AUTOMORPHISMS OF AFFINE SPACE

NIJMEGEN 6 - 10 JULY

INVITED SPEAKERS

A.M. Cohen
W. Danielewski
G. Freudenburg
H.W. Lenstra
M. Miyanishi
D. Wright

SCIENTIFIC COMMITTEE

L. Makar-Limanov
L. Moser-Jauslin
J. Steenbrink

ORGANIZING COMMITTEE

W. Bosma
A. van den Essen
S. Maubach
G. Oliemeulen
R. Willems

Dear attendants of Automorphisms of Affine Space,

it is a great pleasure to welcome you all in Nijmegen.
This booklet contains useful information both about the conference and about Nijmegen. In particular it contains a list of adresses of restaurants, which I personally tried out for you, sometime during the past ten years.
There are two things I'd like to bring to your attention.
First, there is an unofficial part of the program on saturday which consists of a hike through "De Haterse Vennen" and a dinner at a dutch pancake restaurant. If you want to join us on saturday and have not yet registered for this, please do so as quick as possible, because of the reservations we have to make.
Finally, on tuesday afternoon, there won't be any talks, but instead Michiel de Bondt will defend his Ph. D. thesis. Everybody is invited to attend his defense and join him afterwards for drinks and of course to congratulate him.
Well that's it. Enjoy our conference and have a nice stay in Nijmegen.

On behalf of the organizing committee,
Roel Willems

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2. SCHEDULE

MONDAY, 6TH OF JULY		
10.00	10.40	**Registration**
10.45	11.00	**Opening**
11.00	12.00	M. Miyanishi *Generalized Jacobian problem for algebraic surfaces like the affine plane*
12.00	13.30	**Lunch**
13.30	14.00	H.Zoladek *An application of Newton-Puiseux charts in the Jacobian problem*
14.10	14.40	G. Khimshiashvili *On quadruples of polynomials with constant Jacobian*
14.40	15.10	**Break + refreshments**
15.10	15.40	T. Asanuma *Topological approach to the Jacobian conjecture*
15.50	16.20	E. Edo *Coordinates of $R[x,y]$: Constructions and classifications*
16.30	17.00	R. Naghipour *Integral Closures and Homological Dimensions*
17.10	17.30	Askar Dzhumadil'daev *Super-trees, odd derivations and identities*
TUESDAY, 7TH OF JULY		
9.45	10.45	G. Freudenburg *Epimorphisms of Polynomial Rings defined by Generic Matrices*
10.45	11.15	**Break + refreshments**
11.15	11.45	M. Karas *Multidegree of tame automorphisms of $\mathbb{C}^n$*
11.55	12.15	R. Willems *Automorphisms over finite fields as bijections*
12.15	12.35	S. Maubach *Mimicking automorphisms over finite fields by tame automorphisms*
12.40	13.00	E. van den Essen *A (de) Bond(t) Story*
13.00		**Lunch**
		Afternoon program is optional.
15.30	(strict!)	**location AULA** Start promotion Michiel de Bondt.
17.00		refreshments & opportunity to congratulate Michiel de Bondt.
21.30		Party (courtesy of Michiel de Bondt) in "De Hemel".

WEDNESDAY, 8TH OF JULY		
9.45	10.15	W. Danielewski *On a weak Zariski cancellation problem*
10.25	10.55	Y. Bodnarchuk *Nagata's type automorphisms as the exponents of three root localy nilpotent derivations*
10.55	11.25	**Break + refreshments**
11.25	11.55	A. Liendo *Affine T-varieties of complexity one and locally nilpotent derivations*
12.05	12.35	D. Finston *Factorial affine threefolds with isomorphic cylinders*
12.35	14.00	**Lunch**
14.00	14.30	W. Zhao *A Deformation of Commutative Polynomial Algebras in Even Number of Variables*
14.40	15.00	J. Berson *Tameness of automorphisms over Artinian rings*
15.00	15.20	**Break + refreshments**
15.20		Discussion on the future of Affine Algebraic Geometry
$\pm$16.15	$\pm$18.00	Open problem session
THURSDAY, 9TH OF JULY		
9.45	10.45	A. M. Cohen *Constructing some Hurwitz curves with given automorphism group*
10.45	11.15	**Break + refreshments**
11.15	11.45	J. Zygadlow *Minimal polynomial of a locally finite automorphism*
11.55	12.25	P. van Rossum *TBA*
12.35	14.00	**Lunch**
14.00	15.00	L. Makar-Limanov *On Jacobian pairs*
15.00	15.30	**Break + refreshments**
15.30	16.00	L. Moser-Jauslin *The Automorphism group of the Koras-Russell cubic threefold*
16.10	17.10	H. W. Lenstra *Exceptional polynomials*
18.00	18.30	Arrival at Faculty Club on campus.
18.30	21.00	Conference dinner at Faculty Club

