Program

Saturday (January 7)

10:00 – 10:50 Hiroki Fujino (Nagoya University)
Extension theory for quasisymmetric embeddings of planar subsets

11:10 – 12:00 Yoshifumi Matsuda (Aoyama Gakuin University)
Rotation number and actions of 2-orbifold groups on the circle

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14:00 – 14:50 Takashi Ueda (The University of Tokyo)
Algebraic interpretation of McShane's/Mirzakhani's identity in the 1-punctured/hole torus case

15:10 – 16:00 Masakazu Shiba (Hiroshima University)
The period matrices of the closings of an open Riemann surface of finite genus

16:30 – 17:20 Lixin Liu (Sun Yat-Sen University)
Distance and angles between Teichmüller geodesics

Sunday (January 8)

10:00 – 10:50 Naoki Sakata (Hiroshima University)
Veering triangulations of mapping tori of some pseudo-Anosov maps arising from Penner's construction

11:10 – 12:00 Hidetoshi Masai (The University of Tokyo)
Topological entropy of random walks on the mapping class groups

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14:00 – 14:50 Takayuki Okuda (The University of Tokyo)
Splittings of singular fibers into Lefschetz fibers

15:10 – 16:00 Masaharu Tanabe (Tokyo Institute of Technology)
On coincidences of morphisms of closed Riemann surfaces

16:30 – 17:20 Toshiyuki Sugawa (Tohoku University)
Polygonal construction of Riemann surfaces and Teichmüller spaces

Monday (January 9)

10:00 – 10:50 Yoshikazu Yamagishi (Ryukoku University)
Disk packings on logarithmic spiral lattices

11:10 – 12:00 Hiroshige Shiga (Tokyo Institute of Technology)
Holomorphic motions and the extension problem

Abstract

Saturday (January 7)

Hiroki Fujino (Nagoya University)

Extension theory for quasisymmetric embeddings of planar subsets

The history of the quasisymmetry was started from the study by Beurling and Ahlfors in 1956. In this study, they introduced the quasisymmetry as a characterization of boundary correspondences of quasiconformal self homeomorphisms of the upper half plane. Later, the quasisymmetry was generalized to the mappings between any metric spaces, and the quasiconformal extendability of quasisymmetric embeddings has been investigated by many mathematicians, mainly in the case of connected or bounded subsets. In this talk, we explain recent advances of these studies, in particular, for disconnected unbounded planar subsets.

Yoshifumi Matsuda (Aoyama Gakuin University)

Rotation number and actions of 2-orbifold groups on the circle

A Hyperbolic structure on a 2-orbifold induces an action of a 2-orbifold group on the circle. Such an action is called a Fuchsian action. We show that the semi-conjugacy class of a Fuchsian action of certain 2-orbifold groups, such as the modular group, is characterized by rotation number of several elements. We also discuss similar property for lifts of Fuchsian actions.

Takashi Ueda (The University of Tokyo)

Algebraic interpretation of McShane's/Mirzakhani's identity in the 1-punctured/hole torus case

McShane's and Mirzakhani's identities are known as the geometric identities in the Teichuüller space of Rienmann surfaces. We prove these identities in the 1-punctured/hole case by the purely algebraic method. In other words, we consider trace functions as the real quantities satisfying some relations, forgetting its geometric meaning, and we replace the calculation of the sum in two identities by the finding of the solution of some new relations. And we find the solutions.

Masakazu Shiba (Hiroshima University)

The period matrices of the closings of an open Riemann surface of finite genus

Let R be an open Riemann surface of positive finite genus g and χ_R a canonical homology basis of R modulo the boundary. A closing of (R, χ_R) is, by definition, a triplet (S, χ_S, ι) — with a suitable identication — consisting of a closed Riemann surface S of genus g, a canonical homology basis χ_S, and a conformal injection $\iota : R \to S$ which induces the canonical bijection $\chi_R \to \chi_S$. We study the period matrix of (S, χ_S) in the Siegel upper halfspace. (A joint work with S. Hamano and H. Yamaguchi)

Lixin Liu (Sun Yat-Sen University)
Distance and angles between Teichmüller geodesics

We give an estimation for the Teichmüller distance on finite dimensional Teichmüller spaces. We show that the angles between Teichmüller geodesic rays issuing from a common point, defined by using the law of cosines, do not always exist. As a consequence, the Teichmüller space with the Teichmüller metric is not a CAT(k) space, for any real number k. We also discuss some necessary conditions for the existence of angle between the Teichmüller geodesics. This is a joint work with Weixu Su and Youliang Zhong.

