BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 27 **FREDAGEN DEN 10 SEPTEMBER 2004**

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

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Sista manustid för nästa nummer:
Torsdagen den 16 september kl. 13.00.

Kurser

Rolf Sundberg: Statistical theory for exponential families. Se sidan 3.

Anders Szepessy, Olof Runborg, Mikhail Dzugutov: Computational methods from micro to macro scales. Se sidan 6.

Money, jobs: Se sidorna 7 – 8.

SEMINARIER

Fr 09–10 kl. 12.00 – 13.00. GRU-seminarium i matematik: *Lärarnas arbetsbelastning.* Sammanträdesrum 3424 (innanför pausrummet), Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4. Se Bråket nr 26 sidan 2.

Må 09–13 kl. 13.15 – 15.00. Seminar in Analysis and its Applications. Harold Shapiro: *Some extremal problems for analytic functions.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 26 sidan 4.

Må 09–13 kl. 15.00. Docentföreläsning. Lars Engebretsen, Nada, KTH: *Valfrihetens pris.* Sal E3, KTH, Osquars Backe 14, 2 tr. Se Bråket nr 26 sidan 5.

Må 09–13 kl. 15.15 – 17.00. Seminarium i finansiell matematik. Adri de Ridder, Matematisk statistik, KTH, och CEFIN: *Long-run abnormal share-price performance and share repurchases. Evidence from Sweden.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 26 sidan 5.

Ti 09–14 kl. 14.00 – 15.00. Mittag-Leffler Seminar. Karl Sigman, Columbia University: *Unstable region for a simple FIFO multiclass queueing network.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

Fortsättning på nästa sida.

Disputation i matematik

Magnus Rosenlund disputerar vid KTH på avhandlingen *Radical operations in rings and topological spaces* fredagen den 17 september kl. 14.00. Se sidan 2.

Disputation i matematisk statistik

Per Hallberg disputerar vid KTH på avhandlingen *Gibbs Measures and Phase Transitions in Potts and Beach Models* fredagen den 24 september kl. 10.00. Se sidan 5.

Seminarier (fortsättning)

Ti 09–14 kl. 15.30 – 16.30. Mittag-Leffler Seminar. Matthieu Jonckheere, France Telecom R & D, Paris: *Insensitive load balancing.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

On 09–15 kl. 10.00 – 11.45. Logikseminariet Stockholm-Uppsala. Per Martin-Löf: *Normalization by evaluation and by the method of computability.* (Den första föreläsningen i en serie.) Sal 16, hus 5, Matematiska institutionen, SU, Kräftriket.

On 09–15 kl. 13.15 – 14.15. Seminarium i analys och dynamiska system. Håkan Hedenmalm, KTH: *Hele-Shaw flow on weakly hyperbolic surfaces.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 3.

To 09–16 kl. 14.00 – 15.00. Mittag-Leffler Seminar. Peter Glynn, Stanford University: *Distributed algorithms for wireless networks.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

To 09–16 kl. 14.00 – 16.00. Kollokvium i filosofi. James Ladyman, University of Bristol: *Common sense, induction and constructive empiricism.* Rum D255, Filosofiska institutionen, SU.

To 09–16 kl. 15.30 – 16.30. Mittag-Leffler Seminar. Lasse Leskelä, Helsinki University of Technology: *Stabilization of an overloaded queueing network.* Institut Mittag-Leffler, Auravägen 17, Djursholm.

Fr 09–17 kl. 13.15. Presentation i kursen "Elliptiska kurvor". David Jacquet, Martin Skoglund: *Faktorisering av heltal med ECM.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 5.

Må 09–20 kl. 13.15 – 14.15. DNA-seminariet Uppsala-KTH (Dynamics, Number theory, and Analysis). Charles Favre, Institut Mathématique de Jussieu, Université Denis Diderot, Paris: *Equidistribution of points of small heights (joint work with Juan Rivera-Letelier).* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

Må 09–20 kl. 14.15 – 15.00. Seminarium i numerisk analys. Tomas Karlsson, Alfvénlaboratoriet, KTH: *The auroral current circuit, satellite measurements and modelling.* Rum 4523, Nada, KTH, Lindstedtsvägen 5, plan 5. Se sidan 6.

