



BRÅKET



Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 1

FREDAGEN DEN 13 JANUARI 2006

BRÅKET

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

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KTH
100 44 Stockholm

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Sista manustid för nästa nummer:
Torsdagen den 19 januari
kl. 13.00.

Högre undervisning

Ett schema för högre kurser och seminarier i matematik vid KTH och SU under vårterminen 2006 finns på sidorna 9–10.

Kurs

Tilahun Abebaw och Yohannes Tadesse: Representationsteori. Se sidan 3.

SEMINARIER

Må 01–16 kl. 14.00–15.00. Optimization and Systems Theory Seminar. (*Observera dagen och tiden!*) Anders Rantzer, Reglerteknik, LTH: *On opportunities in distributed control theory*. Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

Må 01–16 kl. 15.15–16.00. Seminarium i finansiell matematik. Johan Kilander presenterar sitt examensarbete: *Dimension reduction techniques and multivariate GARCH modeling*. Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 6.

Fortsättning på nästa sida.

Disputation i matematik

Veronica Crispin Quiñonez disputerar vid SU på avhandlingen *Integral Closure and Related Operations on Monomial Ideals* måndagen den 16 januari kl. 10.00. Se sidan 3.

Disputation i datalogi

Klas Wallenius disputerar vid KTH på avhandlingen *Generic Support for Decision-Making in Effects-Based Management of Operations* fredagen den 27 januari kl. 10.00. Se sidan 5.

Kurser

Axel Hultman: Kombinatorik. Se sidan 8.

Mattias Jonsson: Several Complex Variables. Se sidan 4.

Sergei Merkulov: Differential geometry for algebraists. Se sidan 8.

Per Sjölin: Valda ämnen inom Fourieranalysen. Se sidorna 6–7.

Rolf Sundberg: Principles of statistical inference. Se sidan 2.

Seminarier (fortsättning)

- On 01–18 kl. 10.15. Kombinatorikseminarium. Jakob Jonsson:** *Hard squares with negative activity and rhombus tilings of the plane.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 5.
- To 01–19 kl. 13.15. Licentiatseminarium. Nils Sjögren** presenterar sin licentiatavhandling: *Model theory of fields with a group action.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.
- Må 01–23 kl. 15.15–17.00. Seminarium i matematisk statistik. Anders Karlsson,** Matematik, KTH: *A law of large numbers for random walks.* Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 7.
- To 01–26 kl. 9.15. Seminarium i teoretisk datalogi. Professor Mieczyslaw M. Kokar,** Department of Electrical and Computer Engineering, Northeastern University, Boston, USA: *Ontology based higher-level fusion.* Rum 1537, Nada, KTH, Lindstedtsvägen 3, plan 5. Se sidan 6.
- Professor Kokar är fakultetsopponent vid Klas Wallenius' disputation. Se sidan 5.*
- Fr 01–27 kl. 14.15–15.15. Graduate Student Seminar. Michael Björklund:** *On the Hopf-Tsuji-Sullivan Theorem.* Seminariet skall äga rum vid Institutionen för matematik, KTH, Lindstedtsvägen 25. Lokal meddelas senare. Se Bråket 2005 nr 38 sidan 10 och detta nr sidan 7.

GRADUATE COURSE IN MATHEMATICAL STATISTICS**Rolf Sundberg:****Principles of statistical inference (5–6 p)**

The course will be based on a book manuscript by DAVID COX — perhaps the most prominent statistician living today.

Course start: Friday, January 20, 2006, at 13.15.

Intended time table: Spending more or less the whole spring term, meeting one session of three hours per week. David Cox himself might visit the course sometime in the spring.

Regular time: Friday afternoons, starting at 13.15 and finishing at 16.00, at least during the first part of the spring term. If you are interested, but cannot participate on Friday afternoons during January and February, please tell me.

Place: Room 31, house 5, Department of Mathematics, SU, Kräftriket.

Course literature: A book manuscript of about 300 pages will be provided when the course starts, or earlier, in electronic form, or if necessary in paper format. Some consultation of other literature will be needed during the course.