Sunday (January 8)

Naoki Sakata (Hiroshima University)
Veering triangulations of mapping tori of some pseudo-Anosov maps arising from Penner's construction

Agol proved that every pseudo-Anosov mapping torus of a surface, punctured along the singular points of the stable and unstable foliations, admits a canonical "veering" ideal triangulation. In this talk, I will describe the veering triangulations of the mapping tori of some pseudo-Anosov maps arising from Penner's construction.

Hidetoshi Masai (The University of Tokyo)
Topological entropy of random walks on the mapping class groups

Analogously to surface homeomorphisms, we define topological entropy of random walks on the mapping class groups. The goal of this talk is to prove that topological entropy of random walks coincide with the translation distance with respect to Teichmüller metric.

Takayuki Okuda (The University of Tokyo)
Splittings of singular fibers into Lefschetz fibers

A degeneration of Riemann surfaces is a family of complex curves allowed to have a singular fiber. The topological types of minimal degenerations over disks are completely determined by their topological monodromies. We consider splittings of such singular fibers. It may occur that a singular fiber splits into several simpler singular fibers in some deformation, in which case the product of their local monodromies coincides with the monodromy of the original singular fiber. In this talk, we show the splittability of certain singular fibers into Lefschetz fibers, and then express their topological monodromies as products of Dehn twists.

Masaharu Tanabe (Tokyo Institute of Technology)
On coincidences of morphisms of closed Riemann surfaces

We investigate the number of coincidences of two distinct morphisms $f_i : X \to Y\,(i = 1, 2)$ between closed Riemann surfaces of genera greater than zero. A point $p \in X$ which satisfies $f_1(p) = f_2(p)$ is called a coincidence of f_1 and f_2. If $X = Y$ and $f_1 = \mathrm{id.}$, then a coincidence of f_1 and f_2 is nothing but a fixed point of f_2. For the theory of fixed points, the Lefschetz fixed-point formula, the holomorphic Lefschetz fixed-point formula and the Eichler trace formula are well known. For the number of coincidences, we may obtain analogies of these as well. The trace of $f_1^* \circ f_{2*}$, the composition of the push-forward map and the pull-back map of the space of holomorhic differentials, is the key for these analogies. In this talk, we show several statements including a necessary and sufficient condition for diagonalizability of a matrix representation of $f_1^* \circ f_{2*}$.

Toshiyuki Sugawa (Tohoku University)
Polygonal construction of Riemann surfaces and Teichmüller spaces

We consider a $2N$-gon in the complex plane and assign a pairing of the sides of it. By pasting the paired sides by an affine mapping, we can construct a compact Riemann surface with distinguished points which come from the vertices of the $2N$-gon. For a fixed pairing, we have a family of Riemann surfaces. We will make elementary observations on this family and will talk about possible applications to Teichmüller spaces.

Monday (January 9)

Yoshikazu Yamagishi (Ryukoku University)
Disk packings on logarithmic spiral lattices

A logarithmic spiral lattice is a multiplicative group $\Lambda(z)$ generated by a complex number z. We consider the disk packing and Voronoi tiling on $\Lambda(z)$. It is proved that the bifurcation diagram of disk packings is connected and simply connected, as it is a dual graph to the bifurcation diagram of Voronoi tilings. The Farey tree structure and the bounded distance function $d(z, w) = |z - w|/(|z| + |w|)$ play important roles.

Hiroshige Shiga (Tokyo Institute of Technology)
Holomorphic motions and the extension problem

Let ϕ be a holomorphic motion of a set E on the Riemann sphere over a complex manifold M. An important problem on holomorphic motions is the extension problem: under which condition is a holomorphic motion of a subset E over M extended to a holomorphic motion of $\hat{\mathbb{C}}$ over M?

We have already known an answer to the problem if M is simply connected which are given by Bers-Royden, Slodkowski and Hubbard. In this talk, we deal with the case where the complex manifold M is one-dimensional, that is, a Riemann surface, but not simply connected. Then we consider the extension problem for a holomorphic motion of E over M.