FRIDAY, 10TH OF JULY		
9.45	10.45	D. Wright *Commutator Formulas for Polynomial Automorphisms*
10.45	11.15	**Break + refreshments**
11.15	11.45	V. Bavula *The group of automorphisms of the algebra S_n of one-sided inverses of a polynomial algebra*
11.55	12.25	A. Dubouloz *Generic $\mathbb{A}^1$-fibrations on smooth quasi-projective surfaces are $\mathbb{A}^1$-bundles*
12.35	14.00	**Lunch**
14.00	14.30	A. Crachiola *Cancellation for 2-dimensional UFDs*
14.40	15.10	P. Jedrzejewicz *Rings of constants of derivations and p-bases*
15.10	15.40	**Break + refreshments**
15.40	16.10	A. K. Maharana *$\mathbb{Q}$-homology planes as cyclic covers of $\mathbb{A}^2$*
16.20	16.50	M. Sabatini *On divergence-free Jacobian maps*
16.50	$\pm$17.15	**Closure**
SATURDAY (unofficial program)		
		Hike through the “Hatertse Vennen” near Nijmegen

3. ABSTRACTS

MONDAY, 6th of July

11.00 - 12.00

Generalized Jacobian problem for algebraic surfaces like the affine plane

Masayoshi Miyanishi

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abstract

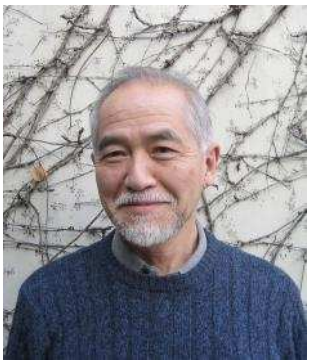
Let X be an algebraic variety defined over the complex field $\mathbb{C}$. The generalized Jacobian problem for X asks whether an unramified endomorphism $\varphi : X \to X$ is a finite morphism. If X is simply connected, this problem simply asks whether such an endomorphism is an automorphism. Hence the problem contains the Jacobian problem for the affine space $\mathbb{A}^n$. The problem is itself interesting in elucidating the structure of algebraic varieties, and the generalization will also reveal the significance of the Jacobian problem essentially from the following two view points.

(1) When X is non-complete, does the absence of ramification of an endomorphism φ of X in the finite distance imply the absence of ramification at infinity as well ? If so, what kind of mechanism is working behind the scene? Is this one of the peculiarity of the affine space?
(2) How can one guess the ramification data of φ at infinity just by looking at the finite distance ?

There are positive and negative results. Namely, there are many interesting and important positive answers though there are also counterexamples. In the talk, most algebraic varieties to be treated are affine surfaces including affine surfaces with $\mathbb{A}^1$-fibrations or $\mathbb{C}^*$-fibrations, affine pseudo-planes and $\mathbb{C}^2/G$ with a finite group G. The automorphism groups of these surfaces are also discussed.

Biography

Professor Miyanishi received his Ph. D. in 1968 from Kyoto University.



He was appointed as associate professor at Osaka University in 1973 (since 1984 full professor), which he kept until he retired from Osaka in 2003. Currently, he is professor of mathematics at Kwansei Gakuin University. Professor Miyanishi was present at the "birth" of AAG since the early 70's and has made numerous contributions to it. Just a few of his well-known results are a geometric characterisation of the affine plane and 3-space, and the famous Miyanishi-Sugie cancellation theorem. His results and books have shaped AAG to be what it is today, and still his work is of considerable influence.

13.30 - 14.00

An application of Newton-Puiseux charts in the Jacobian problem

Henryk Zoladek

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abstract

The Newton-Puiseux charts are special multi-valued coordinate systems near blow-up divisors of points at infinity in CP^2. In the 2-dimensional Jacobian problem these charts are applied to divisors in the resolution of indeterminacies of the component polynomials. Due to simplicity of the Jacobian condition written in these charts a systematic analysis of the Jacobian maps is possible. We also improve many known results in the plane Jacobian problem.

14.10 -14.40

On quadruples of polynomials with constant Jacobian

Giorgi Khimshiashvili

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abstract

A natural relation between generalized Sklyanin brackets and Jacobian problem will be described. To this end a class of algebraic Poisson structures will be introduced which contains the classical Sklyanin algebras. It will then be shown that a quadruple of polynomials with constant Jacobian defines a pair of compatible Poisson structures of this class. Several aspects of the arising connection between integrable systems and Jacobian problem will also be discussed.

15.10 - 15.40

Topological approach to the Jacobian conjecture

Teruo Asanuma

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abstract

Let $\phi = (f_1, ..., f_n) : \mathbf{C}^n \to \mathbf{C}^n$ be a polynomial map with its Jacobian nonzero constant for $f_i \in \mathbf{C}[x_1, ..., x_n]$. The map ϕ is called standard, if the highest degree term of f_n is x_n^m and $\mathbf{C}(f_1, ..., f_n, x_n/x_1) = \mathbf{C}(x_1, ..., x_n)$. There is a polynomial automorphism ψ of $\mathbf{C}^n$ such that $\phi\psi$ is standard. A point $P = (p_1 : ... : p_n : 0)$ at infinity of the complex projective n-space $\mathbf{P}^n$ is said to be quasifinite if there is an infinite sequence $\{P_i\}$ of points in $\mathbf{C}^n \subset \mathbf{P}^n$ which converges to P such that the image $\{\phi(P_i)\}$ converges to a point in $\mathbf{C}^n$. Then we have the following: (1) The conjecture holds if and only if there is no quasifinite point. (2) If P is a quasifinite point, then $p_n = 0$ in the case of ϕ standard. We consider about a homotopy type obstacle which occurs by the existence of such a quasifinite point.