Language: Swedish or English, depending on the participants.

For more details: See Bråket 2005 no. 36, page 4, or send a mail to me.

Welcome!

Rolf Sundberg

Mathematical statistics, SU

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Telephone: 08-16 45 53

DISPUTATION I MATEMATIK

Veronica Crispin Quiñonez

disputerar på avhandlingen

Integral Closure and Related Operations on Monomial Ideals

måndagen den 16 januari 2006 kl. 10.00 i sal 14, hus 5, Matematiska institutionen, SU, Kräft-
riket. Till fakultetsopponent har utsetts *professor Marco D'Anna*, University of Catania,
Italien.

Abstract of the thesis

The motivation for this thesis starts with the theory of Hilbert coefficients. It is a well-known fact that given an ideal I the integral closure $\bar{I}$ can be defined as the largest ideal with the same multiplicity as I . For monomial ideals there is an alternative definition. We give a review of this material and discuss the lattice of integrally closed monomial ideals.

Ideals in two-dimensional regular local rings have the special property that the product of integrally closed ideals is again integrally closed. The study of this subject has a long tradition. Our characterization of integrally closed monomial ideals, presented in the first half of the thesis, is useful when studying other properties of and operations on ideals.

The concept of reduction is tightly connected with the integral closure, since given two ideals $J \subseteq I$ we know that J is a reduction of I if and only if $I \subseteq \bar{J}$. It is well-known that minimal reductions exist in local rings and in polynomial rings. Moreover, the number of generators of a minimal reduction is interestingly connected to the dimension of the fibre cone $\mathcal{F}(I) = R/\mathfrak{m} \oplus I/\mathfrak{m}I \oplus \cdots$ of an ideal I . In general, minimal reductions are not easy to find. We present a process of determining a minimal reduction in a two-dimensional power series ring and in some cases in the two-dimensional polynomial ring over any field k . The method can then be applied to some classes of ideals in integral domains and monomial subrings.

The last section of the thesis concerns associated Ratliff-Rush ideals, an operation defined as $\tilde{I} = \bigcup_{l \geq 1} (I^{l+1} : I^l)$ where I is a regular ideal. An equivalent definition is that $\tilde{I}$ is the unique largest ideal containing I and with the same Hilbert polynomial. The notion was introduced almost thirty years ago, but the subject was not studied until the beginning of the nineties. The Ratliff-Rush operation behaves quite irrationally with respect to other ideal operations. We prove some results on numerical semigroups that we use in our description of Ratliff-Rush ideals of certain classes of monomial ideals. Moreover, we establish new classes of Ratliff-Rush ideals, that is ideals such that $I = \tilde{I}$, and answer some questions from one of the early papers on this subject.

KURS I MATEMATIK

Representationsteori

Tilahun Abebaw och *Yohannes Tadesse* kommer att hålla föreläsningar som en del av undervisningen i ovanstående kurs onsdagen den 18 januari från kl. 9.30 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

Torsten Ekedahl

OPTIMIZATION AND SYSTEMS THEORY SEMINAR

Anders Rantzer:

On opportunities in distributed control theory

Abstract: A control problem is considered where several control units are supposed to cooperate, but they all have access to different information about the system state. Considerable progress in the mathematical understanding of such problems has recently been reported from several directions. One example is the analysis of dynamic interaction between routers and sources in the Internet. Another example is synchronization in networks of nonlinearly coupled oscillators.

Versions of the problem have a long history in economic literature as well as in statistical decision theory. Some instances were solved in the 1960-70's, but significant progress has recently been made. In this seminar, we give an introduction to the problem and show how linear matrix inequalities for solution of the classical LQG control problem can be modified to accommodate more complex information patterns. We also discuss how some distributed control laws can be interpreted in economic terms using price mechanisms.

