Workshop on Geometric structures and representation varieties

Date: 16 January 2020

Time: 10.00 am to 5.00 pm

Venue: S17 04-06 (Morning)

S16 04-31(Afternoon)

Organizers: Ser Peow Tan

Tengren Zhang

SPEAKERS

Hyungryul Baik (KAIST)
David Dumas (UIC))
Lucas Kaufmann (NUS)
Sungwoon Kim (Jeju)
Zhe Sun (Luxembourg)

NUS
National University
of Singapore

Department of Mathematics
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Programme

10.00am – 10.50am	**Coarse and fine geometry of the Thurston metric**
	David Dumas
	University of Illinois, Chicago
10.50am – 11.10am	Break @ Venue
11.10am – 12.00pm	**Simplicial volume and its applications**
	Sungwoon Kim
	Jeju University, Korea
12.00pm – 2.00pm	Lunch
2.00pm – 2.50pm	**Moduli space of unmarked bounded convex projective structures**
	Zhe Sun
	University of Luxembourg
2.50pm – 3.10pm	Break @ Venue
3.10pm – 4.00pm	**Products of random matrices via holomorphic dynamics**
	Lucas Kaufman
	NUS
4.10pm – 5.00pm	**Algebraic and dynamical properties of monodromies of a fibered hyperbolic 3-manifold**
	Hyungryul Baik
	KAIST, Korea

Abstract

Algebraic and dynamical properties of monodromies of a fibered hyperbolic 3-manifold
Hyungryul Baik
KAIST, Korea

There are mysterious connections between algebraic and dynamical properties of monodromies of a fibered hyperbolic 3-manifold which are contained in the same fibered cone. We will report the recent result on this topic based on the joint work with Eiko Kin, Hyunshik Shin, and Chenxi Wu, and discuss some possible future directions.

Coarse and fine geometry of the Thurston metric
David Dumas
University of Illinois, Chicago

I will discuss some results on the geometry of Thurston's metric on Teichmueller space. This asymmetric metric is based on the Lipschitz constants of maps between hyperbolic surfaces. The results include some coarse properties of Thurston metric geodesics in general, and some finer properties (local isometric rigidity, quantitative non-uniqueness of geodesics) in the case of the punctured torus. This is joint work with Anna Lenzhen, Kasra Rafi, and Jing Tao.

Products of random matrices via holomorphic dynamic
Lucas Kaufman
National University of Singapore

The study of random walks on Lie groups is a classical topic in Homogeneous Dynamics. The goal is to understand products of the form $g_n \cdots g_1$ where the g_j are i.i.d. random variables with values on some Lie group G. One is also interested on the action of such products on a given homogeneous space. In this talk I will focus on the case where G is the group of 2 by 2 matrices acting on the Riemann Sphere by Möbius transformations. We can view such a problem as a generalized holomorphic dynamical system and apply recent results on the dynamics of correspondences to study its global behavior. This approach allows us to obtain some new results about such products as well as new and simplified proofs of classical results by Furstenberg, Guivarc'h, Le Page, Benoist-Quint, etc. This is based on joint works with T.-C. Dinh and H. Wu.

Simplicial volume and its applications
Sungwoon Kim
Jeju University, Korea

Gromov introduced the simplicial volume and bounded cohomology of a compact manifold to study minimal volume. We will review the recent results on simplicial volume and discuss about its applications such as rigidity theorem.

Moduli space of unmarked bounded convex projective structures
Zhe Sun
University of Luxembourg

The main object of this talk is the moduli space $\mathcal{H}(S_{g,m})$ of unmarked convex $\mathbb{RP}^2$ structures on $S_{g,m}$. We investigate the boundedness of projective invariants, area and many other notions that are comparable with each other. Let $\mathcal{H}^t(S_{g,m})(L)$ be the subset of $\mathcal{H}_3(S_{g,m})(L)$ with fixed boundary simple root lengths L such that certain projective invariants are bounded by a constant t. We show that the Goldman symplectic volume of $\mathcal{H}^t(S_{g,m})(L)$ is bounded above by a polynomial of t, thus the integral of e^{-t} with respect to the Goldman symplectic volume over $\mathcal{H}_3(S_{g,m})(L)$ is finite. We show that the analog of Mumford's compactness theorem holds on the area bounded subset.