15.50 - 16.20

Coordinates of $R[x,y]$: Constructions and classifications.

Eric Edo

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abstract

Let R be a commutative ring. We give the construction of some new length 2 coordinates of $R[x,y]$.

Theorem. Let $d, p_1, p_2 \in R$ be 3 non zero-divisors such that $dR + p_2R = R$ and let $Q_1, Q_2 \in R[y]$ be two polynomials such that $p_2y + Q_2(Q_1(y)) = 0$ modulo d. We set: $F(x,y) = d^{-1}\{p_2y + Q_2(p_1dx + Q_1(y))\} \in R[x,y]$. The following assumptions are equivalent:
i) $F(x,y)$ is a coordinate of $R[x,y]$,
ii) $F(x,y)$ is a coordinate in $R/p_1R[x,y]$ and in $R/p_2R[x,y]$.
iii) $d^{-1}(p_2y + Q_2(Q_1(y)))$ is a coordinate in $R/p_1R[y]$ and $Q_2(y)$ is a coordinate in $R/p_2R[y]$.

Remark. Due to Nagata's theorem about coordinates in $R[y]$, the assumption iii) can be express in a very explicit way.

Assuming R to be a UFD we prove that all length 2 coordinates have the form of the theorem but with the assumption $\gcd(d, p_2) = 1$ instead of $dR + p_2R = R$ so

we can conclude to a complete classification only when R is a principal ring (for example when $R = k[z]$ where k is a field).

16.30 - 17.00

Integral Closures and Homological Dimensions

Reza Naghipour

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abstract

Let K be a non-zero finitely generated module over a commutative Noetherian ring$R$. The concept of *weakly G_K-perfect ideal* was introduced by Golod. He showed that, this new ideal has some nice properties.

In the this talk we give a characterization for canonical modules. Namely, we show that if $(R,\mathfrak{m})$ is a local ring, and K is a non-zero finitely generated suitable R-module, then $\mathfrak{m}$ is G_K-perfect if and only if K is a canonical module for R.

Also, we study the structure of associated primes to the integral closure of ideals which have finite homological dimension. In fact we show that, if K is a finitely generated suitable R-module, I is a K-proper integrally closed ideal of R such that $G_K\text{-dim}_R I < \infty$ and K satisfies Serre's condition (S_1) or $\text{grade}_K I > 0$, then $K_\mathfrak{p}$ is a canonical $R_\mathfrak{p}$- module for every $\mathfrak{p} \in \text{Ass}_R R/I$.

17.10 - 17.30

Super-trees, odd derivations and identities

Askar Dzhumadil'daev

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abstract

Well-known that commutator of two vector fields (differential operators of first order) is again a vector field. In general N-commutator of vector fields, skew-symmetric sum of $N!$ compositions, is a differential operator of order N. We show that for any n-dimension manifold there exist well-defined N-commutator if $N = n^2+2n-2$. This number can not be improved. For any $M > n^2+2n-2$ skew-symmetric sum of $M!$ compositions of any M vector fields vanishes. This question is equivalent to the problem of studying powers of odd derivations. For calculating compositions of odd derivations we develop super-trees approach.

TUESDAY, 7th of July

9.45 - 10.45

Epimorphisms of Polynomial Rings defined by Generic Matrices

Gene Freudenburg

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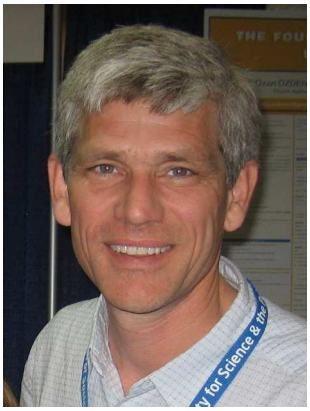
abstract

Key algebraic properties of polynomials defined by 2×2 generic matrices are established. These specialize to the Chebyshev polynomials $T_i(x) \in \mathbb{Z}[x]$. We explore epimorphisms $\phi : \mathbf{k}[x,y,z] \to \mathbf{k}[t]$ defined by $\phi = (T_i, T_j, T_k)$, where $\mathbf{k}$ is any field of characteristic 0. In particular, we determine which triples (i,j,k) produce surjections, and establish certain algebraic equivalences among them. For the knot enthusiast, when the ground field is real, this procedure supplies a vast array of knots parametrized by polynomials; a table of knot types associated with low-degree embeddings is given. By specializing generic matrices in a similar way, we obtain polynomials $F_n(x,y) \in \mathbb{Z}[x,y]$, which are the bivariate analogues of the Chebyshev polynomials. These define natural epimorphisms $\mathbf{k}[x_1,x_2,y_1,y_2,z] \to \mathbf{k}[u,v]$.

Biography

Freudenburg received his PhD in 1992 from Washington University in St Louis under the direction of David Wright.