Må 09–20 kl. 15.15 – 16.15 (cirka). Licentiatseminarium i matematik. Agneta Avasjö presenterar sin licentiatavhandling: *Automata and growth functions of Coxeter groups.* Opponent: **Docent Henrik Eriksson,** Nada, KTH. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

On 09–22 kl. 13.15 – 14.15. Seminarium i analys och dynamiska system. Julius Borcea, SU: *On rational approximation of algebraic functions.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 8.

DISPUTATION I MATEMATIK

Magnus Rosenlund

disputerar på avhandlingen

Radical operations in rings and topological spaces

fredagen den 17 september kl. 14.00 i Kollegiesalen, Administrationsbyggnaden, KTH, Valhallavägen 79. Till fakultetsopponent har utsetts *professor Valentina Barucci,* Università di Roma.

GRADUATE COURSE IN MATHEMATICAL STATISTICS

Rolf Sundberg:
Statistical theory for exponential families

This is an invitation to a graduate course in mathematical statistics at Stockholm University on the above-mentioned topic.

The course will be given on Mondays at 9.15 – 12.00 during September – November 2004, and it will start on Monday, September 13, at 9.15 in the "Cramér Room", i.e. room 306 in house 6, Department of Mathematics, Stockholm University, Kräftriket.

The course is intended for all interested, but in particular as a supplement to Yudi Pawitan's course "Statistical modeling and inference using likelihood" given at Karolinska Institutet in the first half of 2004 (http://www.meb.ki.se/biostat/courses/2004/stat_mod_inf_like/index_en.html).

Intended course contents: Definitions and examples. Regularity conditions and analytical properties. MLE exact properties, exact tests. Large sample asymptotics. Small sample refinements (saddle point approximations, p^* formula). Boltzmann's law. Conditional inference. Curved exponential families. Incomplete data from exponential families. Generalized linear models.

The course literature will be lecture notes handed out during the course. They already exist in a provisional and incomplete version. Lectures will be given in Swedish or English, depending on the audience.

For students with a background in Pawitan's course (or for example the book by Cox & Hinkley), I estimate the course to be worth 3 credit points. However, such a background is not compulsory. The course will be essentially self-contained, relative to other courses in inference at the Ph.D. level, but for students without the mentioned background the course will be more difficult and rather worth 5 credit points.

No pre-registration is needed. The time might be changed later, if desirable.

Welcome!
Rolf Sundberg

SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM

Håkan Hedenmalm:
Hele-Shaw flow on weakly hyperbolic surfaces

Abstract: We consider the Hele-Shaw flow that arises from injection of two-dimensional fluid into a point of a curved surface. The resulting fluid domains are more or less determined implicitly by a mean value property for harmonic functions. We improve on the results of Hedenmalm and Shimorin (Journal de Mathématiques Pures et Appliquées, Vol. 81 (2002), pp. 187 – 222) and obtain essentially the same conclusions while imposing a weaker curvature condition on the surface. Incidentally, the curvature condition is the same as the one that appears in Hedenmalm and Perdomo's paper (Journal de Mathématiques Pures et Appliquées, Vol. 83 (2004), pp. 1075 – 1107), where the problem of finding smooth area minimizing surfaces for a given curvature form under a natural normalizing condition was considered. Probably there are deep reasons behind this coincidence.

Tid och plats: Onsdagen den 15 september kl. 13.15 – 14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

DNA-SEMINARIET UPPSALA-KTH (DYNAMICS, NUMBER THEORY, AND ANALYSIS)

Charles Favre:
Equidistribution of points of small heights
(joint work with Juan Rivera-Letelier)

Abstract: Let R be a rational map with complex coefficients of degree at least 2. For any point z on the Riemann sphere (with at most two exceptions), the sequence of measures equidistributed on the preimages of z under R^n converges to a measure m_R which is independent of z. Our aim is to present an arithmetic analogue of this result. Suppose R has rational coefficients. It is then possible to construct a so-called height function h_R on the algebraic closure of the field of rational numbers. Our main result states that for any sequence of points z_n such that $h_R(z_n)$ tends to 0, the sequence of measures equidistributed on the Galois conjugates of z_n converges to the measure m_R. The proof of this result relies on basic properties of the Laplace operator on the complex plane, as well as on the affine line associated to the p-adic field C_p.

Tid och plats: Måndagen den 20 september kl. 13.15 – 14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

LICENTIATSEMINARIUM I MATEMATIK

Agneta Avasjö

presenterar sin licentiatavhandling

Automata and growth functions of Coxeter groups

Opponent: **Docent Henrik Eriksson,** Nada, KTH.

