

GEOMETRIES in PYRENEES

Université de Pau
5-7th September, 2019

Organizing committee:
E. Artal, V. Florens

- Programme -

	Thursday 5th	Friday 6th	Saturday 7th
9:30-10:30	Artal	Bénard II	Cogolludo
<i>Coffee break</i>			
11:00-12:00	Bénard I	Bannai	(10:45) Blasco
<i>Lunch</i>			
14:00-15:00	Tokunaga	Marco	
<i>Coffee break</i>			
15:30-16:30	Kitano	Shirane	

- Abstracts -

Enrique Artal Bartolo (Universidad de Zaragoza)

Hermitian and Riemannian geometry of plane curves

From the Fubini-Study metric, the normalization of a plane curve inherits a hermitian metric outside the singular branches. The moduli spaces change since the natural group acting on the plane is much smaller (the projective unitary group). A study of the behavior of the Gauss curvature is presented, focusing mainly on conics. It is a joint work with Rodrigo Morón.

Shinzo Bannai (Ibaraki National College of Technology)

The topology of cubic line arrangements

In this talk, we introduce some new results on the topology of plane curve arrangements consisting of a smooth cubic and lines. The torsion classes of the cubic curve which can be represented by lines play an important role in distinguishing the topology.

Leo Benard (University of Gottingen)

Reidemeister torsion and character varieties

In this lecture we will give various definitions and examples of a celebrated topological invariant of 3 manifolds: the Reidemeister torsion. We will discuss how to relate it with a complex curve associated to a knot complement, the character variety, and how to get informations from one another.

Ruben Blasco (Universidad de Zaragoza)

On the isomorphism problem for even Artin groups

Artin groups is an interesting family of groups which can be defined associated to simple labelled graphs. Among them, I will focus on the subfamily of even Artin groups, in which every label is an even number. One of the most important open problems for Artin groups is the isomorphism problem: given two Artin groups $A\Gamma$ and $A\Omega$ with their standard presentation, if $A\Gamma \approx A\Omega$, must it be satisfied that $\Gamma \approx \Omega$? This question is known to be true for right-angled Artin groups and known to be false for general Artin groups. However, it is not known if it is true for even Artin groups. In this talk I will present some partial results regarding this question. This is a joint work with Luis Paris.

Jose Ignacio Cogolludo Agustin (Universidad de Zaragoza)

Asymptotic behavior of fundamental groups of smooth surfaces

As a fundamental example, when studying pencils on the projective plane, they are said to contain a completely reducible member if the member of the pencil is a product of lines. It is well known that the number of completely reducible fibers in such pencils is universally bounded by 4. This has consequences in the structure of fundamental groups of complements of lines giving a bound to the rank of their free quotients. One can ask a similar question about pencils of conic-line arrangements. We find that there is a universal bound as well. We ask ourselves how general this type of results is. The purpose of this talk is to present a series of results regarding the structure of fundamental groups of the complement of curves on smooth surfaces whose irreducible components are assumed to belong to a given effective cone. This is a joint work with A. Libgober.

Teruaki Kitano (Soka University)

Twisted Alexander polynomials and the $SL(2;C)$ -character variety of a torus link

Let L be a link in the 3-dimensional sphere and $G(L)$ the fundamental group of the complement. The twisted Alexander polynomial is an invariant of a link with a linear representation of $G(L)$. Here we consider it only for $SL(2;C)$ -irreducible representations. Then the twisted Alexander polynomial gives a Laurent polynomial valued function on the character variety of $G(L)$. In this talk we give an explicit formula of the twisted Alexander polynomial of the torus link $T(p,q)$ and show that it is a locally constant function on the $SL(2;C)$ -character variety. We also discuss a description of the character variety of $T(p,q)$. This is a part of joint works with Takayuki Morifuji and Anh T. Tran.

Miguel Marco (Universidad de Zaragoza)

Irreducibility of arc-sections of hypersurface singularity germs

Consider an irreducible hypersurface singularity germ $(X,0)$ in $(C^{n+1}, 0)$ and a linear map $\pi: (C^{n+1}, 0) \rightarrow (C^{n+1}, 0)$. If we take an analytic arc $\gamma: (C,0) \rightarrow (C^n, 0)$, its preimage by π determines a plane curve germ, called arc-section of the original hypersurface germ. Using the monodromy induced by the projection, we study the irreducibility of such arc-sections, and provide a method to determine when irreducible ones exist. Moreover, we prove that totally reducible ones always exist, and even give a method to construct them. This is a joint work with Maria Pe.

Taketo Shirane (Tokushima University)

A construction of line bundles on double covers and splitting curves

In 2017, Catanese and Perroni have investigated a correspondence between line bundles on a double cover and rank two vector bundles on the base space. In this talk, we describe the correspondence in detail, and give a method of constructing new line bundles (and rank two bundles) from simple ones. As its application, we give examples of splitting curves with respect to a double cover over the projective plane.

Hiroo Tokunaga (Tokyo Metropolitan University)

Construction of n -contact curve to a cubic and Zariski tuple

Let E be a smooth plane cubic. A plane curve D is said to be a n -contact curve if for each intersection point p , D is smooth at p and the intersection multiplicity is n . In this talk we explain a method to construct such a curve by using n -torsion point of E . As an application, we give explicit example of Zariski tuples.