HỘI NGHỊ ĐẠI SỐ-HÌNH HỌC-TÔ PÔ
ĐÀ LẠT, 24-26/11/2003

TÓM TẮT
BÁO CÁO KHOA HỌC

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Cơ quan tổ chức: Viện Toán học và Đại học Đà Lạt.

Cơ quan tài trợ: Hội đồng chuyên ngành Toán thuộc Chương trình Nghiên cứu Khoa học cơ bản Nhà nước, Đề tài nghiên cứu cơ bản "Một số hướng nghiên cứu hiện đại về Đại số-Hình học-Tô pô".

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Trần Tuấn Minh	ĐH Đà Lạt
Huỳnh Mùi	ĐHDL Thăng Long
Trần Ngọc Nam	ĐH KHTN Hà Nội
Trần Tuấn Nam	Dự bị ĐH Nha Trang
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Dương Quốc Thái	Tp HCM
Đỗ Đức Thái	ĐHSP Hà Nội
Chu Trọng Thanh	ĐH Vinh
Lê Khắc Thành	ĐHSP Hà Nội
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LINEAR COMPACTNESS AND $AB5^*$

Pham Ngoc Anh
Institute of Mathematics, Hungary

We survey our related results, mainly with D. Herbera and C. Menini in this topic in the last few years.

CHARACTERIZATIONS OF SUBSPACES AND QUOTIENTS OF $\ell^\infty(I)\hat{\otimes}_\pi L_f(\alpha,\infty)$ AND $\ell^1(I)\hat{\otimes}_\pi L_f(\alpha,\infty)$-SPACES

Pham Hien Bang
Thainguyen University of Education

In series of important papers D. Vogt and M. J. Wagner studied chracterizations of subspaces and quotients of nuclear power series spaces. Later Apiola has given a characterization of subspaces and quotients of nuclear $L-f(\alpha,\infty)$-spaces. He proved that a Frechet space E is isomorphic to a subspace (resp. quotient) of a stable nuclear $L_f(\alpha,\infty)$-space if and only if E is $\Lambda(f,\alpha,\mathbf{N})$-nuclear in the sense of Ramanujan and Rosenberger and $E\in D_3(f)$ (resp. $D_4(f)$). In this note we consider the Apiola's result for the non-nuclear case.

NON-PROPER VALUE SET AND THE JACOBIAN CONDITION

Nguyen Van Chau
Institute of Mathematics

The non-proper value set of a nonsingular polynomial map from $\mathbb{C}^2$ into itself, if non-empty, must be a curve with one point at infinity.

dd-SEQUENCE ON SOME CERTAIN CLASSES OF MODULES OVER LOCAL RINGS

Đoàn Trung Cường
Institute of Mathematics

In [1] we give a new notion of sequences called dd-sequences which is an extension of standard system of parameters. The existence of dd-sequence is

equivalent to the existence of p-standard system of parameters which plays an important role in Macaulayfication done by T. Kawasaki. However, it is not true that every finitely generated module over a local ring has a p-standard system of parameters. In this paper, we will establish the existence of systems of parameters of dd-sequence kind in cases of sequentially Cohen-Macaulay modules and sequentially generalized Cohen-Macaulay modules.

References
[1] N. T. Cuong and D. T. Cuong, On dd-sequences and partial Euler-Poincaré charateristics of Koszul complex, preprint.

Jointly with Nguyen Tu Cuong

ON THE COMPACT IMBEDDING OF SYMMETRIC SPACES $SL(n,\mathbb{R})/SO(n,\mathbb{R})$

Tran Dao Dong
Hue University

Let $G = SL(n,\mathbb{R})$ be the real semisimple Lie group consists of $n \times n$ real matrices of determinant 1. Denote by θ the Cartan involution defined by $\theta(g) = ({}^tg)^{-1}$, $\forall g \in G$ and by $K = SO(n,\mathbb{R})$ the compact subgroup in G with respect to θ. The coset space $\mathcal{P}_n = G/K$ is then a Riemannian symmetric space of non-compact type.

The purpose of this note is to directly apply our construction for Riemannian symmetric spaces to define a compactification of the symmetric space $\mathcal{P}_n$. The construction is based on the action of the Weyl group. By this way, we will construct a compact real analytic manifold in which the symmetric space $\mathcal{P}_n$ realized as an open orbit and that G acts analytically on it.

Our construction is similar to those of Schlichtkrull, Oshima for Riemannian symmetric spaces and similar to those of Kosters, Shekiguchi for symmetric spaces of rank 1.

ON THE TOP LOCAL COHOMOLOGY MODULES

Nguyen Thi Dung
Thainguyen University

Let $(R,\mathfrak{m})$ be a Noetherian local ring and M be a finitely generated $R-$module with $\dim M = d$. It is well known that the top local cohomology $H^d_{\mathfrak{m}}(M)$ of M is Artinian $R-$module. In this article, some necessary and sufficient conditions to

have $\mathrm{Ann}(0 : H^d_{\mathfrak{m}}(M)\mathfrak{p}) = \mathfrak{p}$ for all prime ideals $\mathfrak{p} \supseteq \mathrm{Ann}H^d_{\mathfrak{m}}(M)$ are given. Then we apply this result to describe the structure of some non-catenary Noetherian local domain constructed by Brodmann.