Tid och plats: Måndagen den 16 januari kl. 14.00 – 15.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

GRADUATE COURSE IN MATHEMATICS

Mattias Jonsson:

Several Complex Variables

Several complex variables is an exciting field with connections to analytic/algebraic geometry, dynamics, number theory, and other areas of mathematics. It is different in flavour from one complex variable, much in the same way that higher-dimensional (real) Euclidean space admits richer behaviour than the real line.

This will be a first course in several complex variables, with some emphasis on recent developments and connections to other areas. Topics will include: holomorphic functions; plurisubharmonic functions; convexity and pseudoconvexity; L^2 estimates for the $\bar{\partial}$ -equation; sheaf cohomology and the Cousin problems; Stein manifolds.

Time and interest permitting, we will also cover additional topics, such as positive closed currents; multiplier ideals and the Ohsawa-Takegoshi theorem; complex dynamics in higher dimension; the Kobayashi metric; elementary Kähler geometry.

Instructor: Mattias Jonsson, mattiasj@kth.se.

Prerequisites: A decent background in complex analysis in one variable is required. Some knowledge of elementary differential geometry (manifolds, differential forms, Stokes' Theorem, ...) will also be useful.

Text: The main book we will be using is *Function Theory of Several Complex Variables* by S. G. KRANTZ, Second Edition, AMS/Chelsea, ISBN: 0-8218-2724-3.

Examination: Homework problems.

Language: Swedish or English.

Time and place: Thursdays at 10.15–12.00 in room 3721, Department of Mathematics, KTH. The first meeting will be on January 19, 2006.

Welcome!

Mattias Jonsson

KOMBINATORIKSEMINARIUM

Jakob Jonsson:

Hard squares with negative activity and rhombus tilings of the plane

Abstract: Let $S_{m,n}$ be the graph on the vertex set $\mathbb{Z}_m \times \mathbb{Z}_n$ with an edge between (a, b) and (c, d) if and only if either $(a, b) = (c, d \pm 1)$ or $(a, b) = (c \pm 1, d)$ modulo (m, n) . We consider the simplicial complex $\Sigma_{m,n}$ of independent sets in $S_{m,n}$ and present a formula for the Euler characteristic of $\Sigma_{m,n}$. In particular, we show that the unreduced Euler characteristic of $\Sigma_{m,n}$ vanishes whenever m and n are relatively prime, thereby settling a conjecture due to Fendley, Schoutens and van Eerten. For general m and n , we relate the Euler characteristic of $\Sigma_{m,n}$ to certain periodic rhombus tilings of the plane. Using this correspondence, we settle another conjecture due to Fendley et al. about a certain “transfer matrix” associated to $\{\Sigma_{m,n} : n \geq 1\}$.

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

DISPUTATION I DATALOGI

Klas Wallenius

disputerar på avhandlingen

**Generic Support for Decision-Making
in Effects-Based Management of Operations**

fredagen den 27 januari 2006 kl. 10.00 i sal F3, KTH, Lindstedtsvägen 26, b.v. Till fakultetsopponent har utsetts *professor Mieczyslaw M. Kokar*, Department of Electrical and Computer Engineering, Northeastern University, Boston, USA.

Abstract of the thesis

This thesis investigates computer-based support tools to facilitate decision-making in civilian and military operations. As flexibility is essential when preparing for unknown threats to society, this support has to be general. Further motivations for flexible and general solutions include reduced costs for technical development and training, as well as faster and better informed decision-making.

We use the term *Effects-Based Management of Operations* to denote the accomplishment of desired effects beyond traditional military goals by the deployment of all types of available capabilities. Supporting this work, *DISCCO* (Decision Support for Command and Control) is a set of network-based services including *Command Support*, helping commanders in the human, collaborative and continuous process of evolving, evaluating, and executing solutions to their tasks, *Decision Support*, improving the human process by integrating automatic and semi-automatic generation and evaluation of plans, and a *Common Situation Model*, capturing the hierarchical structure of the situation regarding own, allied, neutral, and hostile resources.