Since 2006, he has held the position of Professor of Mathematics at Western Michigan University, where he currently serves as Department Chair. His work has focused on the role of locally nilpotent derivations in affine algebraic geometry, and his book, "Algebraic Theory of Locally Nilpotent Derivations", appeared in 2006. Of particular note are Freudenburg's contributions to examples relating to Hilbert's Fourteenth Problem, locally nilpotent derivations in dimension three, and exotic embeddings of Danielewski surfaces. He has written several papers in collaboration with Daniel Daigle and Lucy Moser-Jauslin.

11.15 - 11.45

Multidegree of tame automorphisms of $\mathbb{C}^n$.

Marek Karas

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abstract

By multidegree of polynomial mapping $(F_1,...,F_n)$ we mean the sequence $(\deg F_1,\ldots,\deg F_n)$. We show that there is no tame automorphism of $\mathbb{C}^3$ with multidegree $(3,4,5)$. We also give a characterization of sequences of the form (p_1,p_2,d_3), where p_1,p_2 are prime numbers, such that there is a tame automorphism of $\mathbb{C}^3$ with muldidegree (p_1,p_2,d_3). We, also, show some other remarks about multidegrees of tame automorphisms.

11.55 - 12.15

Automorphisms over finite fields as bijections

Roel Willems

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abstract

In 1994 during a conference in Curaçao, Harm Derksen proved that $\mathrm{TA}_n(k) = \langle \mathrm{Aff}_n(k), \varepsilon \rangle$, for k a field of characteristic zero, $n \geq 3$ and $\varepsilon = (x_1 + x_2^2, x_2, \ldots, x_n)$. I will show that something similar, but weaker, holds for k a finite field. Namely the group $\mathrm{DA}_n(k) = \langle \mathrm{Aff}_n(k), \tilde{\varepsilon} \rangle$ and $\mathrm{TA}_n(k)$ generate the same group of bijections of l^n, where $\tilde{\varepsilon} = (x_1 + x_2^{p-1} \cdots x_n^{p-1}, x_2, \ldots, x_n)$, $\mathrm{char}(k) = p$ and l a field extension of k.

12.15 - 12.35

Mimicking automorphisms over finite fields by tame automorphisms

Stefan Maubach

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abstract

One may hope that one can prove the non-tameness of an automorphism of $\mathrm{GA}_n(\mathbb{F}_p)$ by studying its induced bijection of $\mathbb{F}_q \longrightarrow \mathbb{F}_q$ where $q = p^m$. If this bijection is not in the group of bijections generated by $\mathrm{TA}_n(\mathbb{F}_p)$ then the map is non-tame.

In this talk I will show that this approach cannot work for many examples like the Nagata automorphism. Or, said more positively, I will show that in some cases it is enough to consider the tame automorphisms if you are interested in understanding the bijections induced by automorphisms.

12.40 - 13.00

A (de) Bond(t) Story

Arno van den Essen

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abstract

I will give a overview of some of the highlights of de Bondts Ph.D thesis. I present it in a light vein in such a way that also students can understand it completely.

WEDNESDAY, 8th of July

9.45 - 10.15

On a weak Zariski cancellation problem

Wlodzimierz Danielewski

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abstract

By the weak form of Zariski cancellation problem we mean the following question: are affine varieties X and Y isomorphic, if $X \times \mathbb{A}^1$ is isomorphic to $Y \times \mathbb{A}^1$? This lecture is mostly of historical nature, describing a method of obtaining counterexamples to the problem. It is based on the 1988 preprint "On a Cancellation Problem and Automorphism Group of Affine Algebraic Varieties" and some examples omitted in the original preprint.

Biography

Danielewski studied at the university of Warsaw, Poland. He received his Ph.-D. from the Institute of Mathematics of the Polish Academy of Sciences in 1987. He did mathematical research in algebraic geometry and combinatorics, and held (visiting) positions at University of Bochum and the Economy department of the Instite of Computer Science of the Polish Academy of Sciences. Currently he is employed by Hewlett-Packard as a technical consultant.
Danielewski was the first to notice the counterexamples to the generalized cancellation problem. He showed that the surface $xy+z^2+1$ and x^2y+z^2+1 were not isomorphic, but cylinders over these surfaces are isomorphic. This (unpublished!) result has given rise to many, many follow-ups, and nowadays the term "Danielewski surface" is omnipresent in AAG.

10.25 - 10.55

Nagata's type automorphisms as the exponents of three root localy nilpotent derivations

Y. Bodnarchuk

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abstract

Locally nilpotent derivations from sa_n which is a Lie algebra of the special affine Cremona group are investigated in a connection with the root decomposition of sa_n relative to the maximal standard torus. It is proved that all root locally nilpotent derivations are elementary ones. In the sequential research locally nilpotent derivations which are sums of two and three root ones are described. The last type of derivations is most interesting because the well known Nagata's and Anick's exotic automorphisms of polynomial algebra can be obtained as the exponents of such derivations. With an application of the I. Shestakov's and Umirbaev's results it is proved that the exponents of nearly all obtained three root derivations are wild automorphisms of a polynomial algebra in three variables.