Jointly with Nguyen Tu Cuong and Le Thanh Nhan

THE MOD 2 EQUIVARIANT ORLIK SOLOMON ALGEBRA OF COMPLEMENT

Nguyen Viet Dung
Institute of Mathematics

In the talk we study if the equivariant Orlik Solomon algebra of a real arrangement is determined by its combinatorics data.

ON WEAKLY HYPERBOLIC SPACES AND A CONVERGENCE-EXTENSION THEOREM IN WEAKLY HYPERBOLIC SPACES

Pham Viet Duc
Thainguyen University of Education

In this article we prove some properties of the weakly hyperbolic spaces. Moreover, a convergence-extension theorem for analytic hypersurfaces in weakly hyperbolic spaces is given.

ON SOME HERSTEIN'S CONJECTURE

Bui Xuan Hai
University of Natural Sciences - VNU. HCM

Let D be a division ring with the center F and D^* denotes the multiplicative group of D. We say that D is *centrally finite* provided D is a finite dimensional vector space over F. A subgroup H of D^* is said to be *radical over* F if for every $x \in H$, there exists some positive integer $n(x)$ such that $x^{n(x)} \in F$.

In 1978 I. N. Herstein [1] conjectured that, if H is a normal subgroup of D^* and H is radical over F, then $H \subseteq F$. He showed that the conjecture is true if D is centrally finite. However, in general, it remains still open problem. Here, we replace "normal" by "subnormal" in the above conjecture and show that the

resulting conjecture is also true in the finite dimensional case. This is really a generalization of Herstein's result. The details of our proof may be seen in [2].

References

[1] I. N. Herstein, *Multiplicative commutators in division rings*, Israel Journal of Math., 31, 2(1978), 180-188.

[2] Bui Xuan Hai, Le Khac Huynh, *On subnormal subgroups of the multiplicative group of a division ring*, Vietnam Journal of Mathematics, to appear.

DEFORMATION QUANTIZATION ON K-ORBITS AND UNITARY DUAL OF $SL(2,\mathbb{R})$

Đỗ Đức Hạnh
Institute of Mathematics

We consider two following problems:

Problem 1: Classify all unitary irreducible representations of SL(2,$\mathbb{R}$) (up to an isomorphism).

Problem 2: Classify all quantum mechanic systems admitting symmetric group $SL(2,\mathbb{R})$.

To attach these problems, we use orbit method of Kirillov and theory of deformation quantization of Fedosov on K-orbits of $SL(2,\mathbb{R})$.

Jointly with Do Ngoc Diep

PARAMETRICAL CHARACTERIZATIONS FOR PSEUDO AND SEQUENTIALLY COHEN-MACAULAY MODULES

Nguyen Thai Hoa
Quynhon University of Education

Throughout this note, let $(A,\mathfrak{m})$ be commutative Noetherian and M a finitely generated A-module with $\dim_A M = d$. We denote by

$$Q_M(\underline{x}) = \bigcup_{t>0} \left((x_1^{t+1},\ldots,x_d^{t+1})M : x_1^t \ldots x_d^t\right)$$

where $\underline{x} = (x_1,\ldots,x_d)$ is a systems of parameters on M.

Consider the difference

$$J_{M,\underline{x}}(\underline{n}) = n_1 \ldots n_d e(\underline{x};M) - l_A\big(M/Q_M(\underline{x}(\underline{n}))\big)$$

as a function in $\underline{n}$, where $\underline{x}(\underline{n}) = (x_1^{n_1}, \ldots, x_d^{n_d})$ and $\underline{n} = (n_1, \ldots, n_d)$ is a $d-tuple$ of positive integers. Then it is known that in general $J_{M,\underline{x}}(\underline{n})$ is not a polynomial for large enough $\underline{n}$. But the least degree of all polynomials in $\underline{n}$ bounding above the function $J_{M,\underline{x}}(\underline{n})$ is independent of the choice of $\underline{x}$. This invariant of the module M is denoted by $pf(M)$. A module M is called a *Pseudo Cohen-Macaulay module* if $pf(M) = -\infty$. Moreover a sequentially Cohen - Macaulay module, which is defined by Staley for graded modules and by Schenzel for the non graded case, is also a pseudo Cohen - Macaulay module.

The purpose of this note is to characterize pseudo Cohen - Macaulay and sequentially Cohen - Macaulay modules in terms of systems of parameters.

