BRÅKET

Information om seminarier och högre undervisning i matematiska ämnen i Stockholmsområdet

NR 14 **TORSDAGEN DEN 9 APRIL 2009**

BRÅKET

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

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

Nordic university-level mathematics team-competition

Denna skall äga rum den 16 – 20 april. Anmälan om deltagande skall göras före kl. 12.00 tisdagen den 14 april. Se Bråket nr 13 sidan 8.

Money, jobs: Se sidorna 8 – 9.

SEMINARIER

To 04–09 kl. 10.30. Seminar in Fluid Mechanics. Yohann Duguet, Mekanik, KTH: *Localized patterns in transitional shear flows: pipe flow and plane Couette flows.* Seminarierummet, Institutionen för mekanik, KTH, Teknikringen 8. Se Bråket nr 13 sidan 3.

Ti 04–14 kl. 13.15. Plurikomplexa seminariet. Maurics Rojas, College Station: *Real topology computation via complex amoebas.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 3.

Ti 04–14 kl. 15.30 – 16.30. Institut Mittag-Leffler Seminar. Johan Jonasson, Chalmers tekniska högskola, Göteborg: *The bottom-to-top shuffle and the overlapping cycles shuffle.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 13 sidan 8.

Ti 04–14 kl. 18.00. Populärvetenskaplig föreläsning i fysik. Elin Bergeås Kuutmann, Fysikum, SU: *LHC, CERN och materiens minsta byggstenar: Om att använda de största maskinerna för att hitta de minsta partiklarna.* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

On 04–15 kl. 13.15 – 14.15. Seminarium i analys och dynamiska system. Per Sjölin, KTH: *Maximal operators of Schrödinger type with a complex parameter.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se Bråket nr 13 sidan 9.

Fortsättning på nästa sida.

Philosophy and Foundations of Mathematics: Epistemological and Ontological Aspects

En konferens med denna titel skall äga rum i Uppsala den 5 – 8 maj. Se sidorna 5 – 7.

Seminarier (fortsättning)

On 04–15 kl. 13.15 – 15.00. Algebra and Geometry Seminar. Torsten Ekedahl: *Smooth and proper approximations of classifying spaces.* Rum 306, hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 3.

On 04–15 kl. 15.15. Seminarium i matematisk statistik. Tom Andersson, SU: *Exploring voltage-dependent ion channels in silico by hysteretic conductance.* Rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket. Se sidan 8.

To 04–16 kl. 13.15 – 14.15. DNA-seminariet Uppsala-KTH (Dynamical systems, Number theory, Analysis). Johan Andersson: *Kloosterman sums and their applications in analytic number theory.* Sal 64119, Ångströmlaboratoriet, Uppsala universitet. Se sidan 3.

To 04–16 kl. 13.15 – 14.15. Graduate Student Seminar. *(Observera dagen!)* **Michael Björklund,** Matematik, KTH: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

To 04–16 kl. 14.00 – 15.00. Institut Mittag-Leffler Seminar. Vlada Limic, Université de Provence, Marseille: *The Lambda-coalescent speed of coming down from infinity.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 13 sidan 6.

To 04–16 kl. 15.30 – 16.30. Institut Mittag-Leffler Seminar. Anders Martin-Löf, Stockholms universitet: *Pfaff, Ising and statistical mechanics.* Institut Mittag-Leffler, Auravägen 17, Djursholm. Se Bråket nr 13 sidan 6.

Ti 04–21 kl. 10.30. Seminar in Fluid Mechanics. *(Observera lokalen!)* **Predrag Cvitanovic,** Georgia Tech: *Invariant solutions and state-space dynamics in wall-bounded flows.* Sal E32, KTH, Lindstedtsvägen 3, b.v. Se sidan 4.

On 04–22 kl. 13.15 – 14.15. Seminarium i analys och dynamiska system. Olle Häggström, Göteborg: *Percolating in one dimension.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Se sidan 4.

On 04–22 kl. 16.00. KTH/SU Mathematics Colloquium. Professor Herbert Abels, Universität Bielefeld: *Affine crystallographic and properly discontinuous groups.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Kaffe/te serveras kl. 15.30 i pausrummet, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4. Se sidan 4.

To 04–23 kl. 15.15 – 16.15. AlbaNova and Nordita Colloquium in Physics. Professor N. David Mermin, Cornell University: *What does quantum mechanics to do with factoring?* Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum. Se sidan 7.

Fr 04–24 kl. 13.15 – 14.15. Graduate Student Seminar. Farid Bozorgnia, Matematik, KTH: *Title to be announced.* Seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7.