11.25 - 11.55

Affine T-varieties of complexity one and locally nilpotent derivations

Alvaro Liendo

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abstract

Let $X = specA$ be a normal affine variety over an algebraically closed field k of characteristic 0 endowed with an effective action of a torus of dimension n. Let also D be a homogeneous locally nilpotent derivation on the normal affine $\mathbb{Z}^n$-graded domain A, so that D generates a k_+-action on X. In this talk we will provide a complete classification of pairs (X,D) in two cases: for toric varieties $(n = dimX)$ and in the case where $n = dimX - 1$. This generalizes previously known results for surfaces due to Flenner and Zaidenberg. As an application we show that $ker(D)$ is finitely generated. Thus the generalized Hilbert's fourteenth problem has a positive answer in this particular case, which strengthen a result of Kuroda. As another application, we compute the homogeneous Makar-Limanov invariant of such varieties. In particular we exhibit a family of non-rational varieties with trivial Makar-Limanov invariant.

12.05 - 12.35

Factorial affine threefolds with isomorphic cylinders

David Finston

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abstract

The affine cancellation problem asks whether complex affine varieties X, Y with isomorphic cylinders, i.e. $X \times \mathbb{C} \cong Y \times \mathbb{C}$, are themselves isomorphic. It has a positive solution for $X = \mathbb{C}^2$, but counterexamples are found among normal but nonfactorial surfaces (Danielewski surfaces). Counterexamples are also found among factorial threefolds. These examples all have logarithmic Kodaira dimension equal to 1, and so are remote from $\mathbb{C}^3$, the first unknown case where the base of one cylinder is an affine space. The class of factorial affine threefolds $X_{m,n}$, $m,n > 0$ with defining equations $x^n v - y^m u = 1$ have isomorphic cylinders and are in some some sense closer to $\mathbb{C}^3$ (e.g. all have negative logarithmic Kodaira dimension). It turns out that some members of the class are isomorphic as abstract varieties, but it is unknown whether any members of the class constitute counterexamples to cancellation.

14.00 - 14.30

A Deformation of Commutative Polynomial Algebras in Even Number of Variables

Wenhua Zhao

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abstract

We first introduce a deformation of commutative polynomial algebras in even number of variables. We then show that, even though the deformation is trivial in sense of deformation theory, it does have some interesting connections with the (generalized) Laguerre orthogonal polynomials and also with the well-known Jacobian conjecture.

14.40 - 15.00

Tameness of automorphisms over Artinian rings

Joost Berson

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abstract

Let K be a field. The famous Jung - Van der Kulk Theorem states, that all automorphisms of the polynomial ring $K[x,y]$ are tame, i.e. a composition of linear and elementary automorphisms. But what if K is replaced by a general Artinian ring R? In case R is also a $\mathbb{Q}$-algebra, all automorphisms are tame. (And stably tame for a general Artinian ring.) This recent result by D. Wright, A. van den Essen and the speaker was crucial for the result that all automorphisms of $K[x,y,z]$ of the form $(f(x,y,z), g(x,y,z), z)$ are stably tame, using only 3 new variables in case of characteristic 0. We will examine the structure of the automorphism group

of $R[x,y]$, where R is an Artinian $\mathbb{F}_p$-algebra, and give an example of a non-tame automorphism.

15.20 - ±16.15

Discussion on the future of Affine Algebraic Geometry

Before 1970, traditionally, algebraic geometry meant the study of projective varieties. It is sometimes stated that algebraic geometry of the affine space was born sometime around 1970. Since that time the topic of "Affine Algebraic Geometry" (short AAG) has slowly but surely grown into a separate subtopic, which was underlined by the new AMS classification in 2000 for AAG.

So, AAG has taken a flight. But perhaps it is time to take a step back and discuss where AAG is going. For example, there are several roads the future can take. AAG will keep growing. Tools from AAG will become standard for many mathematicians from other fields. AAG will stagnate and become an old, lost and forgotten subject. AAG will become superfluous once a few big problems are solved. Just to mention a few.

We will discuss this by posing a few prickly statements. There will be a small panel that will pull the discussion.

±16.15- ±18.00

Open problem session

The previous session will sort of smoothly transform into an open problem session.

THURSDAY, 9th of July

9.45 - 10.45

Constructing some Hurwitz curves with given automorphism group

A. Cohen

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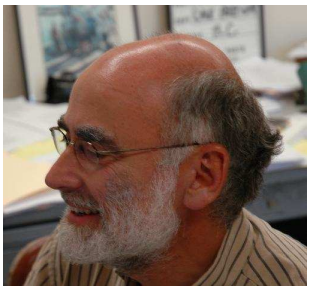
abstract

The Klein curve is the unique Hurwitz curve of genus 3 with automorphism group $\mathrm{PSL}(2,7)$. The MacBeath curve is the unique Hurwitz curve of genus 7 with automorphism group $\mathrm{PSL}(2,8)$. There are three Hurwitz curves of genus 14 with automorphism group $\mathrm{PSL}(2,13)$. We show how these curves can be constructed by affine algebraic methods. We also look at these constructions from the perspective of Riemann surfaces. This is joint work with Maxim Hendriks.

Biography

Cohen obtained his Ph. D. degree in 1975 under guidance of T. A. Springer.