VỀ BỘI CỦA CÁC ĐẠI SỐ REES CỦA CÁC IĐÊAN ĐỊNH NGHĨA CỦA CÁC CUỘN CHUẨN HỮU TỶ

Nguyễn Đức Hoàng
Đại học Sư Phạm Hà Nội

Cho c, d là các số nguyên dương với $c \geq d$. Giả sử $R := k[X_1, \ldots, X_{c+d}]$ là một vành đa thứcư trên trường k. Xét ma trận

$$\begin{pmatrix} X_1 & X_2 & \ldots & X_c \\ X_{1+d} & X_{2+d} & \ldots & X_{c+d} \end{pmatrix}$$

Giả sử I là iđêan sinh bởi 2x2 minor của ma trận này. Khi đó I là iđêan định nghĩa của một cuộn chuẩn hữu tỷ có chiều d trong $\mathbb{P}^{c+d+1}$. Ta có thể liên kết với I đại số Rees

$$R[It] := \oplus_{v \geq 0} I^v t^v.$$

Trong báo cáo này chúng tôi trình bày kết quả nghiên cứu về việc tính số bội của đại số Rees $R[It]$ và các số bội trộn của hàm Hilbert của song phân bậc tự nhiên của $R[It]$ trong trường hợp $d = 1$.

Jointly with Ngo Viet Trung

ON $\overline{T}$-GROUPS

Tong Viet Phi Hung
Vietnam National University of HCM City

Let D be a subgroup of a group G. An intermediate subgroup H, $D \leq H \leq G$ is called $D-complete$ if $D^H = H$. A subgroup D is said to be *polynormal* in

G if $D^{<x>}$ is $D-complete$ for each element x in G. In this paper, we study the properties of groups with only polynormal subgroups. We establish the connection between such groups and the so called $\overline{T}-groups$, i.e, the groups, in which the normality is a transitive relation. Let D be a subgroup of a group G. It is well known that all pronormal, weakly pronormal, paranormal, and normal subgroups are polynormal subgroups. A group G is said to be a $T-group$ if every subnormal subgroup of G is normal. Clearly, G is a $\overline{T}-group$ if each subgroup of G is a $T-group$. $\overline{T}$-groups are studied by many authors. In particular, in [2] it was proved that a finite group G is a soluble $\overline{T}$-group iff it is a group with only polynormal subgroups. In [3], this result is was carried over to FC-groups (i. e. a group with finite conjugacy classes of elements). In fact, for an FC-group G, it was proved that, G is a soluble T-group iff every cyclic subgroup of G is pronormal in G. Here, we will prove that an arbitrary groups G is a $\overline{T}$-group if and only if all its cyclic subgroups are polynormal in G. Next, we prove that, an $FC-group$ is a soluble $T-group$ if and only if all its cyclic subgroups are polynormal. This is a really generalization of the results mentioned above. Finally, some generalization of Theorem A in [1] for $FC-groups$ was also obtained.

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[3] F. D. Giovani, G. Vincenzi, *Pronormality in Infinite Groups*, Mathematical Proceedings of the Royal Irish Academy, 100A(2), 198-203(2000).

Jointly with Bui Xuan Hai

THE COHOMOLOGY OF THE STEENROD ALGEBRA AND REPRESENTATIONS OF THE GENERAL LINEAR GROUPS

Nguyễn Hữu Việt Hưng
Hanoi University of Science

Dedicated to Professor Huỳnh Mùi on the occasion of his sixtieth birthday

Let Tr_k be the algebraic transfer that maps from the coinvariants of certain GL_k-representation to the cohomology of the Steenrod algebra. This transfer was defined by W. Singer as an algebraic version of the geometrical transfer $tr_k : \pi_*^S((B\mathbb{V}_k)_+) \to \pi_*^S(S^0)$. It has been shown that the algebraic transfer is highly nontrivial, more precisely, that Tr_k is an isomorphism for $k = 1, 2, 3$ and that $Tr = \oplus_k Tr_k$ is a homomorphism of algebras.

In this talk, we first recognize the phenomenon that if we start from any degree d, and apply Sq^0 repeatedly at most $(k-2)$ times, then we get into the region, in which all the iterated squaring operations are isomorphisms on the coinvariants of the GL_k-representation. As a consequence, every finite Sq^0-family in the coinvariants has at most $(k-2)$ non zero elements. Two applications are exploited.

The first main theorem is that Tr_k is not an isomorphism for $k \geq 5$. Furthermore, Tr_k is not an isomorphism in infinitely many degrees for each $k > 5$. We also show that if Tr_ℓ detects a nonzero element in certain degrees of $\mathrm{Ker}(Sq^0)$, then it is not a monomorphism and further, Tr_k is not a monomorphism in infinitely many degrees for each $k > \ell$.

The second main theorem is that the elements of any Sq^0-family in the cohomology of the Steenrod algebra, except at most its first $(k-2)$ elements, are either all detected or all not detected by Tr_k, for every k. Applications of this study to the cases $k = 4$ and 5 show that Tr_4 does not detect the three families g, D_3, p' and Tr_5 does not detect the family $\{h_{n+1}g_n |\ n \geq 1\}$.

INVARIANTS OF 3-MANIFOLD AND INTEGRAL OF TRANSCENDENT FUNCTIONS

Vu The Khoi
Institute of Mathematics

Recently, people have shown that value of certain transcendent integral over an algebraic curve is related hyperbolic volume of knot complement and in certain cases this helps to express Mahler measure of a polynomial in terms of special value of L-functions. In this talk we show that the Chern-Simons type invariant of knot complement can be use to get the **exact** value of certain transcendent integral. The question about the number theorectical meaning of this integral is still open.