INSTITUT MITTAG-LEFFLER SEMINAR

Det tidigare annonserade seminariet av Bela Bollobas tisdagen den 14 april kl. 14.00 – 15.00 är *inställt.*

PLURIKOMPLEXA SEMINARIET

Maurics Rojas:
Real topology computation via complex amoebas

Abstract: The logarithm of the absolute values of the coordinates of an algebraic hypersurface — called an amoeba — has a rich structure interweaving combinatorics and geometry. When applied to certain special polynomials known as A-discriminants, one can prove dramatically improved algorithmic complexity results for many questions involving real algebraic sets.

We give an introduction to these techniques, focusing on how amoebas allow us to decide whether a given real algebraic set, defined by a single polynomial in n variables with $n+k$ monomial terms, is empty or not. Considering the special case where k is equal to 1, 2, or 3, we see very clearly how certain polyhedral cones determine the real topology of very general non-linear hypersurfaces.

We assume no background in combinatorics or algorithmic complexity.

Tid och plats: Tisdagen den 14 april kl. 13.15 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

ALGEBRA AND GEOMETRY SEMINAR

Torsten Ekedahl:
Smooth and proper approximations of classifying spaces

Abstract: I will show that for every reductive group G and every integer K there is a smooth and projective variety X and a torsor $P \to X$ for the group $G \times G_m$ such that the classifying map $X \to BG \times GG_m$ induces an isomorphism in cohomology of degrees $\leq K$. This is then applied to showing the non-multiplicativity of the class of P in the Grothendieck of varieties.

Tid och plats: Onsdagen den 15 april kl. 13.15 – 15.00 i rum 306, hus 6, Matematiska institutionen, SU, Kräftriket.

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

Johan Andersson:
Kloosterman sums and their applications in analytic number theory

Abstract: We will introduce the Kloosterman sums

$$S(m,n;c) = \sum_{h\bar{h}\equiv 1 \pmod{c}} e\Big(\frac{mh+n\bar{h}}{c}\Big)$$

and discuss about some of their applications in analytic number theory, in particular applications on exponential sums and on the fourth power moment of the Riemann zeta-function (following Heath-Brown, Kuznetsov, Iwaniec and Motohashi).

Tid och plats: Torsdagen den 16 april kl. 13.15 – 14.15 i sal 64119, Ångströmlaboratoriet, Uppsala universitet.

SEMINAR IN FLUID MECHANICS

Predrag Cvitanovic:
Invariant solutions and state-space dynamics in wall-bounded flows

Abstract: It has recently become possible to compute precise equilibrium, travelling wave, and periodic orbit solutions to pipe and plane Couette flow at Reynolds numbers above the onset of turbulence. These invariant solutions capture the complex dynamics of unstable coherent structures in wall-bounded flows and provide a framework for understanding turbulent flows as dynamical systems. We present a number of weakly unstable equilibria, travelling waves, and periodic orbits of plane Couette flow and visualizations of their physical and state-space dynamics. What emerges is a picture of low-Reynolds turbulence as a walk among a set of weakly unstable invariant solutions.

Tid och plats: Tisdagen den 21 april kl. 10.30 i Sal E32, KTH, Lindstedtsvägen 3, b.v.

SEMINARIUM I ANALYS OCH DYNAMISKA SYSTEM

Olle Häggström:
Percolating in one dimension

Abstract: The usual percolation models have the easy-to-see property that if the underlying graph is a one-dimensional periodic lattice, then the probability of obtaining an infinite cluster is zero as soon as the the retention parameter is nontrivial. We show how it is nevertheless possible to make sense of conditioning on such an event, and we study properties of the resulting conditional model. In particular, we are interested in the asymptotic behaviour of random walk on the infinite cluster.

This is joint work with Marina Axelson-Fisk.

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

KTH/SU MATHEMATICS COLLOQUIUM

Herbert Abels:
Affine crystallographic and properly discontinuous groups

Abstract: There is a long-standing conjecture of Auslander (1964), which states that every affine crystallographic group has a solvable subgroup of finite index. Milnor (1977) asked if, more generally, every properly discontinuous affine group has a solvable subgroup of finite index. This more general conjecture was disproved by Margulis (1983). The Auslander conjecture has been proved in many cases, but is wide open in dimension at least 7. I will explain the geometric and algebraic relevance of the notions and conjectures and will give an idea of the methods involved in the constructions and proofs in our joint work with Margulis and Soifer. We use dynamics of linear and affine maps. The connection with the Tits alternative and proximal maps will be pointed out.

