



Algebraic Geometry in Mexico

Institute for Geometry and Physics Miami-Cinvestav-
Antofagasta-Campinas

Welcome to Puerto Escondido

Welcome! We hope you will have a great mathematical stay in Puerto Escondido. Here I send you the program.

Notice that at 6pm we have some “sunset discussions” which means that we walk across the avenue to the beach and talk mathematics while watching the sunset.

Breakfast, lunch and dinner are at the Arcoiris restaurant.

WiFi is spotty, better near the swimming pool, and even better at the various cafés nearby.

Notice too that Wednesday we have a free afternoon. There is a small local travel agency just next to the hotel entrance that can book very nice eco-turistic tours nearby. I recommend the bioluminescence experience (tour departs 8pm) but if you do that do it on Thursday or Friday as we have a very bright moon at the moment.

The Scientific Program:

TIME/DAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8 - 10 AM	BREAKFAST	BREAKFAST	BREAKFAST	BREAKFAST	BREAKFAST	BREAKFAST
10 - 11:00 AM		URIBE	KALEDIN	EFIMOV	GOMEZ-MONT	ZUNIGA
11:00 - 11:30 AM		BREAK	BREAK	BREAK	BREAK	BREAK
11:30 AM - 12:30		HARDER	MIKHALKIN	DISCUSSION	MOSTOVOY	KARZHEMANOV
1:30 PM		LUNCH	LUNCH	LUNCH	LUNCH	LUNCH AND FAREWELL
4:00 PM		GARAY	VERJOVSKY	FREE	LUPERCIO	
5:00 PM		LOGVINENKO	BURGOS	FREE	KATZARKOV	
6:00 PM	SUNSET WELCOME	SUNSET DISCUSSION	SUNSET DISCUSSION	FREE	SUNSET DISCUSSION	
7:00 PM	DINNER	DINNER	DINNER	DINNER	DINNER	

Bernardo Uribe (Barraquilla)

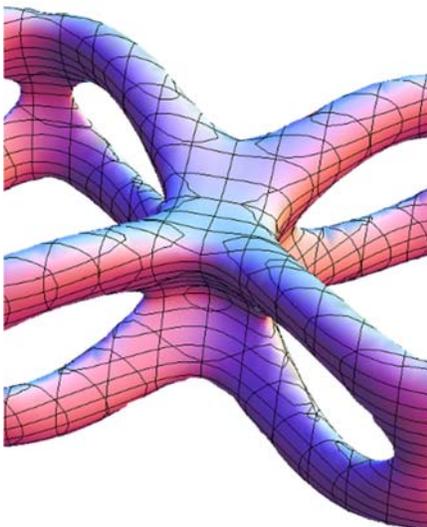
Title: On the Atiyah-Hirzebruch spectral sequence on equivariant K-theory

Abstract: I will present the recent results that we have obtained together with José Manuel Gómez on the explicit description of the third differential of the Atiyah-Hirzebruch spectral sequence on equivariant K-theory for actions of finite groups.

Andrew Harder (Alberta)

Hodge numbers of hypersurfaces in toric varieties and Landau-Ginzburg models

I will describe a construction of the Landau-Ginzburg mirror of a quasi-Fano complete intersection X in a Gorenstein toric Fano variety.



This will be a pair (Y, w) where Y is a mildly singular quasi-projective variety and w is regular function on Y so that Y is relatively compact with respect to w . I will show how the Hodge numbers of X are related to the number of irreducible components in the fiber of w over 0 in the case where X is a sufficiently ample hypersurface in a toric variety.

Christian Garay

Título : The Fundamental Theorem of Tropical Differential Algebraic Geometry

Abstract : Let I be an ideal of the ring of Laurent polynomials $K[x_{-1}^{\pm 1}, \dots, x_n^{\pm 1}]$ with coefficients in a real-valued field (K, v) . The fundamental theorem of tropical algebraic geometry states the equality $\text{trop}(V(I)) = V(\text{trop}(I))$ between the tropicalization $\text{trop}(V(I))$ of the closed subscheme $V(I) \subset (K^*)^n$ and the tropical variety $V(\text{trop}(I))$ associated to the tropicalization of the ideal $\text{trop}(I)$.

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In this work we prove an analogous result for a differential ideal G of the ring of differential polynomials $K[[t]][x_1, \dots, x_n]$, where K is an algebraically closed field of characteristic zero. We define the tropicalization $\text{trop}(\text{Sol}(G))$ of the set of solutions $\text{Sol}(G) \subset K[[t]]^n$ of G , and the set of solutions $\text{Sol}(\text{trop}(G)) \subset \mathcal{P}(\text{dob}\{Z_{g \neq 0}\}^n)$ associated to the tropicalization $\text{trop}(G)$ of G . These two sets are linked by a tropicalization morphism $\text{trop}: \text{Sol}(G) \rightarrow \text{Sol}(\text{trop}(G))$.