THE VANISHING OF SOME ANDRE-QUILLEN HOMOLOGY

Cristodor Ionescu
Rumania

Andre-Quillen homology is used to characterize several classes of noetherian rings and morphisms between noetherian rings. The vanishing of one special module of Andre-Quillen homology is studied and some applications are presented.

UPPER BOUND FOR THE CASTELNUOVO-MUMFORD REGULARITY OF ASSOCIATED GRADED MODULES

Cao Huy Linh
Hue University

We give an upper bound for the Castelnuovo-Mumford regularity of associated graded modules in terms of dimension and extanded degree. This result extends the bound for regularity of the associated graded ring of Rossi, Trung and Valla.

BLOWING-UP CHARACTERIZATION OF PSEUDO COHEN MACAULAY AND PSEUDO BUCHSBAUM MODULES

Nguyen Thi Hong Loan
Vinh University

Let $(A, \mathfrak{m})$ be a commutative Noetherian local ring and M a finitely generated $A-$module. In this talk, we show that the Rees module $R_{\mathfrak{q}}(M)$ and the associated graded modules $G_{\mathfrak{q}}(M)$ is pseudo Cohen Macaulay (resp. pseudo Buchsbaum) whenever M is pseudo Cohen Macaulay (resp. pseudo Buchsbaum) and $\mathfrak{q}$ is a parameter ideal of M.

Jointly with Nguyen Tu Cuong and M. Morales

DENSITY OF MORSE FUNCTIONS ON SETS DEFINABLE IN O-MINIMAL STRUCTURES

Ta Le Loi
University of Dalat

In this note we present a tameness property of sets definable in o-minimal structures by showing that Morse functions on a definable set form a dense and open subset in the space of $\mathcal{C}^p$ definable functions equiped with Whitney topology.

ON THE FIBERING STRUCTURE OF THE FERMAT SURFACE

Yukio Matsumoto
University of Tokyo

Let V_n be the complex hypersurface in $\mathbb{CP}^3$ defined by

$$z_0^n - z_1^n = z_2^n - z_3^n$$

This complex surface is known as the Fermat surface of degree n. From the topological viewpoint, the Fermat surfaces provide us with nice concrete examples of smooth 4-manifolds. The surface V_n has a natural holomorphic fibering structure $f : V_n \to \mathbb{CP}^1$ defined as follows:

$$f : [z_0 : z_1 : z_2 : z_3] \mapsto \begin{cases} z_2^{n-1}/z_0^{n-1} & \text{if } z_0 = z_1 \text{ and } z_2 = z_3 \\ (z_0 - z_1)/(z_2 - z_3) & \text{otherwise.} \end{cases}$$

In this talk, I would like to describe the types and the positions of all the singular fibers contained in this fibration for general $n \geq 2$. To be honest, I proved this result assuming that the number n is of the form $n = N + 1$ with the number N having the following property (*):

(*) Consider the set of $[\frac{N}{2}]$ real numbers

$$\left\{\sin\left(\frac{k\pi}{N}\right)\right\}_{k=1,2,\cdots,[N/2]}$$

Let c_1, c_2, c_3, c_4 be any elements of this set, and assume $c_1 \neq c_2$ and $c_3 \neq c_4$. Then the following conditions (i) and (ii) are equivalent:

(i)
$$\frac{c_1}{c_2} = \frac{c_3}{c_4}$$

(ii)
$$c_1 = c_3, \quad c_2 = c_4$$

Until recently, I have been conjecturing that every $N \geq 2$ has this property (*). But recently, Pho Duc Tai computed using Maple and found that there are many N's which do not satisfy (*). The smallest one is $N = 12$. Also he found that for $12 \leq N \leq 120$, N satisfies (*) if and only if N is not a multiple of 6.

CHỈ SỐ CHÍNH QUY CASTELNUOVO-MUMFORD CỦA TÍCH HAI IĐÊAN ĐƠN THỨC

Nguyễn Công Minh
Đại học Sư Phạm Hà Nội

Cho $R = k[x_1, x_2, \ldots, x_n]$ với k là một trường và I là một iđêan thuần nhất trong R. Chandler [C] đặt ra giả thuyết

$$\text{reg}(I^q) \leq q.\text{reg}(I)$$

với mọi $q \in \mathbb{N}$. Bà cũng đã chứng minh trong trường hợp $\dim(R/I) \leq 1$. Trong trường hợp tổng quát thì giả thuyết Chandler không đúng. Sturmfels [S] đã đưa ra một phản ví dụ với I là một iđêan đơn thức thoả mãn $\text{reg}(I^2) \geq 2\text{reg}(I)$. Nghiên cứu vấn đề tương tự, Conca và Herzog [C-H] đặt ra giả thuyết

$$\text{reg}(I_1 I_2 \ldots I_d) \leq \text{reg}(I_1) + \text{reg}(I_2) + \ldots + \text{reg}(I_d) \qquad (*)$$

với các iđêan I_i sinh bởi những dãy R-chính quy. Nghiên cứu vấn đề Chandler trong trường hợp đơn thức, L. T. Hoa và N. V. Trung [H-T] đã giới thiệu một phương pháp để tìm chặn trên $\text{reg}(I^q)$. Với phương pháp tương tự, chúng tôi sẽ chứng minh (*) trong trường hợp $d = 2$, I_1, I_2 là các iđêan đơn thức và $\mu(I_1) = 2$.