Tid och plats: Onsdagen den 22 april kl. 16.00 i seminarierum 3721, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 7. Kaffe/te serveras kl. 15.30 i pausrummet, Institutionen för matematik, KTH, Lindstedtsvägen 25, plan 4.

PHILOSOPHY AND FOUNDATIONS OF MATHEMATICS: EPISTEMOLOGICAL AND ONTOLOGICAL ASPECTS

A conference dedicated to Per Martin-Löf on the occasion of his retirement, Uppsala, May 5 – 8, 2009

The conference will take place in Thunbergssalen at the Swedish Collegium for Advanced Study (SCAS), Linneanum, Thunbergsvägen 2, Uppsala.

Speakers: Peter Aczel, Mark van Atten, Steve Awodey, Thierry Coquand, Peter Dybjer, Juliet Floyd, Jean-Yves Girard, Sten Lindström, Per Martin-Löf, Colin McLarty, Peter Pagin, Erik Palmgren, Christine Paulin-Mohring, Jan von Plato, Dag Prawitz, Aarne Ranta, Michael Rathjen, Giovanni Sambin, Anton Setzer, Stewart Shapiro, Wilfried Sieg, Jan Smith, Sören Stenlund, Göran Sundholm, William Tait, Jouko Väänänen.

Scope and aim: The aim of the conference is to bring together philosophers, mathematicians, and logicians to penetrate current and historically important problems in the philosophy and foundations of mathematics. Swedish logicians and philosophers have made important contributions to the foundations and philosophy of mathematics, at least since the end of the 1960s. In philosophy, one has been concerned with the opposition between constructivism and classical mathematics and the different ontological and epistemological views that are reflected in this opposition. A central philosophical question concerns the nature of the abstract entities of mathematics: do they exist independently of our epistemic acts (realism, or Platonism) or are they somehow constituted by these acts (idealism)? Significant contributions have been made to the foundations of mathematics, for example in proof theory, proof-theoretic semantics, and constructive type theory. These contributions have had a strong impact on areas of computer science, e.g. through Martin-Löf's type theory.

Two important alternative foundational programmes that are actively pursued today are predicativistic constructivism and category-theoretic foundations. Predicativistic constructivism can be based on Martin-Löf's constructive type theory, Aczel's constructive set theory, or similar systems. The practice of the Bishop school of constructive mathematics fits well into this framework. Associated philosophical foundations are meaning theories in the tradition of Wittgenstein, Dummett, Prawitz, and Martin-Löf. What is the relation between proof-theoretical semantics in the tradition of Gentzen, Prawitz, and Martin-Löf, and Wittgensteinian or other accounts of meaning-as-use? What can proof-theoretical analysis tell us about the scope and limits of constructive and (generalized) predicative mathematics? To what extent is it possible to reduce classical mathematical frameworks to constructive ones? Such reductions often reveal computational content of classical existence proofs. Is computational content enough to solve the epistemological questions?

A central concern for the conference will be to compare the different foundational frameworks — classical set theory, constructive type theory, and category theory — both from a philosophical and a logical point of view. The general theme of the conference, however, will be broader and encompass different areas of philosophy and foundations of mathematics, in particular the interplay between ontological and epistemological considerations.

Organization and programme committee: Peter Dybjer, Sten Lindström, Erik Palmgren (Chair), Dag Prawitz, Sören Stenlund, Viggo Stoltenberg-Hansen.

Attendance: Attendance is open, and there is no registration fee. However, anyone planning to attend should preregister by sending an e-mail message to PFM@math.uu.se no later than Wednesday, April 15. (For reasons of space, the number of participants will be limited to 90.)

(Continued on the next page.)

Complete information about the conference, including a list of sponsors and the programme with abstracts to the lectures, is given at http://www.math.uu.se/PFM/. The programme can also be read below. An abstract is given here only to the talk of Per Martin-Löf. The remaining abstracts can be found at the address given above.

Tuesday, May 5

9.00 Registration. Coffee/tea.
10.00 Opening.
10.20 – 11.10 **William Tait:** *The myth of intuition.*
11.20 – 12.10 **Sören Stenlund:** *On the notion of finite numbers.*
Lunch break.
14.00 – 14.50 **Michael Rathjen:** *The boundaries of intuitionistic type theory.*
15.00 – 15.50 **Peter Dybjer:** *Program testing and constructive validity.*
Coffee/tea.
16.20 – 17.10 **Peter Aczel:** *Predicate logic over a type setup.*
17.20 – 18.10 **Giovanni Sambin:** *A minimalist foundation for mathematics.*
Reception.