The use of the DISCCO has been investigated in three different applications: planning for establishing surveillance of an operation area, planning for NBC defense, and executing a riot control operation. Together, these studies indicate that DISCCO is applicable in many different classes of Effects-Based Management of Operations. Hence, this generic concept will contribute to the work of both the civilian and military defense in dealing with a broad range of current and future threats to the society.

SEMINARIUM I FINANSIELL MATEMATIK

Johan Kilander

presenterar sitt examensarbete:

Dimension reduction techniques and multivariate GARCH modeling

Abstract: The purpose of a multivariate GARCH (MGARCH) model is to make the covariance matrix of a set of risk factors conditional on past events. When the number of risk factors is large, accurate and robust estimation of most MGARCH models will not be feasible. The objective of this thesis is to construct an MGARCH model that efficiently overcomes the estimation problems but still provides a great deal of flexibility. To this end two existing MGARCH models are considered: the Orthogonal (O) GARCH model and the Constant Conditional Correlation (CCC) GARCH model. The strengths of these models are then built upon to form a new MGARCH model referred to as the CCC-OGARCH. The CCC-OGARCH imposes constant conditional correlations on a reduced set of risk factors. To test the validity of this assumption, a model with state-dependent correlations is proposed. Statistical testing and Value-at-Risk computations indicate that the risk factors could be appropriately modeled in a CCC-OGARCH framework.

Tid och plats: Måndagen den 16 januari kl. 15.15 – 16.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SEMINARIUM I TEORETISK DATALOGI

Mieczyslaw M. Kokar:

Ontology based higher-level fusion

Abstract: Higher-level fusion involves estimation of abstract entities — sometimes called “situations” — that can be represented as relations among objects, both physical and conceptual. Unlike features of physical objects, features of relations are not directly measured by any sensors. Instead, the existence of a relation is derived from a domain theory relevant to a specific scenario. In this talk, both theoretical and practical aspects of situation awareness and higher-level information fusion will be discussed. First, a motivational example will be given to demonstrate the importance of relations and to introduce the concept of situation. Then a formal mathematical definition of situation will be formulated and mapped to an ontological framework. This will be followed by a presentation of some methodological techniques and some technologies that are needed for establishing an ontological approach to higher-level fusion processing. In conclusion, directions for both applications and research in the areas of ontologies and higher-level fusion will be discussed.

Tid och plats: Torsdagen den 26 januari kl. 9.15 i rum 1537, Nada, KTH, Lindstedtsvägen 3, plan 5.

DOKTORANDKURS I MATEMATIK

Per Sjölin:

Valda ämnen inom Fourieranalysen

Under vårterminen 2006 kommer jag att ge en doktorandkurs med ovanstående titel. Bland annat kommer följande ämnen att behandlas:

- Konvergens nästan överallt av Fourierserier och Fourierintegraler i en och flera variabler.

(Continued on the next page.)

- Konvergens av waveletutvecklingar.
- Maximaluppskattningar för lösningar till Schrödingerekvationen.
- Uppskattningar av Fourierintegraloperatorer.
- Vektorvärda maximalfunktioner.

För delar av kursen kommer STEINS bok *Harmonic Analysis*, Princeton University Press, 1993, att användas.

Tid och plats: Föreläsningarna kommer att äga rum på fredagar kl. 10.15–12.00 i seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7, med början den 20 januari.

Välkomna!
Per Sjölin

SEMINARIUM I MATEMATISK STATISTIK

Anders Karlsson:

A law of large numbers for random walks

Abstract: In the 1950's and early 1960's probabilists started asking for extensions of the law of large numbers when the random variables take values in a general group instead of the real numbers. Grenander argued in his book *Probabilities on Algebraic Structures* that a noncommutative theory extending classical probability would be of much practical use. Of particular importance is the case of products of random matrices, where much work has been done since then, notably the important multiplicative ergodic theorem of Oseledec from 1968.

In a joint work with F. Ledrappier we prove a rather general noncommutative law of large numbers. It specializes to Oseledec's theorem in the case of invertible matrices (actually it might give finer information in more specialized situations). It also applies to the asymptotic behaviour of random walks on transitive infinite graphs (or finitely generated groups, or Brownian motion on universal covers of compact manifolds). Intuitively our theorem asserts that whenever a random walk escapes at a linear rate from the origin it converges in direction.