BOUNDS FOR COHOMOLOGICAL DEFICIENCY FUNCTIONS OF PROJECTIVE SCHEMES OVER ARTINIAN RINGS

Nguyen Duc Minh
Quynhon University

Let X be a projective scheme over an artinian commutative ring R_0 and let $\mathcal{F}$ be a coherent sheaf of $\mathcal{O}_X$-modules. We give bounds on the so called cohomological deficiency functions $\Delta^i_{X,\mathcal{F}}$ and the cohomological postulation numbers $\nu^i_{X,\mathcal{F}}$ of the pair $(X, \mathcal{F})$. As bounding invariants we use the "cohomology diagonal" $\left(h^j_{X,\mathcal{F}}(-j)\right)_{j \leqslant i}$ at and below level i and the i-th "cohomological Hilbert polynomial" $p^i_{X,\mathcal{F}}$ of the pair $(X, \mathcal{F})$. Our bounds present themselves as a quantitative and extended version of the vanishing theorem of Severi-Enriques-Zariski-Serre.

Jointly with Markus Brodmann and Carlo Matteotti

ON SINGER TRANSFER MAP

Tran Ngoc Nam
Hanoi University of Science

In this report we determine the image of the Singer transfer map in some special cases.

THE NOETHERIAN PROPERTY AND VANISHING, NON-VANISHING OF LOCAL HOMOLOGY MODULES

Tran Tuan Nam
University of Nha trang

In this report, R is a noetherian commutative ring and M is a linearly compact module over R. We defined the local homology modules $H_i^I(M)$ of M with respect to an ideal I by

$$H_i^I(M) = \varprojlim_t \operatorname{Tor}_i^R(R/I^t; M).$$

The aim of this paper is to show some properties of local homology modules.

Theorem 1. *Let $(R, \mathfrak{m})$ be a local noetherian ring and M a semi-discrete linearly compact $R-$module. Then $H_i^{\mathfrak{m}}(M)$ is a noetherian $\widehat{R}-$module for all $i \geq 0$.*

Proposition 2. *Let M be a semi-discrete linearly compact $R-$module with $NdimM = d$, then $H_d^I(M)$ is a noetherian $\Lambda_I(R)-$module.*

Proposition 3. *Let M be a linearly compact $R-$module with $NdimM = d$. Then*

$$H_i^I(M) = 0$$

for all $i > d$.

Theorem 4. *Let $(R, \mathfrak{m})$ be a local ring and M a semi-discrete linearly compact $R-$module with $NdimL(M) = d \geq 0$. Then $H_d^{\mathfrak{m}}(M) \neq 0$ and $H_i^{\mathfrak{m}}(M) = 0$ for all $i > d$.*

By using duality, we get some slight extensions of well-known properties of local cohomology modules.

Jointly with Nguyen Tu Cuong

MỘT SỐ KẾT QUẢ NGHIÊN CỨU VỀ CÁC VÀNH *CS*-NỬA ĐƠN

Mai Quý Năm
Đại học Sư phạm Quy Nhơn

CHỈ SỐ KRONECKER CỦA MA TRẬN, CÁCH TIẾP CẬN MỚI ĐỊNH NGHĨA PHƯƠNG TRÌNH VI PHÂN ĐẠI SỐ CHỈ SỐ LỚN HƠN 1

Ngô Thị Thanh Nga
Đại học Dân lập Thăng Long

Trong những năm gần đây, phương trình vi phân đại số là một lĩnh vực nghiên cứu rất được quan tâm. Được đề xuất bởi Marz vào những năm 80, khái niệm chỉ số đặc trưng cho mức độ suy biến của phương trình vi phân đại số. Trong báo cáo này, chúng tôi xây dựng một số tính chất của chỉ số Kronecker của cặp ma trận, từ đó đưa ra một cách tiếp cận mới định nghĩa phương trình vi phân đại số chỉ số lớn hơn một và khắc phục một số nhược điểm trong phương pháp của Marz.

FUZZY PHYSICS, NONCOMMUTATIVE GEOMETRY AND THE STIEFEL-GRASSMANN PARADIGM

Nguyen Dinh Ngoc
Thang Long University

Towards a more conceptual Understanding of classical and Quantum Field Theory from a novel Mathematical point of view, the author gives a (very) schematic exposition of the Mathematical Foundations and Physical Applications of Noncommutative Geometry, along the lines developed by Alain CONNES et al.: Foundations of Noncommutative Geometry and Basic Physics derived from Noncommutative Geometry, New Directions in Noncommutative Geometry and Mathematical Physics.

Then, the author sets up the STIEFEL-GRASSMANN Paradigm in Noncommutative Geometry along the tradition of Charles EHRESMANN.

