

Workshop on Hyperbolic geometry, geometric structures and bounded cohomology

Date: 21 ~ 24 Nov. 2012

Place: Seminar room 1423 / KIAS

1. Program (21 ~ 24 Nov.)

Time	21(Wed)	22(Thurs)	Time	23(Fri)	24(Sat)
09:40-09:45	Openning		09:00-11:00	Sambarino	Individual Seoul tour
09:45-11:45	Tan	Ohshika	11:10- 12:00	I. Kim	
12:00-12:45	Lunch				
12:45-13:45	recreation				
13:45-15:45	Diaz	Lecuire	13:45-15:45	Hamlet	
16:00-18:00	Kuessner	Emery	16:00-18:00	S. Kim	

2. Title and Abstract

Raquel Díaz (Complutense, Madrid)

Title: Schottky uniformization of stable hyperbolic orbifolds

Abstract: The retrosection theorem says that any hyperbolic or Riemann surface can be uniformized by a Schottky group. This theorem has been generalized in two directions. On the one hand, for the case of hyperbolic orbifolds, Reni-Zimmermann characterized which hyperbolic orbifolds can be uniformized by a finite extension of a Schottky group. On the other hand, one can consider the case of stable Riemann surfaces, that is, topological surfaces where some curves have been pinched to nodes and with a conformal structure outside the nodes. Hidalgo proved that any stable Riemann surface can be uniformized by a noded Schottky group. In this talk we will consider the same kind of problem for case of stable hyperbolic orbifolds, and the uniformizing groups will be Kleinian groups which are finite extensions of noded Schottky groups.

Using a three dimensional language, these Schottky type uniformizations can be interpreted as characterizing which hyperbolic surfaces or 2-orbifolds with nodes can occur as the boundary of hyperbolic handlebodies or hyperbolic handlebody orbifolds with nodes.

This is a work in progress, joint with Ruben Hidalgo, U. T. Santa Maria, Valparaiso, Chile.

Vincent Emery (Stanford)

Title: On the existence of arithmetic homology spheres

Abstract: I will discuss the existence problem of hyperbolic rational homology spheres of even dimension, or more generally the existence of closed hyperbolic manifolds with Euler characteristic = 2.

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Oskar Hamlet (Gothenbourg)

Title: A classification of tight maps/homomorphisms

Abstract: Homomorphisms between groups induce pullback maps between the corresponding continuous bounded cohomologies which are normdecreasing. A homomorphism between Hermitian Lie groups is called tight if the norm of the pullback of the Kähler class equals the norm of the Kähler class. In this talk I'll discuss my work classifying tight homomorphisms.

Inkang Kim (KIAS)

Title: Compactification of real projective and AdS^3 geometry

Abstract: This is an introductory talk about real projective and Anti-de Sitter geometry. We describe moduli space of these structures and possible parametrization and compactifications.

Sungwoon Kim(KIAS)

Title: Limit set, Linear action and higher rank symmetric space

Abstract: We study the limit set of a discrete subgroup arising from Anosov representation. Specially we study the limit set of a discrete group arising from strictly convex real projective structures and Anosov representations from a finitely generated word hyperbolic group into a semisimple Lie group.

Thilo Kuessner (KIAS)

Title: Fundamental class and geometric invariants

Abstract: In our talk we will discuss how several geometrically defined invariants of locally symmetric spaces, such as the volume, the Bloch invariant, the K-theoretic Goncharov invariant, or the volume of CR structures and flag structures can be derived from the image of the fundamental class in the homology of the corresponding Lie group. We will discuss an application to the behaviour of these invariants with respect to topological cut and paste operations.

Cyril Lecuire

Title: Sequences of quasi-Fuchsian groups.

Abstract: I will address the following question: knowing the behavior of the ends invariants (the conformal structures at infinity for example) of a sequence of quasi-Fuchsian groups, can one say whether or not the sequence converges algebraically? I will give a criterion for the existence of a converging subsequence, explain its meaning and some elements of the proof. This is a joint work with J. Brock, K. Bromberg and R. Canary.

Ken'ichi Ohshika

Title: Automorphism groups of Heegaard splittings and bridge decompositions

Abstract: We consider a hyperbolic Heegaard splitting or a bridge decomposition with its splitting surface S .

Motivated by work of D. Lee and Sakuma on two-bridge knot complements, we study subgroups of mapping class groups generated by Dehn twists around "meridians" on S (with regard to two handlebodies on the two sides of the surface).

We show that this group is naturally decomposed into a free product, and study the dynamics of the action of this group on the projective lamination space.

This is joint work with Sakuma, and partly with Bowditch.

Andres Sambarino

Title: Convexity and counting

Abstract: We will show precise counting results for a class of discrete subgroups of $SL(d, \mathbb{R})$. This class contains Hitchin representations of surface groups and groups dividing a strictly convex set of $P(\mathbb{R}^d)$.

Tan Ser Peow

Title: Coxeter group actions on complex and real spaces (I and II).

Abstract: We will study certain polynomial actions of Coxeter groups generated by n reflections on complex and real n -dimensional space, and various invariant subspaces under this action. In the case when $n=3$, this corresponds to the important example of the action of the outer automorphism group of the free group on two generators on its $SL(2, \mathbb{C})$ (respectively $SL(2, \mathbb{R})$) character variety; in higher dimensions, there seems to be intriguing connections and analogues with Apollonian circle/sphere packings, and also the $SL(2, \mathbb{C})$ character variety of the free group on three generators.

We study the dynamics of this action, in particular, we show how to describe a domain of discontinuity for this action (an open subset on which the group acts properly discontinuously), and in some cases, demonstrate subsets on which the action is ergodic. We also derive various identities, which can be considered higher dimensional analogues of McShane's identity.

This is joint work with various authors including Yan Loi Wong and Ying Zhang; Bill Goldman, Greg McShane and George Stantchev; Caroline Series and Yasushi Yamashita; and Hengnan Hu and Ying Zhang.