研究集会　Intelligence of Low-dimensional Topology

京都大学数理解析研究所 RIMS 研究集会として、また、大阪市立大学数学研究所から後援をうけて、標記の研究集会を開催いたします。この研究集会はトポロジープロジェクトの一環として科学研究費補助金 基盤研究 A「クライン群とタイヒミュラー空間の大域幾何的研究」（課題番号 22244005、研究代表者 大鹿健一氏（大阪大学））の援助をうけています。また、この研究集会は科学研究費補助金 基盤研究 B 「グラフィクスとカンドル理論の観点からの４次元トポロジーの研究」（課題番号 21340015、研究代表者 鎌田聖一氏（広島大学））と科学研究費補助金 基盤研究 C 「結び目と 3 次元多様体の同変不変量」（課題番号 21540077、研究代表者 大槻知忠（京都大学））の援助をうけています。

日程：２０１１年5月２５日（水）～ ２７日（金）
場所：京都大学 数理解析研究所 420 大講演室
アクセス：http://www.kurims.kyoto-u.ac.jp/ja/access-01.html

５月２５日（水）

13:20～14:10　松本堯生（広島大学）
On the smooth unknotting conjecture in dimension four

14:30～15:20　清水理佳（大阪市立大学数学研究所、日本学術振興会特別研究員ＰＤ）
On region unknotting numbers

15:40～16:30　Jinseok Cho (Department of Mathematics, Waseda University)
The optimistic limit of the colored Jones invariant and the volume calculation

５月２６日（木）

10:00～10:50　佐藤進（神戸大学）
Quandle cocycle invariants of roll-spun knots (joint work with Masahide Iwakiri)

11:10～12:00　中村伊南沙（京都大学数理解析研究所）
Torus-covering links and their triple linking numbers

13:20～14:10　横田佳之（首都大学東京）
On the Kashaev invariant of twist knots

14:30～15:20　Roland van der Veen (University of California, Berkeley)
The volume conjecture for quantum spin networks

15:40～　　Problem Session

５月２７日（金）

10:00〜10:50　石井敦（筑波大学 大学院数理物質科学研究科）
A quandle cocycle invariant with non-commutative flows for a handlebody-knot

11:10〜12:00　大城佳奈子（日本女子大学）
Pallets and coloring invariants for spatial graphs

13:20〜14:10　廣瀬進（東京理科大学理工学部）
On diffeomorphisms over non-orientable surfaces embedded in the 4-sphere

14:30〜15:20　市原一裕（日本大学文理学部）
Exceptional surgeries on components of two-bridge links

組織委員：河内明夫、河野俊丈、金信泰造、鎌田聖一、大槻知忠
世話人：　大槻知忠（京大数理研）、和久井道久（関西大学）

Intelligence of Low-dimensional Topology

May 25–27, 2011
Room 420, RIMS, Kyoto University
Access: http://www.kurims.kyoto-u.ac.jp/en/access-01.html

Program

May 25 (Wed)

13:20–14:10 Takao Matumoto (Hiroshima University)
On the smooth unknotting conjecture in dimension four

14:30–15:20 Ayaka Shimizu (OCAMI, Osaka City University, JSPS research fellow PD)
On region unknotting numbers

15:40–16:30 Jinseok Cho (Department of Mathematics, Waseda University)
The optimistic limit of the colored Jones invariant and the volume calculation

May 26 (Thu)

10:00–10:50 Shin Satoh (Department of Mathematics, Kobe University)
Quandle cocycle invariants of roll-spun knots (joint work with Masahide Iwakiri)

11:10–12:00 Inasa Nakamura (RIMS, Kyoto University)
Torus-covering links and their triple linking numbers

13:20–14:10 Yoshiyuki Yokota (Tokyo Metropolitan University)
On the Kashaev invariant of twist knots

14:30–15:20 Roland van der Veen (University of California, Berkeley)
The volume conjecture for quantum spin networks

15:40– Problem Session

May 27 (Fri)

10:00–10:50 Atsushi Ishii (Institute of Mathematics, University of Tsukuba)
A quandle cocycle invariant with non-commutative flows for a handlebody-knot

11:10–12:00 Kanako Oshiro (Japan Women's University)
Pallets and coloring invariants for spatial graphs

13:20–14:10 Susumu Hirose (Faculty of Science and Technology, Tokyo University of Science)
On diffeomorphisms over non-orientable surfaces embedded in the 4-sphere

14:30–15:20 Kazuhiro Ichihara (College of Humanities and Sciences, Nihon University)
Exceptional surgeries on components of two-bridge links

Intelligence of Low-dimensional Topology

May 25–27, 2011

RIMS, Kyoto University

Abstract

Jinseok Cho (Department of Mathematics, Waseda University)
The optimistic limit of the colored Jones invariant and the volume calculation

We discuss how to calculate the complex volume of a hyperbolic knot combinatorially using the optimistic limit of the colored Jones invariant. This method is based on the colored Jones version of Yokota theory. This is a joint-work with Jun Murakami.