After having worked at, amongst others, Technical University Twente, CWI, and University of Utrecht, he became a full professor of Discrete Mathematics at the Technische Universiteit Eindhoven (TU/e). He currently is the dean of the Department of Mathematics and Computer Science at TU/e, chairman of the board of the research school EIDMA, and chairman of the Dutch mathematics cluster DIAMANT. Cohen's main scientific contributions are in groups and geometries of Lie type,
and in algorithms for algebras and their implementations. He is also known for his work on interactive mathematical documents. Sixteen students have received a Ph.D. under his supervision. Currently, he is or has been on the editorial board of six research journals and the ACM book series of Springer-Verlag. He published 111 research papers, coauthored four books, and (co-)edited another eight.

11.15 - 11.45

Minimal polynomial of a locally finite automorphism

Jakub Zygadlo

Jagiellonian University, Poland
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abstract

Polynomial automorphism F of the affine space K^n is locally finite iff there exist univariate polynomial p such that $p(F) = 0$. We will present methods for calculating the minimal polynomial p (i.e. one with the lowest degree) for F in some special cases.

11.55 - 12.25

TBA

Peter van Rossum

Radboud University, The Netherlands
petervr@cs.ru.nl

abstract

TBA

14.00 - 15.00

On Jacobian pairs

L. Makar-Limanov

Wayne State University, USA
lml@wayne.edu

abstract

Let f and g be a Jacobian pair from $C[x,y]$. In my talk I will discuss properties of the Newton polytope of an algebraic dependence of x, f and g.

Biography

Professor Makar-Limanov received his Ph. D. from Moscow State University in 1970. He has been employed by Wayne State University, Detroit USA, since 1981, of which full professor since 1989.

He is famous for several results: his second publication hails from 1970 determining the automorphism group of the free algebra in two variables over a field. In non-commutative algebra he is well-known for his research on the Weyl algebra, and the construction of the now-called Makar-Limanov skew field.In AAG he is best known for the Makar-Limanov invariant, which was used to prove for the first time that the Koras-Russell threefold $x^2y+x+z^2+t^3$ was not isomorphic to affine 3-space, but there are many well-known, mainly algebraic techniques and objects, that do not bear his name, like the concept of a Jacobian derivation and the related theorems.
He is a master of the use of gradings on algebras, which is one of the main tools to compute the Makar-Limanov invariant.

15.30 - 16.00

The Automorphism group of the Koras-Russell cubic threefold

Lucy Moser-Jauslin

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abstract

The Koras-Russell cubic threefold X is a three-dimensional smooth affine complex contractible variety. It was shown by Makar-Limanov that X is not isomorphic to affine three-space. This was done by studying the locally nilpotent derivations on the coordinate ring of X. We will use this result to determine the automorphism group of X. It is shown, in particular, that X can be embedded in affine four-space in two different ways : one in which all automorphisms extend to automorphisms

of the four-space, and one for which there are automorphisms which do not extend algebraically. This work was done with A. Dubouloz and P.M. Poloni.

16.10 - 17.10

Exceptional polynomials

Hendrik Lenstra

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abstract

Exceptional polynomials are polynomials in one variable over a finite field that permute the field and that have, imprecisely speaking, a good reason to do so. The lecture forms a first introduction to the subject, emphasizing the connection with permutation groups.

Biography

Hendrik W. Lenstra received his Ph.D. in mathematics from the Universiteit van Amsterdam in 1977. He was a full professor at Amsterdam from 1978 until 1986 and at the University of California at Berkeley from 1987 until 2003. Since 1998 he has been at the Universiteit Leiden in the Netherlands.

Lenstra is active in number theory and algebra, and he is best known for introducing advanced techniques in the area of number-theoretic algorithms. His many contributions to primality testing and factorisation include the invention of the elliptic curve method for factoring integers. Also, he was the first to notice how elliptic curves can be implemented in cryptography. In addition, he is the middle L of the LLL lattice basis reduction method, which found numerous applications in both pure and applied mathematics. With the influential Cohen-Lenstra heuristics he left his mark in algebraic number theory.
Among his many prizes are his receipt of the Fulkerson Prize of the AMS in 1985, the Spinoza Award in 1998 (the highest scientific honor in the Netherlands), and the receival of an Academy Professorship from the Royal Dutch Academy of Science in 2007.

FRIDAY, 10th of July

9.45 - 10.45

Commutator Formulas for Polynomial Automorphisms

David Wright

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abstract

Two simple formulas involving commutators and stabilization are one of the keystones to the proof that all two dimensional automorphisms over a regular ring are stably tame. We will discuss these formula, explain the role they play in the proof, and ponder whether additional formulas of this type might lead to further tameness results.

Biography

Wright got his Ph.-D. from Columbia University in 1975 under the guidance of H. Bass. In that same year he became assistant professor at Washington University, St. Louis, eventually becoming full professor in 1993. Among others he worked in K-theory and AAG, being very influential in the latter. Some of his best known results are on local polynomial algebra, tree formulas for the inversion of a polynomial automorphism, and on subgroups of the automorphism group in dimension two. He is author of the frequently quoted "Bass-Connel-Wright" paper on the Jacobian Conjecture.

Currently, Wright is chairman of the math department of Washington University. Recently he was elected "member at large" of the AMS

11.15 - 11.45

The group of automorphisms of the algebra S_n of one-sided inverses of a polynomial algebra.

