BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 18

FREDAGEN DEN 13 MAJ 2005

Konferens i algebraisk geometri

Denna äger rum vid KTH under tiden 18 – 20 maj. Se sidorna 6 – 7.

Disputation i matematik

Jakob Jonsson disputerar vid KTH på avhandlingen *Simplicial Complexes of Graphs* onsdagen den 25 maj kl. 15.00. Se sidan 8.

Money, jobs: Se sidorna 11 – 12.

SEMINARIER

Fr 05 – 13 kl. 11.00 – 12.00. Optimization and Systems Theory Seminar. Professor Bijoy K. Ghosh, Department of Electrical and Systems Engineering, Washington University, St. Louis, USA: *An example of signal processing in the visual cortex.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

Må 05 – 16 kl. 10.15 – 12.00. Extra Algebra and Geometry Seminar. *(Observera dagen och tiden!)* **Dimitri Zvonkine,** Institut de Mathématiques de Jussieu, Paris: *Towards an r-analogue of the Ekedahl-Lando-Shapiro-Vainshtein formula.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 5.

Fortsättning på nästa sida.

Disputation i matematik

John Andersson disputerar vid KTH på avhandlingen *Regularity boundary regularity near the fixed boundary* fredagen den 20 maj kl. 10.00. Se sidan 9.

Göran Gustafsson Lectures in Mathematics

Dessa äger rum den 20, 23 och 24 maj vid KTH. Se sidan 9.

Gustafssonpriset till unga forskare

Mattias Jonsson, docent och universitetslektor i matematik vid KTH, har fått detta pris. Priset utgörs av ett forskningsbidrag på sammanlagt 1 miljon kronor, under tre år. Detta är en stor ära för institutionen.

Låt oss gratulera Mattias till den fina utmärkelsen!

Institutionen utlyser ett "postdoctoral fellowship", som finansieras av Mattias Jonssons pris. Se sidan 5.

Anders Lindquist
Prefekt vid Institutionen för matematik, KTH

Seminarier (fortsättning)

Må 05−16 kl. 13.15−14.15. Seminar in Analysis and its Applications. Norayr Matevosyan, Wien: *An Obstacle-Problem like problem.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

Ti 05−17 kl. 10.15−11.15. Presentation av examensarbete i matematik. Alan Sola: *Prawitz-type inequalities and diagonal expansions for conformal mappings.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 11.

Ti 05−17 kl. 10.15. Plurikomplexa seminariet. Elin Götmark, Göteborg: *An explicit proof of the Briançon-Skoda theorem using integral formulas.* Sal MIC 2446, Matematiska institutionen, Polacksbacken, Uppsala universitet. Se sidan 8.

Ti 05−17 kl. 13.15. Plurikomplexa seminariet. Dimitri Zvonkine, Paris: *A model of 2-dimensional gravity via ramified coverings of the sphere.* Sal MIC 2446, Matematiska institutionen, Polacksbacken, Uppsala universitet. Se sidan 9.

Ti 05−17 kl. 14.00−15.00. Mittag-Leffler Seminar. Jörgen Backelin, SU: *Ramsey optimal graphs and triangulations of spheres.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

Ti 05−17 kl. 15.30−16.30. Mittag-Leffler Seminar. Sergi Elizalde, MIT, Cambridge: *Combinatorics from biology: inference functions and sequence alignment.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 05−18 kl. 10.15. Mathematical Physics Seminar. Marc-Thomas Eisele, Technische Universität München: *Baryogenesis — introduction and overview of different scenarios.* Seminarierummet i hus 11 (rum 112:028), Roslagstullsbacken 11, AlbaNova universitetscentrum.

On 05−18 kl. 13.00. Seminarium i statistik. Dr Paul Dickman, Institutionen för medicinsk epidemiologi, Karolinska Institutet: *Titel meddelas senare.* Sal B705, Statistiska institutionen, SU, Universitetsvägen 10B, plan 7, Frescati.

On 05−18 kl. 13.15−14.15. Seminarium i analys och dynamiska system. A. B. Aleksandrov: *Approximation by M. Riesz's kernels in L^p for $p < 1$.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 16 sidan 4.

On 05−18 kl. 13.15−15.00. Logikseminariet Stockholm-Uppsala. Marko Djordjevic: *Entropy of formulas.* Sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet. Se sidan 5.

