東北大学理学部数学科
東北大学大学院理学研究科数学専攻
Mathematical Institute, Tohoku University

Seminar

February 2024

2024.2.7（Wed）

Geometry Seminar (15:00--16:40【Venue: Mathematics Building 305】)

The day and time of the seminar is different from usual.

15:00--15:45
Speaker : 河澄 響矢 (The University of Tokyo)
Title : Fenchel-Nielsen座標によるWeil-Peterssonシンプレクティック形式についてのWolpertの公式の位相的証明
Abstract :
WolpertはTeichmuller空間上のWeil-PeterssonシンプレクティックをFenchel-Nielsen座標によって具体的に表す公式を与えている．閉曲面のパンツ分解から自然な定まる曲面の胞体分割を導入することにより，この公式の位相的な証明を与える．この証明において，シンプレクティック形式はパンツ分解を与える単純閉曲線の周りに局所化していることが見える．

15:55--16:40
Speaker : 和久田 葵 (The University of Tokyo)
Title : TWGリー代数の中心の拡張と双曲幾何
Abstract :
向き付けられた曲面のGoldman Lie代数はloopの向きを反転させる自然なLie代数同型写像によって，Z/2-次数付きLie代数になる．そのeven partはThurston-Wolpert-Goldman Lie代数(TWG Lie代数)と同型である．ChasとKabirajは，TWG Lie代数の中心が，constant loopの類と，境界成分や1点穴を周回するloopの類によって生成されることを証明した．even partの中心は，even partの各元によってannihilateされるeven partの元全体の集合と言い換えることができる．本講演ではodd partを含む残りの3つの場合についても，同様の定理が成り立つことを証明する．

2024.2.8（Thu）

Geometry Seminar (15:00--16:30【Venue: Mathematics Building 305】)

The day of the week of the seminar is different from usual.
Speaker : 河東 泰之 (The University of Tokyo)
Title : Topological quantum computing, tensor categories and operator algebras
Abstract :
Modular tensor categories have caught much attention in connection to topological quantum computing based on anyons recently. Condensed matter physicists recently try to understand structures of modular tensor categories appearing in two-dimensional topological order using tensor networks. We present their tools based on operator algebras. For example, 4-tensors they use are exactly bi-unitary connections in the Jones theory of subfactors and their sequence of finite dimensional Hilbert spaces on which their gapped Hamiltonians act is given by the so-called higher relative commutants of a subfactor. No knowledge on operator algebras is assumed.

2024.2.9（Fri）

Probability Seminar (15:30--17:00 【Venue: Mathematics Building 209】)

Speaker : Sunder Sethuraman (University of Arizona)
Title : Atypical behaviors of a tagged particle in asymmetric simple exclusion
Abstract :
Informally, the one dimensional asymmetric simple exclusion process follows a collection of continuous time random walks on Z interacting as follows: When a clock rings, the particle jumps to the nearest right or left with probabilities p or q=1-p, if that location is unoccupied. If occupied, the jump is suppressed and clocks start again.
In this system, seen as a toy model of `traffic', the motion of a distinguished or `tagged' particle is of interest. Starting from a stationary state, we study the `typical' behavior of a tagged particle, conditioned to deviate to an `atypical' position at time Nt, for a t>0 fixed. In the course of results, an `upper tail' large deviation principle, in scale N, is established for the position of the tagged particle. Also, with respect to `lower tail' events, in the totally asymmetric version, a connection is made with a `nonentropy' solution of the associated hydrodynamic Burgers equation. This is work with S.R.S. Varadhan (arXiv:2311.0780).

2024.2.13（Tue）

Geometry Seminar (15:00--16:30【Venue: Mathematics Building 305】)

Speaker : Xingyu Zhu（University of Bonn）
Title : Nonnegative Ricci curvature and linear volume growth revisited

Abstract :

Manifolds with nonnegative Ricci curvature and linear (minimal) volume growth were extensively studied in the beginning of this century. The recent advance of RCD theory and the study of isoperimetric problem require new understandings of the limit spaces at infinity in the above setup. In this talk, we will survey through classical results and discuss the isoperimetric problem in this setting. We will reveal the interactions between the structure at infinity, properties of Busemann functions and the existence of isoperimetric sets for large volumes.