Knots and Manifolds

February 7 (Sat) – February 8 (Sun), 2015
Osaka City University

Abstract

February 7 (Sat)

Madeti Prabhakar (Indian Institute of Technology Ropar)
An unknotting operation using polynomial representation of non-compact knots

For every knot-type K ($\mathbb{R} \hookrightarrow \mathbb{R}^3$), there exist real polynomials $f(t), g(t)$ and $h(t)$ such that the map $t \mapsto (f(t), g(t), h(t))$ from $\mathbb{R}$ to $\mathbb{R}^3$ represents K and in fact this map defines an embedding of $\mathbb{C}$ in $\mathbb{C}^3$. In this presentation, we show that changing one of the polynomial in the polynomial representation of knot-type K, provides an unknotting operation. In particular, we show that by continuously deforming the polynomial which provides the under/over crossing information for the knot-type K in a particular way, it is possible to change a crossing from over (under) to under (over).

Taizo Kanenobu (Osaka City University)
Oriented Gordian distance of two-component links with up to six crossings

The oriented Gordian distance between two oriented links is the minimal number of crossing changes needed to deform one into the other. We compile a table of oriented Gordian distances between 2-component non-splittable links with up to six crossings.

Kanako Oshiro (Sophia University)
On the minimum number of colors for knots and surface-knots

In 1999, Harary and Kauffman introduced a knot invariant derived from Fox colorings for knots. It is the minimum number of colors which admits a non-trivial p-coloring for a given p-colorable knot. There are several studies about the invariant. The main purpose of this talk is to introduce the minimum number of colors for knots and surface-links, and show several previous works. In particular, I will show that for any 7-colorable knot, the minimum number of colors is four.

Yoshiro Yaguchi (Gunma National College of Technology)
Hurwitz action on tuples of standard generators of a braid group

Hurwitz action is an natural action of a braid group on a direct product of a group. In this talk, we will determine all elements in the Hurwitz orbit of tuples of the standard generators of a braid group.

Atsushi Ishii (University of Tsukuba)
The skein index and Fox p-colorings

We introduce the skein index for link invariants. The number of Fox p-colorings is an invariant for links. We discuss the skein index of the invariant.

Shin'ya Okazaki (OCAMI)
Graph for Alexander polynomial of handlebody-knot

We introduce an invariant of handlebody-knots comes from the Alexander invariant. The Alexander polynomial is an invariant for a pair of a handlebody-knot and its meridian system. However, this invariant depend on only the handlebody-knot type.

February 8 (Sun)

Vikash Siwach (Indian Institute of Technology Ropar)
Region unknotting number for 2-bridge knots

In this talk, I discuss region unknotting number for 2-bridge knots. In particular, I give region unknotting number for 2-bridge knots whose Conway's notation is $C(m, n)$, $C(m, 2, m)$, $C(m, 2, m \pm 1)$, $C(2, m, 2, n)$ etc. Further, I will also discuss an upper bound for region unknotting number of a general 2-bridge knot.

Kirandeep Kaur (Indian Institute of Technology Ropar)
Gauss diagrams for Spatial graphs

In this talk, I will introduce the notion of Gauss diagram for spatial graphs and discuss the equivalence in Gauss diagrams. Using Gauss diagram, I will discuss based-Gauss diagram, warping degree and different unknotting numbers for spatial graph. Further, I will define an unknotting invariant for virtual knots by using crossing change and virtualization.

Takefumi Nosaka (Kyushu University)
The Blanchfield pairing of the torus knot

I give a method for computing the Blanchfield pairing of knots, by the means of the quandle cocycle invariant. As a corollary, we succeed giving the first to determine the pairing of the torus knot. In this talk, I state the method as a theorem, and give a rough proof of the computation.

Naoko Kamada (Nagoya City University)
Invariants of twisted links and virtual links

JKSS invariants is a virtual knot invariant. Jaeger, Kauffman and Saleur defined the invariant of links in thickened surfaces, where surfaces are orientable. Sawollek applied it to virtual links. In this talk, we extend it to a twisted link invariant.

Ayaka Shimizu (Gunma National College of Technology)
Describing knots by matrices via warping degree

Warping matrix is defined for oriented knot diagrams on the 2-sphere. Since each warping matrix represents an oriented knot diagram uniquely, it can be said that warping matrix is a new description of oriented knots. In this talk we will discuss the properties of warping matrix.

Seonmi Choi (Kyungpook National University)
On the connected sum of a knotted surface and a standard real projective plane

On the connected sum of a knotted surface and a standard real projective plane Abstract : Let $L \xrightarrow{\mathfrak{B}} L_{\mathfrak{B}}$ be a hyperbolic transformation. Let B be a new band attaching to L such that $L_B \xrightarrow{\mathfrak{B}} L_{\mathfrak{B}\cup\{B\}}$ is also a hyperbolic transformation. In this paper, we will study the relationship between the realizing surfaces $F(L \xrightarrow{\mathfrak{B}} L_{\mathfrak{B}})$ and $F(L_B \xrightarrow{\mathfrak{B}} L_{\mathfrak{B}\cup\{B\}})$. If B is a noncoherent band to L and $L_{\mathfrak{B}}$ such that $\hat{F}(L_B \xrightarrow{\mathfrak{B}} L_{\mathfrak{B}\cup\{B\}})$ is defined, then $\hat{F}(L \xrightarrow{\mathfrak{B}} L_{\mathfrak{B}}) \sharp \mathbb{R}P^2$ and $\hat{F}(L_B \xrightarrow{\mathfrak{B}} L_{\mathfrak{B}\cup\{B\}}) \sharp \mathbb{R}P^2$ are ambiently isotopic, where $\mathbb{R}P^2$ is one of the standard real projective planes. As an application, $\mathbb{R}P^2$ can untangle a knotted sphere F with suitable conditions, when it is attached to F by the connected sum.(Jointly with Yongju Bae)