On 05−18 kl. 15.15. Seminarium i matematisk statistik. Tom Britton, SU: *An epidemic model with different severities.* Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 4.

On 05−18 kl. 16.00. KTH/SU Mathematics Colloquium. Professor Andrei Zelevinsky, Northeastern University, Boston, USA: *Cartan-Killing classification: old and new.* Sal 14, hus 5, Matematiska institutionen, SU, Kräftriket. Se Bråket nr 17 sidan 4.

To 05−19 kl. 14.00−15.00. Mittag-Leffler Seminar. Xiangsheng Xia, Wayne University: *The resolutions of Weyl modules of skew shapes.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

Fortsättning på nästa sida.

Seminarier (fortsättning)

To 05−19 kl. 15.30−16.30. Mittag-Leffler Seminar. Jakob Jonsson, KTH: *Generalized triangulations of a convex polygon.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

Fr 05−20 kl. 11.00−12.00. Optimization and Systems Theory Seminar. Henrik Sandberg, Institutionen för reglerteknik, Lunds tekniska högskola: *Frequency-domain analysis of linear time-periodic systems.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 17 sidan 5.

Fr 05−20 kl. 15.30. Göran Gustafsson Lecture in Mathematics. Professor Peter Sarnak, Princeton University, USA: *Zeta functions and random matrix theory.* Sal E1, KTH, Lindstedtsvägen 3, b.v. Se sidan 9.

Må 05−23 kl. 15.15. Göran Gustafsson Lecture in Mathematics. Professor Peter Sarnak, Princeton University, USA: *Quantum chaos and spectra of locally symmetric spaces I.* Sal D2, KTH, Lindstedtsvägen 5, b.v. Se sidan 9.

Ti 05−24 kl. 14.00. Licentiatseminarium i matematisk statistik. *(Observera dagen, tiden och lokalen!)* **Gudrun Jonasdottir** presenterar sin licentiatavhandling: *Statistical Methods for Assessing Genetic Association in the Presence of Linkage.* Licentiatopponent: **Pär-Ola Bendahl,** Lunds universitet. Sal 14, hus 5, Matematiska institutionen, SU, Kräftriket. Se sidan 7.

Ti 05−24 kl. 15.15. Göran Gustafsson Lecture in Mathematics. Professor Peter Sarnak, Princeton University, USA: *Quantum chaos and spectra of locally symmetric spaces II.* Sal D2, KTH, Lindstedtsvägen 5, b.v. Se sidan 9.

On 05−25 kl. 10.00−11.00. Presentation av examensarbete i matematik. Xavier Fernandes: *Lilavati in the history of mathematics.* Handledare: **Paul Vaderlind.** Sal 37, hus 5, Matematiska institutionen, SU, Kräftriket. Se sidan 10.

On 05−25 kl. 10.15−12.00. Extra Algebra and Geometry Seminar. *(Observera tiden!)* **Ngo Viet Trung,** Hanoi: *Mixed volume of polytopes versus mixed multiplicities of ideals.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

On 05−25 kl. 13.00. Seminarium i statistik. Hans Nyquist: *Design av experiment, minikurs, del 3.* (Fortsättning från den 27 april och den 11 maj.) Sal B705, Statistiska institutionen, SU, Universitetsvägen 10B, plan 7, Frescati.

On 05−25 kl. 13.15. Seminarium i analys och dynamiska system. Håkan Eliasson: *KAM for the non-linear Schrödinger equation.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 11.

On 05−25 kl. 16.00−17.00. KTH/SU Mathematics Colloquium. *(Observera lokalen!)* **Professor Michael Berry,** Physics Department, University of Bristol: *Physics of non-Hermitian degeneracies.* Sal D1, KTH, Lindstedtsvägen 17, 3 tr. Kaffe/te serveras kl. 15.30 i pausrummet, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4. Se sidan 10.

ALGEBRA/GEOMETRY SEMINAR

Mark Haiman: Macdonald polynomials

I Bråket nr 17 annonserades att ovanstående seminarium skulle äga rum onsdagen den 18 maj. Seminariet är ***inställt.*** Mark Haiman kommer i stället att hålla sitt föredrag onsdagen den 18 maj kl. 14.00−15.00 inom ramen för konferensen i algebraisk geometri. Se sidan 6.