Susumu Hirose (Faculty of Science and Technology, Tokyo University of Science)
On diffeomorphisms over non-orientable surfaces embedded in the 4-sphere

For a closed orientable surface standardly embedded in the 4-sphere, it was known that a diffeomorphism over this surface is extendable to the 4-sphere if and only if this diffeomorphism preserves the Rokhlin quadratic form of this surface. In this talk, we will explain an approach to the same kind of problem for closed non-orientable surfaces, namely we think on the elements of the mapping class group of a non-orientable closed surface which preserve the Guillou-Marin form for the embedding of this surface.

Kazuhiro Ichihara (College of Humanities and Sciences, Nihon University)
Exceptional surgeries on components of two-bridge links

We will give a complete classification of exceptional Dehn surgeries on components of hyperbolic two-brdige links in the 3-sphere.

Atsushi Ishii (Institute of Mathematics, University of Tsukuba)
A quandle cocycle invariant with non-commutative flows for a handlebody-knot

A handlebody-knot is a handlebody embedded in the 3-sphere. We introduce a quandle cocycle invariant with non-commutative flows for handlebody-knots, which is a "twisted" quandle cocycle invariant. This is a joint work with Masahide Iwakiri, Yeonhee Jang and Kanako Oshiro.

Takao Matumoto (Hiroshima University)
On the smooth unknotting conjecture in dimension four

If the complement of a given smooth embedding of S^2 in $\mathbb{R}^4$ has an infinite cyclic fundamental group, the knot is conjectured to be smoothly unknotted. A one-parameter family of maps between the knot and standard one with only cusp singularities can be transformed into a one-parameter family of singular 2-braids by the Markov type theorem. Using the deformation of corresponding chart diagrams we can reduce to the special case of deformation of simple chart diagrams with only one double point. The discussion about the reduced case is very delicate.

Inasa Nakamura (RIMS, Kyoto University)
Torus-covering links and their triple linking numbers

A torus-covering link is a surface link in the 4-space in the form of a branched covering over the standard torus. In this talk we consider a torus-covering T^2-link, which is a torus-covering link whose each component is of genus one. A torus-covering T^2-link is determined from two commutative braids a and b, which we call basis braids. The triple linking number is an invariant of an oriented surface link with at least three components, introduced as an analogical notion of the linking number of a classical link. In this talk we present the triple linking numbers of a torus-covering T^2-link, by using the linking numbers of the closures of its basis braids, for the case when the basis braids are pure braids. Further, we explain some application.

Kanako Oshiro (Japan Women's University)
Pallets and coloring invariants for spatial graphs

We introduce the notion of pallets of quandles and define coloring invariants for spatial graphs which give a generalization of Fox colorings studied by Y. Ishii and A. Yasuhara. All pallets for dihedral quandles are obtained from the quotient sets of the universal pallets under a certain equivalence relation. We study the quotient sets and classify their elements.

Shin Satoh (Department of Mathematics, Kobe University)
Quandle cocycle invariants of roll-spun knots (joint work with Masahide Iwakiri)

We have two fundamental families in 2-knot theory; one is a ribbon 2-knot and the other is a deform-spun knot. Since any ribbon 2-knot is represented by a diagram with no triple point, the quandle cocycle invariant is always trivial. As sub-families of deform-spun knots, we have a twist-spun knot and a roll-spun knot. The invariant of a twist-spun knot have been studied in many papers. The aim of this talk is to explain how to calculate the quandle cocycle invariant of a roll-spun knot and give several properties.

Ayaka Shimizu (OCAMI, Osaka City University, JSPS research fellow PD)
On region unknotting numbers

A region crossing change at a region of a link diagram was proposed by K. Kishimoto to be the crossing changes at all the crossing points on the boundary of the region. In this talk, we show that we can deform any knot diagram into a diagram of the trivial knot by region crossing changes without Reidemeister moves, and we introduce an application of region crossing changes. Then, we define the region unknotting number of a knot. We show that the region unknotting number of a knot is less than or equal to half the crossing number plus one.

Roland van der Veen (University of California, Berkeley)
The volume conjecture for quantum spin networks

We propose to generalize the volume conjecture to quantum spin networks. A quantum spin network is a knotted graph in S^3 labeled by integers. We will explain how to evaluate such networks in a way that directly generalizes the colored Jones polynomial for links. Phrasing the volume conjecture in terms of graphs makes the connection to hyperbolic polyhedra more apparent. Moreover, it allows us to study the same questions in a simpler non-trivial setting at $q = 1$. As an application we show that for any knot there is a link containing the knot for which the volume conjecture is true.

Yoshiyuki Yokota (Tokyo Metropolitan University)
On the Kashaev invariant of twist knots

We compute the Kashaev invariant of twist knots, give their integral expressions, and explain how to analyze their asymptotic behaviors.