東北結び目セミナー 2013

アブストラクト集

市原 一裕（日本大学文理学部）

Pairs of boundary slopes with small differences

In this talk, we discuss about boundary slopes for Montesinos knots, and show that, for any positive real number, there exists a knot in the 3-sphere admitting a pair of boundary slopes whose difference is at most the given number.

伊藤 哲也（京都大学数理解析研究所）

Framing functions and strengthened version of Dehn's lemma

For a knot K, Greene-Wiest introduced a framing function of K by counting the self-intersections of singular spanning discs of K. In this talk, we prove a conjecture of Greene-Wiest that can be regarded as a strengthened version of Dehn's lemma, one of the most fundamental result in 3-manifold topology.

宮澤 康行（山口大学大学院理工学研究科）

Two component links with v-span 4 and their HOMFLY polynomials

We are concerned here with the HOMFLY polynomials of knots and links, and consider the question whether for links with v-span 4 the Jones polynomial determines the HOMFLY polynomial. For 3-braid links, Emmes announces that the HOMFLY polynomial is determined by the Jones polynomial. In this talk, we report some research results for two component links.

石原 海（山口大学教育学部）

Band surgeries and crossing changes between fibered links

If a fiber surface has a Hopf plumbing summand, then cutting along the spanning arc of the Hopf annulus results in another fiber surface. Such an arc corresponding to a Hopf plumbing can be characterized in terms of the monodromy. We will characterize all arcs on a fiber surface cutting along which gives another fiber surface. This will lead naturally to the construction of a generalized Hopf banding, and we will be able to leverage our results to relate to two other crucially important operations: band surgeries, and generalized crossing changes. We will complete the

characterization of band surgeries between fibered links, and generalized crossing changes between fibered links.

This is a joint work with Dorothy Buck, Matt Rathbun, and Koya Shimokawa.

佐藤進（神戸大学大学院理学研究科）
効果的 9 彩色に必要な色の数

n が合成数の場合に, Fox の n 彩色が効果的であるという概念を導入する. n が素数の場合には, 非自明に n 彩色された射影図上には少なくとも $\log_2 n + 1$ 種類以上の色が現れることを以前の研究で示したが, この不等式が効果的に n 彩色された射影図に対しても成り立つことを示す. さらに, 特に $n = 9$ の場合に, この不等式が最良であることを示す. この研究は中村氏（大阪電気通信大）と中西氏（神戸大）との共同研究である.

橋爪 恵（奈良女子大学人間文化研究科）
同じ射影図を持つリンクダイアグラムの集合の領域交差交換による同値類について

2010 年，清水氏らによって領域交差交換と呼ばれる，classical な link diagram における局所変形が定義された．ここで，同じ射影図を持つリンクダイアグラムの集合 $\{D_i\}$ に対して，D_i と D_j が領域交差交換で移り合うとき同値であるという同値関係を入れる．今回の講演ではこの同値関係による同値類について得られた結果を報告する.

三好 重明（中央大学理工学部）
結び目を平面への沈め込みの逆像として実現する構成について

開ソリッドトーラスのコアのケーブリングである結び目についてそれを平面への沈め込みの逆像として実現する具体的な構成について解説する.

河内 明夫（大阪市立大学数学研究所）
Splitting a 4-manifold with infinite cyclic fundamental group, revised

In this talk, we report some results in a revised version of the author's earlier paper on a TOP-splitting of a closed connected oriented 4-manifold with infinite cyclic fundamental group. We show that a closed connected oriented 4-manifold with infinite cyclic fundamental group is TOP-split if it is virtually TOP-split. As a consequence, we see that a closed connected oriented 4-manifold with infinite

cyclic fundamental group is TOP-split if the intersection form is indefinite. This also implies that every surface-knot with infinite cyclic fundamental group is TOP unknotted and every closed connected oriented smooth spin 4-manifold with infinite cyclic fundamental group is TOP-split.

小沢 誠（駒澤大学総合教育研究部）
Coiled surfaces for knots and links

A "coiled surface" for a knot is a closed surface containing the knot essentially. If the knot is non-separating in the coiled surface, it is called a "Neuwirth surface". The Neuwirth conjecture states that any non-trivial knot has a Neuwirth surface. In this talk, we introduce the "generalized Dehn twist" and the "generalized Murasugi sum" for a coiled surface, and show that the coiled surface remains a coiled surface for almost all knots obtained by the generalized Dehn twist, and after the generalized Murasugi sum. And also we show the existence of Seifert surface systems for closed surfaces and give a necessary and sufficient condition for the existence of mutually disjoint Seifert surface systems via an alternative proof of Fox's re-embedding theorem. This is a joint work with Koya Shimokawa.

安藤 龍郎（立教大学大学院理学研究科）
Realizing Exterior Cromwell moves on rectangular diagrams by Reidemeister moves

If a rectangular diagram represents the trivial knot, then it can be deformed into the trivial rectangular diagram with only four edges by a finite sequence of merge operations and exchange operations, without increasing the number of edges, which was shown by I. A. Dynnikov. Using this, Henrich and Kauffman gave an upper bound for the number of Reidemeister moves needed for unknotting a knot diagram of the trivial knot. However, exchange or merge moves on the top and bottom pairs of edges of rectangular diagrams are not considered in their proof. In this talk, we show that there is a rectangular diagram of the trivial knot which needs such an exchange move for being unknotted, and study upper bound of the number of Reidemeister moves needed for realizing such an exchange or merge move. In the course of proof, we study maximal number of crossings which a rectangular diagram with n vertical edges can have. (日本女子大学、林忠一郎氏、西川友紀氏との共同研究)

野坂 武史（九州大学数理学研究院）

線型形式としてのカンドルコサイクル不変量

そもそも結び目のカンドルコサイクル不変量とは, 彩色ひとつに対しコサイクルで重みを付けた不変量であった. 本講演ではアレクサンダーカンドルの G 族に於いて, 彩色ふたつ (resp. 三つ) に対し重み付けが可能で, 当不変量が bilinear (resp. Trilinear) form へと拡張する事を見る. この拡張と見地は、任意の群 G と右加群 M と G-不変双線形関数に対し出来る程一般的で, さらに当不変量の計算に役立つ. そして球面上レフシェッツ束や曲面ブレイドへの応用も簡単に紹介する.