4

OPTIMIZATION AND SYSTEMS THEORY SEMINAR

Bijoy K. Ghosh:
An example of signal processing in the visual cortex

Abstract: In this talk I shall discuss some new results on our ongoing investigation with the visual cortex of freshwater turtles. A turtle's visual cortex has three layers of cells that are interconnected in a way that can sustain waves of activity. These activity waves have been measured using voltage sensitive dyes, and a large scale simulation model has been built using multicompartmental models. The activity waves are analysed using principal components with the goal of detecting the source location of a stationary visual source and the velocity of a moving visual source. The talk emphasizes detection using maximum likelihood methods and also utilizing dynamic inversion.

Tid och plats: Fredagen den 13 maj kl. 11.00 – 12.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINAR IN ANALYSIS AND ITS APPLICATIONS

Norayr Matevosyan:
An Obstacle-Problem like problem

Abstract: We will consider the following minimization problem: For a given domain $D \subset R^n$, minimize the functional

$$J(v) = \int_D \Big(\frac{|\nabla v|^2}{2} + v^+\Big)$$

over the space $K = \big\{v \in W^{1,2}(D) : v - u_0 \in W_0^{1,2}(D)\big\}$ for a given $u_0 \in W^{1,2}(D)$. It is important to note that u_0 can take negative values. We give a review of the problem and a classification of the global solutions.

Tid och plats: Måndagen den 16 maj kl. 13.15 – 14.15 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I MATEMATISK STATISTIK

Tom Britton:
An epidemic model with different severities

Abstract: We consider a stochastic epidemic model having two types of severity — mild and severe — and the type of severity depends on the amount of infectious exposure an individual receives. Large population properties of the model are derived: a rigorous branching process approximation to the early stages of the epidemic, and a strong law and associated central limit theorem for the final outcome of epidemics which take off. The basic reproduction number, which determines whether or not a major outbreak can occur given few initial infectives, depends only on parameters of the mild infectious state, whereas the final outcome in the event of a major outbreak depends also on parameters of the severe state. Moreover, the limiting final size proportions need not even be continuous in the model parameters.

This is joint work with Frank Ball.

Tid och plats: Onsdagen den 18 maj kl. 15.15 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

EXTRA ALGEBRA AND GEOMETRY SEMINAR

Dimitri Zvonkine:
Towards an r-analogue
of the Ekedahl-Lando-Shapiro-Vainshtein formula

Abstract: The Ekedahl-Lando-Shapiro-Vainshtein (ELSV) formula relates (i) the number of generic meromorphic functions on genus g complex curves with fixed orders of poles and fixed critical values and (ii) some integrals over the moduli space $M_{g,n}$ of stable genus g curves with n marked points. We are going to present a project of a generalization of this formula to the case of meromorphic functions with r-tuple critical points. The right-hand side then involves integrals over the space of r-spin structures. We hope that such a generalization will be useful for studying the intersection theory on the space of r-spin structures.

Tid och plats: Måndagen den 16 maj kl. 10.15 – 12.00 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

LOGIKSEMINARIET STOCKHOLM-UPPSALA

Marko Djordjevic: Entropy of formulas

Abstract: For a closed first-order formula and any positive integer n, we consider a probability distribution on the set of models with universe $\{1, \ldots, n\}$ of that formula. From the 0-1 law for first-order formulas we may draw a conclusion about the entropy of the given distribution, as n approaches infinity.

Tid och plats: Onsdagen den 18 maj kl. 13.15 – 15.00 i sal MIC 3513, Matematiska institutionen, Polacksbacken, Uppsala universitet.

Postdoctoral fellowship in complex analysis or complex dynamics

The Department of Mathematics at KTH announces a postdoctoral fellowship in mathematics, funded by Associate Professor Jonsson's grant from the Göran Gustafsson Foundation.

The applicant must have completed his/her PhD or equivalent at the start of the position, and at most five years earlier. He/she should be doing mathematical research close to the research of Jonsson himself: see the web page below. Of specific interest are applicants in complex analysis, complex dynamics and certain nearby fields, such as singularity theory within complex algebraic geometry.

The applicant must not have been an employee of KTH during the last three years.

The fellowship is for up to one year, with a possible extension for another year, subject to funding. The salary will be in the range 15 000 – 18 000 SEK per month (tax free) depending on qualifications. In addition there will be an allowance for travels, etc.