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

GRADUATE STUDENT SEMINAR

Michael Björklund:

On the Hopf-Tsuji-Sullivan Theorem

Abstract: We begin by discussing some generalities on Markov operators on general Lebesgue spaces. In particular, we will focus on recurrent Markov operators. The classical theorem of Hopf-Tsuji-Sullivan tells us that ergodicity (in fact, even conservativity) of the geodesic flow with respect to the invariant harmonic measure class is equivalent to recurrence of Brownian motion on certain Gromov-hyperbolic spaces. I will present a generalization of this result due to Vadim Kaimanovich which is formulated and proved in the language of Markov operators.

Tid och plats: Fredagen den 27 januari kl. 14.15–15.00 vid Institutionen för matematik, KTH, Lindstedtsvägen 25. Lokal meddelas senare.

FÖRDJUPNINGSKURS I MATEMATIK

Axel Hultman: Kombinatorik

We will study basic techniques in enumerative combinatorics. Examples include the “twelvefold way” (i.e. counting functions subject to various restrictions), sieve methods such as various versions of the inclusion-exclusion principle, the involution principle and determinantal lattice path counting. We also take a peek into the rich theory of partially ordered sets (posets). Our initial motivation is the general Möbius inversion theorem for posets which is a common generalization of the Möbius inversion theorem from number theory and the principle of inclusion-exclusion, but posets turn out to have many more applications.

Language: English is available upon request. Otherwise, the course will be given in Swedish.

Literature: RICHARD P. STANLEY, *Enumerative Combinatorics, Volume I*, Second Edition, Cambridge University Press, 1998.

Examination: Homework assignments.

Time and place: Thursdays at 10.15–12.00 in room 3733, Department of Mathematics, KTH, Lindstedtsvägen 25, floor 7. The first meeting will take place on January 19.

Welcome!
Axel Hultman

DOKTORANDKURS I MATEMATIK

Sergei Merkulov:

Differential geometry for algebraists

Kursen börjar fredagen den 27 januari kl. 15.15–17.00 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

Föreläsare: Sergei Merkulov, sm@math.su.se.

Kursen kommer att omfatta följande:

- 1) Basics of sheaf theory, ringed spaces, analytic spaces and manifolds.
- 2) Sheaves of differential graded Lie algebras of polyvector fields and of differential forms. De Rham cohomology. Symplectic and Poisson structures. Formalities.
- 3) Covariant derivative and its basic invariants: torsion and Riemann curvature. Riemann metric and Levi-Civita connection.
- 4) Parallel transport and holonomy groups. Kähler, hyper-Kähler, quaternionic and other geometric structures. Classification of all local torsion-free geometries.
- 5) Einstein equations and mathematics of two families of its solutions: (i) “Black Holes” and (ii) closed, open and flat models of “Expanding Universe”.

Welcome!
Sergei Merkulov

**Schema för högre kurser och seminarier i matematik
vid KTH och Stockholms universitet under vårterminen 2006**

Fördjupningskurser

Fourieranalys, 5B1466, 5 p.

Lärare: T. Kolsrud.

Tid och plats: Måndagar kl. 10.15–12.00 i KTH:3721. Kursstart den 30 januari.

Funktionalanalys, 5B1472, 5 p.

Lärare: A. Laptev.

Tid och plats: Tisdagar kl. 10.15–12.00 i KTH:3733. Kursstart den 17 januari.

Kombinatorik, 5B1475, 5 p.

Lärare: A. Hultman.

Tid och plats: Torsdagar kl. 10.15–12.00 i KTH:3733. Kursstart den 19 januari. Se sidan 8.

Talteori, 5 p.

Lärare: S. Merkulov.

Tid och plats: Måndagar kl. 15.15–17.00 i SU:306. Kursstart den 23 januari.

Seminariekurs IV: Matematisk hydrodynamik, 5B1459.