Abstract: The aim of this thesis is to study, in some detail, properties of growth functions and geodesic growth functions for Coxeter groups. To do this, we use the fact that all Coxeter groups, which can be defined by some simple rules on a presentation by generators and relators, are described by formal languages which satisfy rather strong finitary conditions. By connecting the context of groups with that of formal languages and constructing finite state automata for the languages $\mathcal{N}(G, S)$ and $\mathcal{L}(G, S)$ we make explicit algorithmic computations of the corresponding growth functions of the group G.

As a test-case we choose the subclass of triangle groups, which are defined in a purely geometric way as groups generated by reflections with respect to the sides of a triangle. The theorems and the methods shown are however valid for all Coxeter groups. The construction of the automatons is based on a representation of a Coxeter group by linear transformations acting on a vector space. The key notion here is that of a *root system.* We demonstrate that the growth series and the growth series of geodesics associated with a Coxeter system can both be given by rational expressions.

Triangle groups (except for a finite number) are naturally organized into a few infinite series, and we were able to perform our computations for these infinite series, with one or several parameters tending to infinity. We give graphical representations of the constructed automata as well as results of numerical computations of the corresponding growth functions.

Tid och plats: Måndagen den 20 september kl. 15.15 – 16.15 (cirka) i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

PRESENTATION I KURSEN "ELLIPTISKA KURVOR"

David Jacquet, Martin Skoglund:
Faktorisering av heltal med ECM

Sammanfattning: Vi kommer att gå igenom vår datorimplementation av H. Lenstras *Elliptic Curve Method* för faktorisering av heltal. Vi går igenom algoritmen på ett lättfattligt sätt och beräknar hur sannolik den är att lyckas. Vidare presenterar vi några fallgropar vi ramlat i under arbetets gång.

Presentationen är en del av examinationen för kursen "Elliptiska kurvor" under vårterminen 2004.

Tid och plats: Fredagen den 17 september kl. 13.15 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

DISPUTATION I MATEMATISK STATISTIK

Per Hallberg

disputerar på avhandlingen

Gibbs Measures and Phase Transitions in Potts and Beach Models

fredagen den 24 september kl. 10.00 i Kollegiesalen, Administrationsbyggnaden, KTH, Valhallavägen 79. Till fakultetsopponent har utsetts *professor Ronald Meester,* Vrije Universiteit, Amsterdam.

Abstract of the thesis

The theory of Gibbs measures belongs to the borderland between statistical mechanics and probability theory. In this context, the physical phenomenon of phase transition corresponds to the mathematical concept of non-uniqueness for a certain type of probability measures.

The most studied model in statistical mechanics is the celebrated Ising model. The Potts model is a natural extension of the Ising model, and the beach model, which appears in a different mathematical context, is in certain respects analogous to the Ising model. The two main parts of this thesis deal with the Potts model and the beach model, respectively.

For the q-state Potts model on an infinite lattice, there are $q+1$ basic Gibbs measures: one wired-boundary measure for each state and one free-boundary measure. For infinite trees, we construct "new" invariant Gibbs measures that are not convex combinations of the basic measures above. To do this, we use an extended version of the random-cluster model together with coupling techniques. Furthermore, we investigate the root magnetization as a function of the inverse temperature. Critical exponents to this function for different parameter combinations are computed.

The beach model, which was introduced by Burton and Steif, has many features in common with the Ising model. We generalize some results for the Ising model to the beach model, such as the connection between phase transition and a certain agreement percolation event. We go on to study a q-state variant of the beach model. Using random-cluster model methods again we obtain some results on where in the parameter space this model exhibits phase transition. Finally we study the beach model on regular infinite trees as well. Critical values are estimated with iterative numerical methods. In different parameter regions we see indications of both first and second order phase transition.