Wednesday, May 6

9.00 – 9.50 **Jean-Yves Girard:** *Towards non-commutative foundations.*
Coffee/tea.
10.20 – 11.10 **Steve Awodey:** *Type theory and homotopy theory.*
11.20 – 12.10 **Thierry Coquand:** *Forcing and type theory.*
Lunch break.
14.00 – 14.50 **Christine Paulin-Mohring:** *Reasoning on randomized programs in Coq.*
15.00 – 15.50 **Anton Setzer:** *Coalgebras as types determined by their elimination rules.*
Coffee/tea.
16.20 – 17.10 **Peter Pagin:** *Assertion, truth and judgement.*
17.20 – 18.10 **Sten Lindström:** *Church-Fitch's knowability paradox revisited.*

Thursday, May 7

9.00 – 9.50 **Stewart Shapiro:** *An "i" for an i: singular term, uniqueness and reference.*
Coffee/tea.
10.20 – 11.10 **Colin McLarty:** *Identity and existence in categorical foundations.*
11.20 – 12.10 **Wilfried Sieg:** *Reductive structuralism.*
Lunch break.
14.00 – 14.50 **Jouko Väänänen:** *Second order logic, set theory and the foundations of mathematics.*
15.00 – 15.50 **Mark van Atten:** *Different times: Kant and Brouwer on real numbers.*
Coffee/tea.
16.20 – 17.10 **Jan von Plato:** *Aristotle's deductive logic: a proof-theoretical study.*
17.20 – 17.50 **Jan Smith:** *Can Hume's analysis of causality tell us something about the rules of logic?*
18.00 – 18.30 **Erik Palmgren:** *Formal topology and foundational problems.*

(Continued on the next page.)

Friday, May 8

9.00 – 9.50 **Juliet Floyd:** *Wittgenstein, Gödel and Turing.*
Coffee/tea.

10.20 – 11.10 **Aarne Ranta:** *Levels of abstraction in language and logic.*

11.20 – 12.10 **Göran Sundholm:** *Three key-features of Martin-Löf's philosophy of logic.*
Lunch break.

14.00 – 14.50 **Dag Prawitz:** *Title to be announced.*

15.00 – 15.50 **Per Martin-Löf:** *Logic: epistemological or ontological?*

Abstract: What is logic? Is it the study of the process of inference or reasoning, called demonstration in mathematics, by means of which we justify our judgements? Or is it the study of the logical and set-theoretical concepts, like proposition, truth and consequence on the one hand, and set, element and function on the other, that make their appearance in the contents of our judgements? This is the fundamental question whether logic is in its essence epistemological or ontological. The answer is presumably that it is both, which is to say that, within logic, one can distinguish between two parts, or two layers, the one epistemological and the other ontological. But there remains the question of the order of priority between these two layers: Which comes first? Is epistemology prior to ontology, or is it the other way round? Bolzano, whose logic in four volumes, called Wissenschaftslehre, has the most clear architectonic structure of all logics that have so far been written, treated of the ontological notions of proposition, truth and logical consequence (Ableitbarkeit) in the first two volumes of his Wissenschaftslehre, relegating the epistemology to the third volume. Thus he let ontology take priority over epistemology. Although the line of demarcation between the two was drawn in exactly the right place by Bolzano, my own work on constructive type theory has forced me to the conclusion that the order of priority between ontology and epistemology is nevertheless the reverse of the order in which they are treated in the Wissenschaftslehre. The epistemological notions of judgement and inference have to be in place already when you begin to deal with propositions, truth and consequence, as well as with other purely ontological notions, like the set-theoretical ones.

Coffee/tea.

19.00 Conference dinner (separate registration required).

ALBANOVA AND NORDITA COLLOQUIUM IN PHYSICS

N. David Mermin:
What does quantum mechanics to do with factoring?

Abstract: Quantum computer science will be introduced in the context of its most sensational algorithm: the highly efficient factoring routine discovered by Peter Shor. I will emphasize those features of Shor's procedure that puzzled, surprised, and charmed me in the course of my own efforts to better understand how it does its magic. The subject offers some offbeat glimpses of both quantum mechanics and computation.

Tid och plats: Torsdagen den 23 april kl. 15.15 – 16.15 i Oskar Kleins auditorium, Roslagstullsbacken 21, AlbaNova universitetscentrum.