The Royal Institute of Technology invites female as well as male applicants. No distinction will be made according to race, ethnicity, religion, handicap, or sexual orientation.

For further information about the fellowship, please contact Associate Professor Mattias Jonsson, telephone + 46 8 790 7173, e-mail mattiasj@kth.se, URL http://www.math.kth.se/~mattiasj.

The application deadline is May 30, 2005. Please supply the reference number 520-2005-0094 and send the application to KTH, Institutionen för matematik, Lindstedtsvägen 25, 100 44 Stockholm.

CONFERENCE IN ALGEBRAIC GEOMETRY

The conference will take place at KTH during the period 18 – 20 May. It will be held at the Studio C, in the KTH Library Building, Osquars Backe 31. Up-to-date information about the conference can be found at http://www.math.kth.se/~dirocco/KTH/AlgGeomHP/Conf. May05/konferens.html. The conference is sponsored by the Göran Gustafsson Foundation.

Wednesday, May 18

11.00 – 12.00 **W. Fulton:** *Ehrhart polynomials and toric varieties.*
Abstract: Ehrhart polynomials count the number of lattice points in polytopes and their integral multiples. We will discuss some old and new results and conjectures about them, especially as they relate to the geometry of toric varieties.

14.00 – 15.00 **M. Haiman:** *Macdonald polynomials.*
Abstract: The classical Weyl character formula has 'q-analogues', which provide links between representation theory, geometry, and the combinatorics of symmetric functions. In 1988, Macdonald discovered '(q, t)-analogues' involving an extra parameter. Macdonald's functions appear in geometric and representation-theoretic contexts not visible from the one-parameter q-theory. The talk will be an introduction to some of these developments, with hints about tantalizing combinatorial aspects of Macdonald's theory that we are just beginning to understand.

15.30 – 16.30 **L. Gatto:** *Schubert calculus on Grassmann algebras.*
Abstract: The Grassmann algebra of a finitely generated free module of rank n is a module over a natural commutative subring of endomorphisms. It turns out that any degree of the exterior algebra inherits a module structure which is isomorphic to the homology ring of some Grassmannian, seen as a module over its cohomology. The talk will be mainly devoted to show how such a formalism works.

Thursday, May 19

10.00 – 11.00 **K. Ranestad:** *An abelian fibration on the Hilbert scheme of degree 3 sub-schemes in a K3 surface of genus 9.*
Abstract: Mukai gave a simple example of an abelian fibration on Hilb_2 of a general complete intersection of three quadrics in P^5. In work together with Atanas Iliev we describe a similar example for K3 surfaces of genus 9.

11.30 – 12.30 **T. Johnsen:** *Schubert unions in flag varieties.*
Abstract: We study subsets of Grassmann varieties, such that these subsets are unions of Schubert varieties, with respect to a fixed flag. We study the linear spans of, and in case of positive characteristic, the number of F_q-rational points on such unions. Moreover, we study a geometric duality of such unions, and give a combinatorial interpretation of this duality. We discuss generalizations to (partial) flag varieties.

15.00 – 16.00 **R. Piene:** *Bell polynomials and enumerative geometry.*
Abstract: Bell polynomials appear naturally in the study of generating functions for enumerative problems. Here I shall discuss the case of enumeration of nodal curves on surfaces.

Friday, May 20

9.30 – 10.30 **S. A. Stromme:** *Geometry and graphs connected to the n! theorem.*
Abstract: Haiman's $n!$ theorem concerns a certain finite commutative algebra of length $n!$ over the complex numbers. Could it be the cohomology ring of some smooth projective variety?

11.00 – 12.00 **T. Gustavsen:** *The deformation relation on the set of Cohen-Macaulay modules on a quotient surface singularity.*
Abstract: I will report on joint work with Runar Ile, and consider the set of isomorphism classes of rank r, maximal Cohen-Macaulay modules on a quotient surface singularity X. This set will be considered as a graph $\mathbf{G}^{\mathrm{def}}(X, r)$ with edges coming from the deformation relation. We conjecture that the number of connected components in the graph $\mathbf{G}^{\mathrm{def}}(X, r)$ is the absolute value of the determinant of the intersection matrix corresponding to the minimal resolution of X. When X is a rational double point, I will interpret a result of A. Ishii as an enrichment of the McKay correspondence and explain how this implies our conjecture. Using our work on the deformation theory of reflexive modules on a rational cone, I will prove the conjecture in this case.