Of course, the whole field is under active development and important aspects as Field Theory of (fuzzy) Extended Objects or Advances in Renormalisation Theory are only touched upon here and could only be covered in subsequent Meetings of the DAHITO Seminar.

THE FINITENESS OF CERTAIN SETS OF ATTACHED PRIME IDEALS AND THE LENGTH OF GENERALIZED FRACTIONS

Le Thanh Nhan
Thainguyen University

This is a joint work with Nguyen Tu Cuong and M. Morales. In this talk we introduce the notion of strictly f-sequences and apply this concept to study the finiteness of sets of attached prime ideals of local cohomology modules of M to study the polynomial property of the length of generalized fractions defined by R. Y. Sharp and M. Hamieh, and to characterize pseudo generalized Cohen-Macaulay modules defined by N. T. Cuong and L. T. Nhan

GEOMETRY OF PLANE CURVE VIA ALEXANDER POLYNOMIAL

Mutsuo Oka
Tokyo Metropolitan University

For a given hypersurface $V \subset \mathbf{P^n}$, the fundamental group $\pi_1(\mathbf{P^n} - \mathbf{V})$ plays a crucial role when we study geometrical objects over $\mathbf{P^n}$ which are branched over V. By the hyperplane section theorem of Zariski, Hamm-Lê, the fundamental group $\pi_1(\mathbf{P^n} - \mathbf{V})$ can be isomorphically reduced to the fundamental group $\pi_1(\mathbf{P^2} - \mathbf{C})$ where $\mathbf{P^2}$ is a generic projective subspace of dimension 2 and $C = V \cap \mathbf{P^2}$. A systematic study of the fundamental group was started by Zariski and further developments have been made by many authors. For a given plane curve, the fundamental group $\pi_1(\mathbf{P^2} - \mathbf{C})$ is a strong invariant but it is not easy to compute. Another invariant which is weaker but easier to compute is the Alexander polynomial $\triangle_C(t)$. This is related to a certain infinite cyclic covering space branched over C. Important contributions are done by Libgober, Randell, Artal, Loeser-Vaquié, and so on.

The main purpose of this talk is to give a survey for the study of the fundamental group and the Alexander polynomial. However we also give a new result on θ-Alexander polynomials. It turns out that the Alexander polynomial does not tell much about certain non-irreducible curves. A possibility of a replacement is *the characteristic variety* of the multiple cyclic covering. This theory is introduced by Libgober.

Another possibility is *the Alexander polynomial set* (§4). For this, we consider the infinite cyclic coverings branched over C which correspond to the kernel of arbitrary surjective homomorphism $\theta : \pi_1(\mathbf{C^2} - \mathbf{C}) \to \mathbf{Z}$ and we consider the *θ-Alexander polynomial*. Basic properties are explained.

CLASSIFICATION OF ELEMENTARY ABELIAN 2-SUBGROUPS OF THE ALTERNATING GROUPS

Hoàng Mạnh Quang
Hanoi University of Science

Dedicated to Professor Huỳnh Mùi on the occasion of his sixtieth birthday

Classifying elementary abelian 2-subgroups of a finite group is among the classical problems which have attracted lots of attention. The purpose of this paper is to classify maximal elementary abelian p-subgroups of the alternating groups in the case of $p = 2$. The method used in this paper is the orbit method. As far as we have known, a maximal elementary abelian 2-subgroups B of the alternating group $\mathbb{A}_n$ is also a subgroup of a maximal elementary abelian 2-subgroups of the symetric group Σ_n. Therefore, studying the group $A \cap \mathbb{A}_n$ is the major step in the process of classifying maximal elementary abelian 2-subgroups of the alternating subgroups. Especially, specifying the orbits of such groups as $A \cap \mathbb{A}_n$ is the most important step in the whole process. Besides, studying the relation between the normalizers of $A \cap \mathbb{A}_n$ in Σ_n and in $\mathbb{A}_n$ will be useful for distinguishing the 2-subgroups which are conjugated in Σ_n but not conjugated in $\mathbb{A}_n$.

SIU-YEUNG'S LEMMA IN P-ADIC CASE

Nguyen Thanh Quang and Phan Duc Tuan
Vinh University

Let us start by recalling Borel's lemma:

Borel's Lemma. *Let $f_1, \dots, f_n$, $n \geq 3$ be non-zero holomorphic functions on $\mathbb{C}$ such that*

$$f_1 + \cdots + f_n = 0.$$

Then the functions $\{f_1, \dots, f_{n-1}\}$ are linearly dependent.

It is well-known that Borel's lemma plays an important role in the study of hyperbolic spaces. For different purposes some generalizations of the lemma are given. We mention here a recent result of Y. T. Siu and S. K. Yeung:

Siu-Yeung's Lemma. *Let $g_j(x_0, \dots, x_n)$ be a homogeneous polynomial of degree δ_1 for $0 \leq j \leq n$. Suppose there exists a holomorphic map $f : \mathbb{C} \to \mathbb{P}^n(\mathbb{C})$ so that its image lies in*

$$\sum_{j=0}^{n} x_j^{k-\delta_j} g_j(x_0, \dots, x_n) = 0,$$

and $k > (n+1)(n-1) + \sum_{j=0}^{n} \delta_j$. Then there is a nontrivial linear relation among $x_1^{k-j_1} g_1(x_0, \dots, x_n), \dots, x_n^{k-j_n} g_n(x_0, \dots, x_n)$ on the image of f.