SEMINARIUM I NUMERISK ANALYS

Tomas Karlsson:
The auroral current circuit, satellite measurements and modelling

Abstract: The aurora (northern lights) is maybe the most spectacular manifestation of the interaction between the solar wind plasma and the Earth's magnetosphere and ionosphere. Associated with the aurora is an input of energy from the solar wind to the ionosphere and atmosphere, a large part of which is in the form of large currents flowing into the auroral zones. I will present recent satellite measurements by the Freja, Astrid-2 and Cluster satellites, where the Swedish space physics community has been heavily involved. In particular I will show recent results from the return current part of the system, outside of the actual aurora. Earlier this was not thought to be particularly interesting, but has lately been shown to play an important role in the magnetosphere-ionosphere interaction by actively modifying the ionosphere. I will also show some modelling work related to this topic. Finally I will present some work in progress on Cluster multi-point satellite measurements and demonstrate how these can be used to separate spatial variations (e.g. signatures of a static current system) from temporal ones (e.g. Alfvén waves and other plasma waves). This promises to resolve a classical dilemma of single-satellite measurements.

Tid och plats: Måndagen den 20 september kl. 14.15 – 15.00 i rum 4523, Nada, KTH, Lindstedtsvägen 5, plan 5.

GRADUATE COURSE IN NUMERICAL ANALYSIS

Anders Szepessy, Olof Runborg, Mikhail Dzugutov:
Computational methods from micro to macro scales, 5 p

The course presents an overview on computational models from ab initio Schrödinger equation over molecular dynamics to related continuum partial differential equations, and something on their coupling.

To solve the full (linear) Schrödinger equation is computationally feasible only for some very simple molecules; the tiny time and space scales and the high dimension, $3(M+N) = d$, of larger molecules with M nuclei and N electrons set severe computational limitations: already in water it means to solve a partial differential equation in $d = 39$ dimensions. Approximations are therefore needed. The main two approximations, the Born-Oppenheimer-Hartree-Fock and the the Born-Oppenheimer-Kohn-Sham strategies, reduce the problem to a large system of nonlinear partial differential equations, in three dimensions. The main goal of the course is to understand accuracy and numerical complexity of the approximations that are made in order to arrive at some common simplified models.

The course will start with the Schrödinger equation and its simplifying approximations and continue with Dzugutov's lectures on molecular dynamics. We will finally discuss how molecular dynamics leads to the Boltzmann equation and subsequently to the Euler and Navier-Stokes equations.

Teachers will be Anders Szepessy, Olof Runborg and Mikhail Dzugutov. The first meeting of the course will be at 10 – 12 on Thursday, September 23 in room 1625, Nada, KTH. More information can be found on URL, http://www.nada.kth.se/~olofr/MikroMakro/.

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 2004. 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. Selma Andersons stiftelse utlyser ett eller flera stipendier på sammanlagt 137 000 kronor. Stipendium utdelas till kvinna, i första hand till den som avlagt doktorsexamen vid något av rikets universitet och visat verklig vetenskaplig begåvning. Bidrag utgår till utgivande av vetenskapligt arbete, undersökning eller studieresa. Ansökan, åtföljd av meritförteckning, forskningsplan samt kostnadsberäknad projektbeskrivning skall ha inkommit till Uppsala universitet, Stipendiekansliet, S:t Olofsgatan 10 B (postadress: Box 256, 751 05 Uppsala) senast den 22 september kl. 18.00.
12. Knut och Alice Wallenbergs Stiftelse utlyser resebidrag ur jubileumsdonationen. Bidrag utgår till främst yngre forskare vid Stockholms universitet, i första hand för sådana resor som befordrar ett personligt vetenskapligt utbyte tilll gagn för svensk forskning. Undantagsvis kan bidrag utgå för gästforskare. Ansökan skall ske på särskild blankett i två exemplar. Blankett finns på hemsidan. Ansökan skickas till Stockholms universitet, Registrator, 106 91 Stockholm. Sista ansökningsdag 23 september. Web-info: http://www.su.se/forskning/stipendier/utlysning.php3.

Old information

Money, to apply for

13. Wenner-Gren Stiftelserna utlyser ett antal anslag och stipendier. Web-info: http://www.swgc.org/anvisningar.html.
14. Magn. Bergvalls Stiftelse utlyser anslag till vetenskapliga forskningsprojekt för svenska forskare som avlagt doktorsexamen (ej resestipendier). Upplysningar genom SEB Enskilda Banken, Stiftelser och företag, telefon 08-763 68 97. Sista ansökningsdag 15 september.
15. Från stiftelsen P. E. Lindahls fond utdelas sex forskningsstipendier om vardera 120 000 kr. Stipendier utdelas för vetenskapliga studier eller fortsatt praktisk utbildning inom eller utom Sverige. Sökande skall ha avlagt doktorsexamen år 1998 eller senare eller vara behörig att antagas till forskarutbildning inom någon av de filosofiska eller medicinska fakulteterna i riket och får inte inneha tjänst hos stat eller kommun. Ansökan skall vara poststämplad senast den 30 september. Web-info: http://www.kva.se/KVA_Root/swe/awards/scholarships/detail_scholarships.asp?grantsId=15.