13.30 – 14.30 **E. Sernesi:** *The rational connectedness of M_{15}.*
Abstract: The talk will be devoted to an outline of the recent proof by A. Bruno and A. Verra of the rational connectedness of the moduli space of curves of genus 15.

LICENTIATSEMINARIUM I MATEMATISK STATISTIK

Gudrun Jonasdottir

presenterar sin licentiatavhandling:

Statistical Methods for Assessing Genetic Association in the Presence of Linkage

Licentiatopponent: **Pär-Ola Bendahl,** Lunds universitet.

Abstract: This thesis is concerned with the analysis of association between genetic markers and disease. We consider a scenario where it is known that a genetic region of interest has a tendency to be transmitted intact from parent to offspring. The region is said to be linked. The hope is that a mutation involved in the causal pathway of the disease is contained in the linked region, and that we can pinpoint its exact location through association analysis. We describe and assess existing methodologies, parametric and non-parametric, for the testing and estimation of association in the presence of linkage. Many genetic association studies have complex ascertainment schemes. We develop a novel score test of association in the presence of linkage for binary traits that takes ascertainment, as well as population stratification, into account.

Licentiatavhandlingen finns tillgänglig i Matematiska institutionens bibliotek (SU) samt på http://www.math.su.se/matstat/reports/index.html.sv.

Tid och plats: Tisdagen den 24 maj kl. 14.00 i sal 14, hus 5, Matematiska institutionen, SU, Kräftriket.

PLURIKOMPLEXA SEMINARIET

Elin Götmark:
An explicit proof of the Briançon-Skoda theorem
using integral formulas

Abstract: We prove the following general version of the Briançon-Skoda theorem: If $f_1, \ldots, f_m, \phi$ are germs of holomorphic functions at $0 \in \mathbb{C}^n$ such that $|\phi| \lesssim |f|^{\min(m,n)+r-1}$, then $\phi \in (f)^r$. Our proof is based on Bo Berndtsson's weighted integral formulas, and we provide an explicit representation formula of ϕ as an element in $(f)^r$.

Tid och plats: Tisdagen den 17 maj kl. 10.15 i sal MIC 2446, Matematiska institutionen, Polacksbacken, Uppsala universitet.

DISPUTATION I MATEMATIK

Jakob Jonsson

disputerar på avhandlingen

Simplicial Complexes of Graphs

onsdagen den 25 maj kl. 15.00 i sal E1, KTH, Lindstedtsvägen 3, b.v. Till fakultetsopponent har utsetts *professor John Shareshian,* Washington University, St. Louis, USA.

Abstract of the thesis

Let G be a finite graph with vertex set V and edge set E. A *graph complex* on G is an abstract simplicial complex consisting of subsets of E. In particular, we may interpret such a complex as a family of subgraphs of G. The subject of this thesis is the topology of graph complexes, the emphasis being placed on homology, homotopy type, connectivity degree, Cohen-Macaulayness, and Euler characteristic.

We are particularly interested in the case that G is the complete graph on V. *Monotone graph properties* are complexes on such a graph satisfying the additional condition that they are invariant under permutations of V. Some well-studied monotone graph properties that we discuss in this thesis are complexes of matchings, forests, bipartite graphs, disconnected graphs, and not 2-connected graphs. We present new results about several other monotone graph properties, including complexes of not 3-connected graphs and graphs not coverable by p vertices.

Imagining the vertices as the corners of a regular polygon, we obtain another important class consisting of those graph complexes that are invariant under the natural action of the dihedral group on this polygon. The most famous example is the associahedron, whose faces are graphs without crossings inside the polygon. Restricting to matchings, forests, or bipartite graphs, we obtain other interesting complexes of *noncrossing* graphs. We also examine a certain "dihedral" variant of connectivity.

The third class to be examined is the class of digraph complexes. Some well-studied examples are complexes of acyclic digraphs and not strongly connected digraphs. We present new results about a few other digraph complexes, including complexes of graded digraphs and non-spanning digraphs.

Many of our proofs are based on Robin Forman's discrete version of Morse theory. As a byproduct, this thesis provides a loosely defined toolbox for attacking problems in topological combinatorics via discrete Morse theory. In terms of simplicity and power, arguably the most efficient tool is Forman's divide and conquer approach via decision trees, which we successfully apply to a large number of graph and digraph complexes.