Lärare: B. Gustafsson.

Tid och plats: Tisdagar kl. 13.15–15.00 i KTH:3733. Kursstart den 21 februari.

Doktorandkurser

Differential geometry for algebraists.

Lärare: S. Merkulov.

Tid och plats: Fredagar kl. 15.15–17.00 i SU:306. Kursstart den 27 januari. Se sidan 8.

Several Complex Variables, 5B5151.

Lärare: M. Jonsson.

Tid och plats: Torsdagar kl. 10.15–12.00 i KTH:3721. Kursstart den 26 januari. Se sidan 4.

Valda ämnen inom Fourieranalysen, 5B5166.

Lärare: P. Sjölin.

Tid och plats: Fredagar kl. 10.15–12.00 i KTH:3733. Kursstart den 20 januari. Se sidorna 6–7.

Schemateori II, 5B5213.

Lärare: D. Laksov.

Tid och plats: Undervisningen ges på KTH. Tider meddelas senare.

Seminarier

Algebra- och geometriseminarier.

Seminarieledare: Ekedahl, Fröberg, Roos.

Tid och plats: Varannan vecka onsdagar kl. 13.00–14.45 i SU:306. Varannan vecka onsdagar kl. 13.15–15.00 i KTH:3733.

Seminarier i analys och dynamiska system.

Seminarieledare: Benedicks, Boman, Carleson, Hedenmalm, Laptev, Smirnov.

Tid och plats: Onsdagar kl. 13.15–14.15 i KTH:3721.

Logikseminarier.

Seminarieledare: Martin-Löf, Palmgren, Stoltenberg-Hansen.

Tid och plats: Onsdagar kl. 10.00–11.45 i SU:16. Vissa veckor i Uppsala.

(Fortsättning på nästa sida.)

Plurikomplexa seminarier.

Seminarieledare: Filipsson, Jonsson, Jöricke, Kiselman, Passare.

Tid och plats: Varannan tisdag kl. 10.15–15.00. Var fjärde vecka i SU:306. Var fjärde vecka i Uppsala.

Matematik med didaktisk inriktning.

Seminarieledare: Bøgvad, Fröberg, Gottlieb, Löfwall.

Tid och plats: Vissa onsdagar kl. 10.15–12.00 i SU:306.

Doktorandseminarier.

Seminarieledare: Brage, Crispin, Lundqvist.

Tid och plats: Meddelas senare.

Kollokvier.

Seminarieledare: Kurlberg, Shapiro.

Tid och plats: Onsdagar kl. 16.00–17.00. Plats anges vid varje tillfälle.

Kombinatorikseminarier.

Seminarieledare: A. Björner, S. Linusson.

Tid och plats: Onsdagar kl. 10.15–12.00 i KTH:3733.

Seminarier i analys och dess tillämpningar.

Seminarieledare: H. Shahgholian.

Tid och plats: Vissa måndagar kl. 13.15–14.15 i KTH:3733.

DNA-seminarier (Dynamics, Number theory, and Analysis).

Seminarieledare: A. Karlsson (KTH), A. Strömbergsson (Uppsala).

Tid och plats: Seminarier är gemensamt mellan KTH och Uppsala universitet. Det äger rum vissa måndagar, alternerande mellan KTH och Uppsala.

Om du undrar över någon kurs som ej ges under läsåret, kan du kontakta huvudläraren (fördjupningskurser), din handledare eller studierektor för forskarutbildningen. Eventuellt kan någon form av studiecirkel anordnas om tillräckligt intresse finns.

För kurserna vid Stockholms universitet gäller: Undervisningen börjar tidigast under vecka 4 (23–27 januari). Möjlighet till tentamen på fördjupningskurser, som inte går under terminen, ges i augusti om tentamensanmälan inlämnas senast den 1 juli 2006.

Adresser: KTH:3721: Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

KTH:3733: Seminarierum 3733, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

SU:16: Sal 16, hus 5, Matematiska institutionen, SU, Kräftriket.

SU:306: Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.