(Continued on the next page.)

16. Hellmuth Hertz' Foundations postdoktorsstipendier vill ge yngre forskare möjlighet till vidareutbildning och forskning vid välrenommerat icke svenskt universitet (eller motsvarande) under en längre period (minst 6 månader). Stipendium är öppet för sökande som avlagt doktorsexamen högst 3 år före ansökningsdatum vid svenskt universitet eller teknisk högskola inom ämnesområdena naturvetenskap, medicin eller teknik. Sista ansökningsdag 30 september. Info: 046-13 25 28, e-post kansli@fysiografen.org. Web-info: http://www.fysiografen.org/.
17. Sverige-Amerika Stiftelsen utlyser stipendier för masters- till postdocstudier i USA och Canada. Sista ansökningsdag 15 september. Web-info: http://www.sweamfo.se/stip.html.
18. Letterstedtska föreningen utlyser anslag till bland annat anordnande av nordiska konferenser och seminarier och gästbesök av nordiska forskare. Anslag utdelas vid två tillfällen under 2004; ansökningar skall vara inkomna senast 15 februari respektive 15 september till Letterstedtska föreningens huvudstyrelse, Box 22333, 104 22 Stockholm. Web-info: se punkt 6 ovan.
19. Sweden-Japan Foundation (SJF) utlyser stipendier för studier, forskning samt examensarbete och praktik på högskolenivå i Japan. Stipendierna är främst avsedda för studier inom teknik, naturvetenskap, ekonomi, juridik, medicin och handel. Beslut fattas vid två tillfällen per år. Sista ansökningsdagar är den 1 mars och den 1 oktober. Info: SJF, 08-611 68 73. Web-info: http://www.swejap.a.se.
20. 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.

Jobs, to apply for

21. Matematiska och systemtekniska institutionen vid Växjö universitet söker en doktorand i tillämpad matematik/teknisk fysik och elektroteknik, 14 september. Info: Andrei Khrennikov, 0470-70 87 90, e-post Andrei.Khrennikov@msi.vxu.se, Sven Nordebo, 0470-70 81 93, e-post Sven.Nordebo@msi.vxu.se. Web-info: http://www.vxu.se/jobb/040914_doktorand_msi.html.
22. Statistiska institutionen vid Lunds universitet utlyser utbildningsbidrag/anställning som doktorand i statistik, 15 september. Info: Björn Holmquist, 046-222 89 26, e-post Bjorn.Holmquist@stat.lu.se, Krzysztof Nowicki, 046-222 89 18, e-post Krzysztof.Nowicki@stat.lu.se. Web-info: http://www2.stat.lu.se/education/grad/UtbBidragHT04.htm.

SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM

Julius Borcea:
On rational approximation of algebraic functions

Abstract: We construct a new scheme of approximation of any multivalued algebraic function $f(z)$ by a sequence $\{r_n(z)\}_{n\in\mathbb{N}}$ of rational functions. The latter sequence is generated by a recurrence relation which is completely determined by the algebraic equation satisfied by $f(z)$. Compared to the usual Padé approximation our scheme has a number of advantages, such as simple computational procedures that allow us to prove natural analogues of the Padé Conjecture and Nuttall's Conjecture for the sequence $\{r_n(z)\}_{n\in\mathbb{N}}$ in the complement $\mathbb{CP}^1 \setminus \mathcal{D}_f$, where $\mathcal{D}_f$ is the union of a finite number of segments of real algebraic curves and finitely many isolated points. In particular, our construction makes it possible to control the behaviour of spurious poles and to describe the asymptotic ratio distribution of the family $\{r_n(z)\}_{n\in\mathbb{N}}$. If time permits we will also discuss applications of our results to polynomial recursions related to certain combinatorial problems.

This is joint work with Rikard Bøgvad and Boris Shapiro.

Tid och plats: Onsdagen den 22 september kl. 13.15 – 14.15 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.