PLURIKOMPLEXA SEMINARIET

Dimitri Zvonkine:
A model of 2-dimensional gravity
via ramified coverings of the sphere

Abstract: A naïve approach to 2-dimensional gravity leads to ill-defined integrals of the space of Riemannian metrics on a surface. We will compare two ways to give a meaning to these integrals: (i) by counting quadrangulations, (ii) by counting ramified coverings of the sphere. Both turn out to give the same results.

Tid och plats: Tisdagen den 17 maj kl. 13.15 i sal MIC 2446, Matematiska institutionen, Polacksbacken, Uppsala universitet.

DISPUTATION I MATEMATIK

John Andersson

disputerar på avhandlingen

Regularity boundary regularity near the fixed boundary

fredagen den 20 maj kl. 10.00 i sal D3, KTH, Lindstedtsvägen 5, b.v. Till fakultetsopponent har utsetts *professor Ki-Ahm Lee,* University of Texas, Austin, USA.

GÖRAN GUSTAFSSON LECTURES IN MATHEMATICS

Peter Sarnak:
Zeta functions and random matrix theory

Abstract: It has become clear that the study of the finer questions concerning the distribution of the zeros of zeta functions as well as families of zeta functions (where the symmetry of the family enters decisively) are controlled by random matrix ensembles. We will discuss some of these recent developments which have led to striking conjectures concerning zeta functions as well as related developments which have led to the solution of some long-standing problems.

Tid och plats: Fredagen den 20 maj kl. 15.30 i sal E1, KTH, Lindstedtsvägen 3, b.v.

Peter Sarnak:
Quantum chaos and spectra of locally symmetric spaces I

Abstract: Quantum chaos is concerned with the study of the quantization of a classically chaotic Hamiltonian and its semi-classical limit. Most of what is known about this consists of numerical experiments and heuristics. We give an introduction to this subject and then discuss the special case where the classical mechanics is the geodesic motion on a hyperbolic arithmetic manifold. Recent developments in the theory of automorphic forms, their zeta functions and ergodic theory allow for the resolution of the basic problems in these cases.

Tid och plats: Måndagen den 23 maj kl. 15.15 i sal D2, KTH, Lindstedtsvägen 5, b.v.

Peter Sarnak:
Quantum chaos and spectra of locally symmetric spaces II

Tid och plats: Tisdagen den 24 maj kl. 15.15 i sal D2, KTH, Lindstedtsvägen 5, b.v.

The lectures are sponsored by the Göran Gustafsson Foundation.

PRESENTATION AV EXAMENSARBETE I MATEMATIK
Xavier Fernandes:
Lilavati in the history of mathematics

Handledare: **Paul Vaderlind.**

Abstract: The main objective of this thesis is to provide a review of Lilavati, a work written in the 12th century by Bhaskara II, also known as Bhaskaracharyya. In his work, the author presents mathematical problems in a poetic form and most of these are to be regarded as recreational. Generally, and somewhat surprisingly, little concern is paid to the theoretical background of formulae anywhere in this work, the author instead concentrating on the mechanical application of the methods being described. Nevertheless, there are a number of problems from the epoch in which Lilavati was composed that may be solved by the application of modern algebra, especially indeterminate equations. In addition to an analysis of the mathematical problems presented in Lilavati, the present thesis also provides an outline of the importance of Lilavati, and other work by Bhaskaracharyya, in the context of a number of significant events in the general history of mathematics. The second edition of the translation of Lilavati by Henry Thomas Colebrooke, with notes by Haran Chandra Banerji, comprising 13 chapters and an appendix, preserved in the original Sanskrit, has been used for the purposes of this thesis. This text consists of 278 verses and deals with various subjects: tables, the number system, arithmetic operations, fractions, zero, rule of three, compound rule of three, mixture, interest, progressions, plane geometry and the measurement of geometric quantities, stacks, saw, etc. The perspective adopted in this thesis is to focus in particular on the number zero and its function and Bhaskaracharyya's method of squaring a number, extraction of the square root by hand, the cube of a number, the cube root of a number, completing and forming perfect squares and dealing with problems in proportionality, principal and interest on money, permutations and combinations, arithmetical progression, geometrical progression, Pythagoras' theorem, an invariant (lamba) perpendicular in geometry and pulverizer. Comparisons are drawn with modern mathematical methods, and some general conclusions are drawn from these with regard to the contemporary relevance of the work of Bhaskaracharyya.