We show the equality $\text{trop}(\text{Sol}(G)) = \text{Sol}(\text{trop}(G))$, answering a question raised by D. Grigoriev earlier this year.

Timothy Logvinenko (Cardiff)

Title: "P-functors"

Abstract:

" P^n objects are a class of objects in derived categories of algebraic varieties first studied by Huybrechts and Thomas. They were shown to give rise to derived autoequivalences in a similar fashion to Seidel-Thomas spherical objects. It was also shown that they could sometimes be produced out of spherical objects by taking a hyperplane section of the ambient variety.

In this talk we'll explain how to generalise the above to the notion of P -functors between (enhanced) triangulated categories. We'll also discuss a closely related notion of a non-commutative line bundle over such category. This is based on work in progress with Rina Anno and Ciaran Meachan."

Dmitry Kaledin (Steklov)

Title: Polynomial Witt vectors

Abstract: Polynomial Witt vectors are a certain polynomial functor from vector spaces to vector spaces that generalizes the usual Witt vectors of commutative rings. I am going to present a very simple construction of this functor that uses only some basic properties of cyclic groups.

Gregory Mikhalkin (Geneva)

"Quantum index of real plane curves and refined enumerative geometry"

Abstract:

We note that under certain conditions, the area bounded by the logarithmic image of a real plane curve is a half-integer multiple of π square. The half-integer number can be interpreted as the quantum index of the real curve and used to refine real

enumerative invariants. The result agrees with the Block-Göttsche numbers from the tropical world.

Alberto Verjovsky (UNAM)

QUATERNIONIC KLEINIAN MODULAR GROUPS
AND ARITHMETIC HYPERBOLIC ORBIFOLDS
OVER THE QUATERNIONS.

(Joint work with F. Vlacci and J. P Diaz)

Abstract:

We describe modular groups over the quaternions which are analogs of the classical modular group

Juan Manuel Burgos (UNAM)

"Adelic Nag-Verjovsky embedding"

abstract: The Nag-Verjovsky map is an analytic isometric embedding of a Virasoro

coadjoint Kähler orbit into the universal Teichmüller space. We will discuss an adelic

generalization of this embedding.

Alexander Efimov (HSE - Moscow)

Title: Homotopy finiteness of derived categories of coherent D-modules

Abstract: We will briefly recall the general properties of derived categories of coherent D-modules on general singular algebraic varieties over a field of characteristic zero. Then we will show that these categories (considered as DG categories) are homotopically finite in the sense of Toën and Vaquié. This answers a question of Drinfeld (private communication).

The proof uses resolution of singularities and a certain new technical observation about the behaviour of these derived categories under abstract blow-ups.

Xavier Gómez-Mont (CIMAT)

Binding Spectral chains with the Jacobian Algebra, for isolated hypersurface singularities.

The points of the (Steenbrink) spectrum form chains by using the logarithm of the unipotent part N of the monodromy. We will show that multiplication by the function in the Jacobian Algebra binds together different N -chains. We will also show a bilinear form appearing as a consequence of the binding and measures the difference between the bilinear forms $\langle N, \cdot \rangle$ and $\langle f, \cdot \rangle$ in vanishing cohomology and the Jacobian Algebra.

Jacob Mostovoy (Cinvestav)

TBA

Ernesto Lupercio (Cinvestav and UNAM)

Non-commutative topic varieties

I explain what they are, the features of the theory and make some comments regarding sandpiles.

Ludmil Katzarkov (Miami and Vienna)

Categorical DUY correspondence

In this talk we introduce DUY correspondence.

As consequence we propose a version of categorical Donaldson theory/

Applications will be discussed.

Wilson Zuñiga (Cinvestav)

Zeta Functions and Oscillatory Integrals for Meromorphic Functions

Abstract

In the talk we will present the results of our preprint arxiv:1510.03622. In the 70's Igusa developed a uniform theory for local zeta functions and oscillatory integrals attached to polynomials with coefficients in a local field of characteristic zero. In the present article this theory is extended to the case of rational functions, or, more generally, meromorphic functions f/g , with coefficients in a local field of characteristic zero. This generalization is far from being straightforward due to the fact that several new geometric phenomena appear. Also, the oscillatory integrals have two different asymptotic expansions: the 'usual' one when the norm of the parameter tends to infinity, and another one when the norm of the parameter tends to zero. The first asymptotic expansion is controlled by the poles (with negative real parts) of all the twisted local zeta functions associated to the meromorphic functions $f/g - c$, for certain special values c . The second expansion is controlled by the poles (with positive real parts) of all the twisted local zeta functions associated to f/g .

Ilya Karzhemanov

TBA

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