SEMINARIUM I MATEMATISK STATISTIK

Tom Andersson: Exploring voltage-dependent ion channels in silico by hysteretic conductance

Abstract: Kinetic models of voltage-dependent ion channels are usually inferred from time records of macroscopic current relaxation or microscopic single channel data on dwell time. A complementary explorative approach is here outlined. Hysteretic conductance refers to a non-equilibrium condition of conductance due to periodic change of voltage, making ion channel conductance a periodic function of voltage.

This type of data enables complementary qualitative and quantitative assessments of the state space and the kinetics of voltage-dependent ion channels. Hysteretic conductance can be used to probe the number of states, as well as the qualitative relations between them, e.g. independent versus cooperative gating. Under the Hodgkin-Huxley condition of independent gating, data on hysteretic conductance enable direct estimation of voltage-dependent rate functions.

Even when the Hodgkin-Huxley condition is not fulfilled, hysteretic conductance provides a basis for efficient tests of hypothetical models of voltage-dependent channels. At the single channel level, hysteretic conduction provides a basis for inferring multiple gating modes. The argument is mainly theoretical. Simulations of Markov models of ion channels are used to illustrate it.

Tid och plats: Onsdagen den 15 april kl. 15.15 i rum 306 (Cramérrummet), hus 6, Matematiska institutionen, SU, Kräftriket.

MONEY, JOBS

Columnist: Johannes Lundqvist, Department of Mathematics, Stockholm University. E-mail: johannes@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://www2.math.su.se/~johannes/mj.html.

Unless stated otherwise, a given date is the last date (e.g. for applications), and the year is 2009. 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://www2.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.

(Continued on the next page.)

Old information

Money to apply for

11. Vetenskapsrådet utlyser projektbidrag. Dessa ges under en bestämd period för forskning i syfte att lösa en definierad forskningsuppgift. Bidraget söks av enskild forskare och ges under längst fem år. Projektbidraget kan innefatta medel för löner för olika typer av anställningar, materiel, resor, publiceringskostnader m.m. samt utrustning till en kostnad lägre än 2 000 000 kr, exklusive indirekta kostnader. Minsta möjliga belopp att söka för projektbidrag är 100 000 kr per år, exklusive indirekta kostnader. Sista ansökningsdag är den 15 april. Web-info: http://www.vr.se/huvudmeny/sokabidrag/vetenskapsradetsutlysningar/utlysningsvy.4.aad30e310abcb9735780004381.html?resourceId=-1945&languageId=1.

Jobs to apply for

12. SU söker två doktorander i matematik. Anställningarna har ämnesbeskrivningarna "Geometric invariants of finite groups" respektive "Geometry on configuration spaces with applications to homological algebra, number theory, and quantization". Sista ansökningsdag är den 4 maj. Web-info: http://www.math.su.se/content/1/c6/02/88/39/applic09.pdf.
13. SU söker två doktorander i matematisk statistik. Sista ansökningsdag är den 4 maj. Web-info: http://www.math.su.se/content/1/c6/02/88/39/FoutbVT09.pdf.
14. KTH söker en lektor i matematisk statistik. Sista ansökningsdag är den 20 april. Web-info: http://www.kth.se/aktuellt/tjanster/2/ShowAdd.aspx?ID=153685.
15. Lunds universitet söker en eller två doktorander i matematisk statistik. Sista ansökningsdag är den 8 maj. Web-info: http://www3.lu.se/info/lediga/admin/document/PA2009-1208eng.pdf.
16. Uppsala universitet söker en professor i matematisk statistik. Sista ansökningsdag är den 15 maj. Web-info: http://www.math.uu.se/inform/vacant.php.
17. Uppsala universitet söker en professor i statistik. Sista ansökningsdag är den 20 april. Web-info: http://www.personalavd.uu.se/ledigaplatser/340prof.html.
18. Uppsala universitet söker tre doktorander i statistik. Sista ansökningsdag är den 15 april. Web-info: http://www.personalavd.uu.se/ledigaplatser/579dorand.html.
19. Institutionen för matematik vid KTH söker två doktorander i finansiell matematik/matematisk statistik. Sista ansökningsdag är den 30 april. Web-info: http://www.math.kth.se/finansdokt.html.
20. Vetenskapsrådet utlyser bidrag för anställning som forskarassistent. Sista ansökningsdag är den 15 april. Web-info: http://www.vr.se/huvudmeny/sokabidrag/vetenskapsradetsutlysningar/utlysningsvy.4.aad30e310abcb9735780004381.html?resourceId=-1839&languageId=1.