Tid och plats: Onsdagen den 25 maj kl. 10.00 – 11.00 i sal 37, hus 5, Matematiska institutionen, SU, Kräftriket.

KTH/SU MATHEMATICS COLLOQUIUM
Michael Berry:
Physics of non-Hermitian degeneracies

Abstract: Decoherence makes quantum evolution non-unitary, and such systems, where some freedoms are ignored, can be described by non-Hermitian Hamiltonian operators. These differ most dramatically from Hermitian operators in the neighbourhood of degeneracies. Several examples of non-Hermitian degeneracy-dominated physical phenomena will be given, in laser physics, atom optics, and crystal optics.

Tid och plats: Onsdagen den 25 maj kl. 16.00 – 17.00 i sal D1, KTH, Lindstedtsvägen 17, 3 tr. Kaffe/te serveras kl. 15.30 i pausrummet, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4.

PRESENTATION AV EXAMENSARBETE I MATEMATIK
Alan Sola: Prawitz-type inequalities
and diagonal expansions for conformal mappings

Abstract: The study of the universal means spectrum of conformal maps of the unit disk is a topic of great interest in complex analysis. Recently, Hedenmalm and Shimorin developed a method to find improved estimates of the universal means spectrum by using both classical geometric function theory and Bergman space techniques. In this thesis, we have extended the method to take into account more general inequalities than the theorem of Prawitz used by Hedenmalm and Shimorin. Most of the talk will be about how the choice of the initial inequalities affects the final Bergman norm estimates. We shall see that while some of our findings are quite similar to the previous results, we have also encountered some additional difficulties. If there is time, we will discuss how one could proceed further in a study of the universal means spectrum using the aforementioned results.

Tid och plats: Tisdagen den 17 maj kl. 10.15 – 11.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM
Håkan Eliasson:
KAM for the non-linear Schrödinger equation

Abstract: We shall discuss the non-linear Schrödinger equation (NLS) with periodic boundary conditions in dimension d. This is an infinite-dimensional Hamiltonian system and one central problem is the perturbation theory for lower-dimensional tori = quasi-periodic solutions, usually known as KAM. The difficulties in applying KAM in infinite dimensions are substantial and become larger with increasing d.

For NLS the case $d = 1$ was solved in the late 1980's by Kuksin and, later, Bourgain. The case $d = 2$ was solved in the early 1990's by Bourgain, but by an approach (known as the Craig-Wayne scheme) that provides less information than KAM. We shall discuss these issues and, if time admits, report on a recent work (with Kuksin) that aims to solve the problem for any d.

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

MONEY, JOBS

Columnist: Hans Rullgård, Department of Mathematics, SU. E-mail: hansr@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/~hansr/mj.html.
Unless stated otherwise, a given date is the last date (e.g. for applications), and the year is 2005. 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://www.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

Money, to apply for

11. Från Vetenskapsrådet kan konferensbidrag sökas med huvudsyftet att göra det möjligt att inbjuda framstående utländska föredragshållare. Ansökan skall vara inkommen senast två månader innan konferensen äger rum. Ansökningar behandlas ej mellan 15 juni och 15 augusti. Info: Mona Berggren, 08-546 44 246, e-post Mona.Berggren@vr.se. Web-info: http://www.vr.se/forskning/bidrag/ovrbidrag.jsp?resourceId=822&languageId=1.

Jobs, to apply for

12. Matematikcentrum vid Lunds universitet söker en forskarassistent i matematisk statistik med inriktning mot finansiell statistik, 20 maj. Info: Ulla Holst, 046-222 85 49, e-post Ulla.Holst@matstat.lu.se. Web-info: http://www3.lu.se/info/lediga/admin/document/473.pdf.

Old information

Money, to apply for

13. Från Knut och Alice Wallenbergs Stiftelse ställs anslag till rektors för KTH förfogande för att "i första hand användas till bidrag för sådana resor, som bäst befordrar ett personligt vetenskapligt utbyte till gagn för svensk forskning. Bidrag skall främst beviljas till yngre forskare. Medel kan även — efter rektors bedömning — undantagsvis disponeras för utländska gästforskare." Bidrag kan sökas under hela året. Info: Anette Nyström, 08-790 70 59. Web-info: se punkt 4 ovan.