By using p-adic Nevanlinna-Cartan theorem, we prove a p-adic version of Siu-Yeung's lemma.

DEFORMATION OF GERM r-RETICULAR FUNCTIONS

Ngo Dinh Quoc
Tay Nguyen University

The purpose of this paper is to study the theory of deformation of r-reticular functions under the action of the group $Diff^r(n)$.

The main result is to prove the relations between versal deformation and infinitesimal deformation of a germ r-reticular function.

REAL DISCRIMINANT

Kyoji Saito
RIMS, Kyoto, Japan

The quotient variety $S_W := V//W$ of a finite reflection group W action on a real vector space $V = V_{\mathbb{R}}$ together with its discriminant divisor D_W in S_W is a simple geometric object which attracts attentions from several different aria of mathematics (including Lie theory, complex and differential geometry). We name a few results from topology: the regular orbits space $(V//W)^{reg}_{\mathbb{C}} = S_{W,\mathbb{C}} \setminus D_{W,\mathbb{C}}$ of the complexified action of W has a) the Artin group (generalized braid group) as for its fundamental group (Brieskorn), and b) the contractible universal covering space (Deligne). Interestingly, for the both results, the polyhedron K_W which is dual to the simplicial cone (=chamber) decomposition of $V_{\mathbb{R}}$ by the reflection hypeplanes of W plays essential role. Namely, a) 1- and 2-skeletons of K_W determine the generators and relations of the fundamental group of $(V//W)^{reg}_{\mathbb{C}}$, and b) the contractibility of K_W is a key step in proving the contractibility of the nerve of a covering system of the universal covering of $(V//W)^{reg}_{\mathbb{C}}$.

The purpose of the present paper is to reconstruct the dual polyhedron K_W from a completely different view point. Namely, the quotient variety $S_W := V//W$ carries a (kind of) differential geometric structure, called the flat structure (Saito). Then we shall make a use of (a part of) the flat structure for a construction of the polyhedron.

SUPERSINGULAR K3 SURFACES

Ichiro Shimada
Hokkaido University

We show that every supersingular K3 surface is birational to a double cover of a projective plane.

PHƯƠNG PHÁP MONTE CARLO GIẢI BÀI TOÁN TỐI ƯU 2 MỤC TIÊU TRONG LÍ THUYẾT PHỤC VỤ ĐÁM ĐÔNG

Phạm Văn Sơn
Đại học Mỏ-Địa chất

Xuất phát từ việc tổng quát hoá bài toán Điền xe rỗng với 2 chỉ số trong công trình nghiên cứu khoa học của các thày: Nguyễn Quí Hỷ, Phạm Trọng Quát, Đào Kiến Quốc, Nguyễn Văn Các, Vũ Đức Ninh, Hồ Đức Việt theo hợp đồng nghiên cứu giữa trường ĐHTH và Tổng cục đường sắt. Cộng với sự giúp đỡ của GS. TS Nguyễn Quí Hỷ trong Bài báo này sẽ đưa ra vấn đề giải quyết bài toán ba chỉ số ngẫu nhiên, số chiều rất lớn, miền chấp nhận là miền rời rạc... Và chỉ bằng phương pháp monte carlo nhờ sự kết hợp của lí thuyết độ đo, xác suất, quy hoạch ngẫu nhiên... mới giải quyết hiệu quả được... Sau đó tóm tắt cơ bản những cơ sở lý thuyết phục vụ cho việc thiết lập mô hình để rồi xây dựng thuật toán và chứng minh sự hội tụ nghiệm của bài toán.

SOME ARITHMETIC AND COHOMOLOGICAL PROPERTIES OF UNIPOTENT ALGEBRAIC GROUPS

Nguyen Duy Tan
Institute of Mathematics

In this talk we discuss some arithmetic and cohomological properties of unipotent groups. As consequences, we derive also some rational properties of unipotent groups and their homogenous spaces.

A FAMILY OF HYPERBOLIC HYPERSURFACES OF LOW DEGREE IN P3 AND P4

Do Duc Thai
Hanoi University of Education

In this article, we show a family of hyperbolic surfaces of degree 8 in P3 and a family of hyperbolic hypersurfaces of degree 28 in P4

Jointly with Tran Van Tan

ON SOME CORESTRICTION PRINCIPLES FOR ARITHMETIC GROUPS

Nguyen Quoc Thang
Institute of Mathematics

Let k be either a p-adic or number field and T a commutative algebraic k-group. If $\pi : H^i(k, G) \to H^j(k, T)$ is a connecting map appearing in an exact sequence of algebraic k-groups, then for any finite extension k'/k, we have $\pi' : H^i(k', G) \to H^j(k', T)$ and the following inclusion holds

$$Cores_{k'/k}(Im(\pi')) \subset Im(\pi),$$

where $Cores_{k'/k} : H^j(k', T) \to H^j(k, T)$ is the usual corestriction map. In this talk we consider an analogous situation when instead of rational points we consider the arithmetic groups, and prove some new results.

