATISK STATISTIK****Lars Holst: Bernoullital,  
Euler-Maclaurins summationsformel och Stirlings formel**

*Sammanfattning:* Bernoullipolynom och asymptotik för Bernoullital diskuteras, och Euler-Maclaurins summationsformel visas och tillämpas på Stirlings formel. Seminariet ansluter till de tidigare den 11 september och den 9 oktober.

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

---