Vladimir Bavula

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abstract

The algebra in the title belongs to a class of algebras like the polynomial algebra in $2n$ variables and the n'th Weyl algebra. We found the group of automorphisms of the algebra S_n, it is huge. In the case $n = 1$, it looks like the the group of polynomial automorphisms in the case of two variables or the group of automorphisms of the first Weyl algebra.

11.55 - 12.25

Generic $\mathbb{A}^1$-fibrations on smooth quasi-projective surfaces are $\mathbb{A}^1$-bundles.

Adrien Dubouloz

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abstract

A generic $\mathbb{A}^1$-fibration on an algebraic surface S is is a faithfully flat $\pi : S \to C$ over a curve C, with generic fiber isomorphic to the affine line over the function field of C. If S is smooth, I will explain how to factor this fibration through a locally trivial $\mathbb{A}^1$-bundle over a suitable algebraic space, which, in general, is not a scheme.

14.00 - 14.30

Cancellation for 2-dimensional UFDs

Anthony Crachiola

Saginaw Valley State University, USA
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abstract

If A and B are 2-dimensional affine UFDs over an algebraically closed field such that $A[x] \cong B[x]$, then $A \cong B$. I will give a short algebraic explanation and discuss distinctions between the characteristic 0 and characteristic p cases.

14.40 - 15.10

Rings of constants of derivations and p-bases

Piotr Jedrzejewicz

Nicolaus Copernicus University, Poland
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abstract

We present various sufficient conditions and necessary conditions for elements of a domain of characteristic $p > 0$ to form a p-basis of a ring of constants (i.e. kernel) of a derivation. We discuss equivalencies of some conditions in special cases and present counter-examples. We also discuss analogies with the zero characteristic case.

15.40 - 16.10

$\mathbb{Q}$-homology planes as cyclic covers of $\mathbb{A}^2$

Alok Kumar Maharana

Tata Institute of Fundamental Research, India

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abstract

We classify all $\mathbb{Q}$-homology planes which arise as cyclic covers of $\mathbb{A}^2$.

16.20 - 16.50

On divergence-free Jacobian maps

M. Sabatini

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abstract

Complex divergence-free jacobian maps were proved to be globally invertible by J. Neuberger (2006). We prove that real divergence-free jacobian maps are shear maps, i. e. their nonlinearity depends on a single variable, up to a linear change of variables.

16.50 - $\pm$17.15

Closure

Here we wish you a pleasant trip home, and will hope that you had a wonderful time!

SATURDAY, 10th of July

Hike through the "Hatertse Vennen" (unofficial program)

The official program has ended. On this day we make a hike through the "Hatertse Vennen" near Nijmegen. No special shoes are required, though depending on weather predictions it might be wise to bring a raincoat or umbrella. Probably the hike starts at about 1-2 o'clock, and last for approx. 3 hours. During the hike, there's no opportunity to buy food and drinks (except at the end), so remember to bring some if you want to drink/eat along the way. We end the hike at a Dutch pancake restaurant (which differs a lot from the American breakfast pancake places!), where we will eat.

4. LUNCHES

You can have lunch in the Huygens building in the central hall. There you can buy sandwiches or one small meal (no choice). You can also walk to ”the Refter” (see route description & map below) which has a choice of warm meals.

You have max 5 coupons that are worth up to 5 euro, which you can use to spend on lunch. If you buy more than 5 euro you have to pay the rest (or use another coupon). If you spend less than 5 euro, you’ll not get refunds.

5. Restaurants

Because even mathematicians have to eat, we will include a short list of restaurants and places to go for diner. I (Roel) have eaten at most of them and they all serve very good food. In most of these restaurants a main course costs between 15 and 25 euro. For People with limited spending money I can especially recommend *Eetcafé De Muis*, which is a student restaurant and serves main courses for aproximately 10 euro. Bon appétit!

Restaurant Popocatepetl

A very good restaurant that serves mainly mexican food.
Prizes are between 15 and 20 euro, for a main course.
Van Welderenstraat 92
6511 MS Nijmegen
024 3230155

Restaurant Romagna

A nice Italian restaurant.
Prizes for a main course are between 10-20 euros.
In de Betouwstraat 6
6511 GC Nijmegen
024 3232394

Eetcafé De Muis

A studentrestaurant, quick, cheap but very good food (mainly french).
Prizes of a main course are between 10-15 euros.
Tweede Walstraat 163-165
6511 LT Nijmegen
06 42994271

Restaurant De Hemel

Here they serve the food Brazilian style:Churrascaria!
27,50 pp
Franseplaats 1
6511 VS Nijmegen
024 3656394

Restaurant De Spil

French cuisine.
And a bit more expensive, but very good! (15-30 euro for a main course).
Van Welderenstraat 58
6511 MP Nijmegen
024-3229138

Bistro De Bok

A cosy little bistro, serving mostly french dishes.
A main course goes for aproximately 15-20 euros.
In de Betouwstraat 14
6511 GC Nijmegen
024 3225540

Eetcafé De Plak

A very popular restaurant in Nijmegen.
Main course 15-25 euros.
Bloemerstraat 90
6511 EM Nijmegen
024 3222757

Restaurant Dionysos

A greek restaurant.
Main course 15-25 euro.
Bloemerstraat 1
6511 EB Nijmegen
024 3225853