ON SEMIPERFECT, MINIINJECTIVE RINGS WITH ESSENTIAL SOCLES

Le Van Thuyet
Hue University

In this paper, we obtain some properties-of miniinjective rings and consider the Faith's open problem: Is a semiprimary right self-injective ring quasi-Frobenius? We study this question by examining rings with a very weak self-injectivity hypothesis. The main result is that a semiperfect, right and left miniinjective ring with essential right socle such that R has ACC on right annihilators is quasi-Frobenius. This result is related to Harada's, Nicholson's and Yousif's.

Jointly with Le Duc Thoang

DUALITIES AND DIMENSIONS OF IRREDUCIBLE REPRESENTATIONS OF PARABOLIC SUBGROUPS OF LOW DEGREES

Ton That Tri and Nguyen Dang Ho Hai
Hue University

THE REAL ZETA FUNCTION AND ITS APPLICATIONS

Le Cong Trinh
Quinhon University of Education

The purpose of this report is to study some properties and some applications of the real Zeta function which is given by formula

$$\zeta(x) = \sum_{n=1}^{\infty} \frac{1}{n^x}, x \in (1, +\infty).$$

The report contains 3 sections. After introducing about the real zeta function in section 1, we present some its properties in section 2. Finally section 3 is an application of the real zeta function to compute some special sums, for example $\sum_{n=1}^{\infty} \frac{1}{n^{2k}}, k = 1, 2, ...$ or compute $\zeta(\alpha), \alpha \in (1, +\infty)$.

MIXED MULTIPLICITIES OF IDEALS AND BERNSTEIN'S THEOREM

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In this lecture I will show how to intepret mixed multiplicities of arbitrary ideals as Samuel's multiplicity and mixed volumes of lattice polytopes as mixed multiplicities of monomial ideals. These intepretations can be used to give a short proof of Bernstein's theorem which predicts the number of common zeros of systems of Laurent polynomial equations in the torus.

ON STRUCTURES OF SOME CLASSES OF SEMIMODULES AND THEIR COHOMOLOGY

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From the middle of twentieth centenary many words of semimodules appear, as R. Wiegandt (1958), V. R. Hancok (1960), B. Chakanh (1963), H. Inassavidze (1975), A. Patchkoria (1976), J. M. Firsov (1978), ..., especially, M. Takahashi's ones (1981, 1982, 1987, 1993,...). Recently, J. S. Golan (1992) gave some results on simple semirings, H. Wang (1994) considered injective hulls of semimodules over additively - idemponent semirings, H. M. J. Al-Thani (1995, 1996) gave some characteristic properties of projective and k-projective semimodules, Y. Katsov (1997) studied injective envelopes of semimodules over additively - regular semirings, N. X. Tuyen -L. T. Trung - T. G. Nam (2002) gave some characteristic properties of injective semimodules, N. X. Tuyen - T. G. Nam (2003) considered characteristic properties of semisimple semimodules. On cohomology of semimodules, A. Patchkoria (1976) considered extensions of order 1 of semimodules by monoids, Tuyen (1999) considered extensions of order n of semimodules by monoids, M. Takahashi (1982, 1983) studied extensions of order 1 of semimodules by semimodules, Tuyen and Son (2001, 2002) considered extensions of order n of semimodules by semimodules and cohomology of semimodules.

To extend the above rezults, we consider in this report structures of some classes of semimodules, their cohomology and applications.

The substance of this report consists five bollowing main sections. In the first section, we consider the class of projective semimodules and related problens. In the second section, we study the class of injective semimodules and their applications, in the third section, we study simple and semisimple semimodules. In the 4-th section, we consider cohomology and extensions of semimodules by monoids. In the 5-th section, we consider cohomology and extensions of semimodules by semimodules.

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ON (FC)-SEQUENCES AND SOME APPLICATIONS

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The concept of (FC)-sequences was built in [1], and it has been shown to play an important role in studying ideals. In this paper, we will introduce the notion of (FC)-sequences and some applications as follow (see [1, 2, 3, 4, 5]): Linking mixed multiplicities of arbitrary ideals with Hilbert-Samuel multiplicities, to determine formulas for multiplicities of Ress rings, studying the vanishing and non-vanishing of mixed multiplicities, to compute the mixed multiplicity and the multiplicity of blow-up rings of equimultiple ideals, giving some forms of reductions of ideals generated by maximal weak-(FC)-sequences.

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MINIMIZING POLYNOMIAL FUNCTIONS

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It has been shown that if a real polynomial in n-variable attained its infimum at a critical point then this infimum value can be effectively by using Grobner bases. In case the polynomial does not attained itsn infimum, we show that its infimum value will not satisfy the Malgrange condition. Combining this with recent result of Jelonek, we can also effectively the compute this infimum by using the Grobner bases of ideal constructed from the polynomial and its partial derivatives.