Restaurant Humphreys

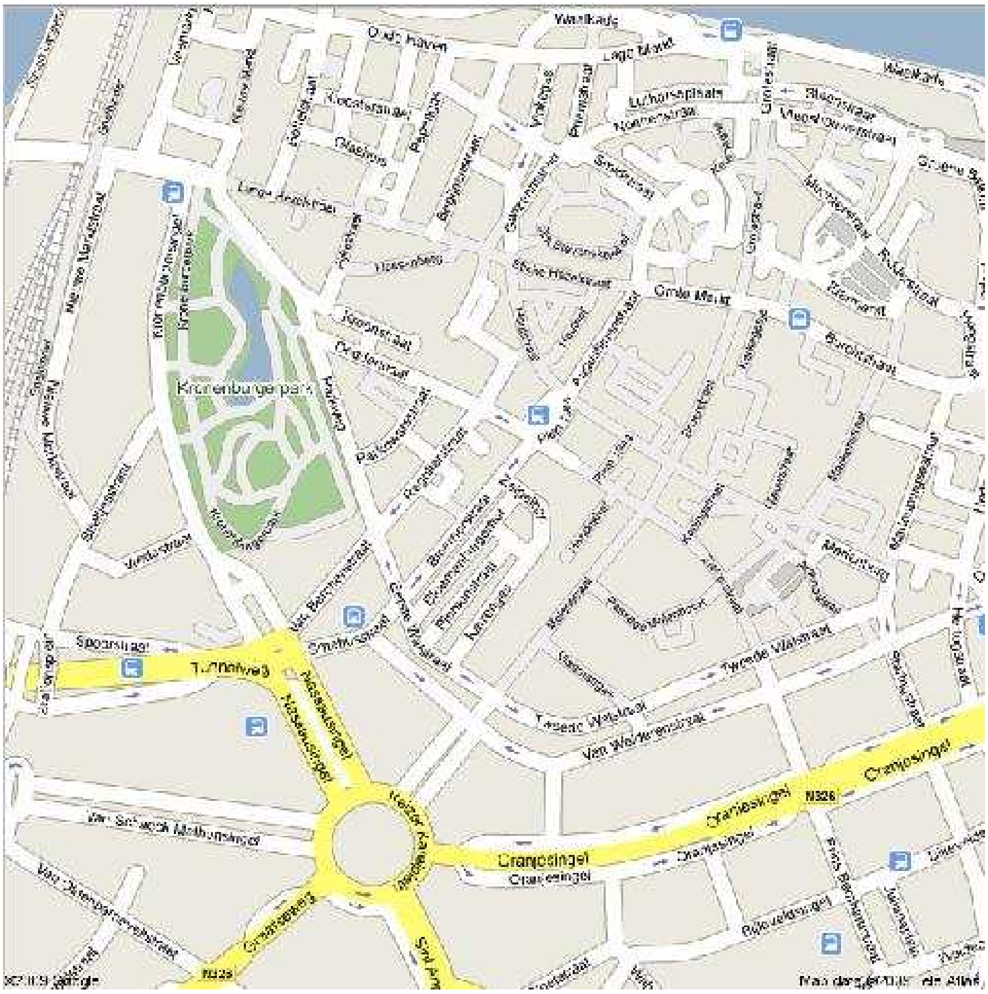
A very nice restaurant at the riverside of the Waal.
Main course 15-30 euro.
Vismarkt 7
6511 VJ Nijmegen
024 3602880

Restaurant De Ontmoeting

A tapas restaurant, just outside the center.
Graafseweg 27
6512 BM Nijmegen
024 3230466

6. MAP OF NIJMEGEN

Nijmegen



The centre of Nijmegen

7. ROUTES

From the trainstation *Nijmegen Central* to the Huygensbuilding:

To get from the trainstation *Nijmegen Central* to the Huygensbuilding take bus 10 (Heyendaalshuttle) or the veolia train in the direction Venlo/Roermond (leaves from platform 35) and get of at the trainstation *Nijmegen Heyendaal*. Walk towards the main road (Heyendaalse weg) and turn right. You can see the Huygens building a few hundred meters down the road on the other side of the road.
(It's the green one!) The entrance is between the second and third wing.

From the trainstation *Nijmegen Central* to the Rozenhof

To get from the trainstation *Nijmegen Central* to The Rozenhof you have to take bus 5a in the direction of Groesbeek and get off at the stop Pannovenlaan. The Rozenhof is just across the street from the busstop.
Another option is to take the veolia train towards Venlo/Roermond and get of at the trainstation *Nijmegen Heyendaal*. It is aproximately a 20 minute walk from there to the Rozenhof.

You can either follow the dark or the slightly lighter line on the map.
Note that the darker line is also the route to get from the Rozenhof to the Huygens-building on Monday.

From the trainstation *Nijmegen Central* to Jozef Steenbrinks home

Jozefs house is very near to the trainstation *Nijmegen Heyendaal*. See the map above, it is at the black circle. adress:
Heyendaalseweg 107
6524 Nijmegen.

To the Refter

The Refter is next to the Erasmus tower. Leaving the Huygens building through the main entrance, turn left and after the busstop cross the street.

It is at the Erasmusplein, ont the map below.