Knots and Spatial Graphs 2020
A workshop in memory of Choon Bae Jeon
February 17–18, 2020
KAIST

Abstracts

Nafaa Chbili (United Arab Emirates University) (Canceled)

OBSTRUCTION TO QUASI-ALTERNATING LINKS

Quasi-alternating links represent an important class of links that has been introduced by Ozsváth and Szabó while studying the Heegaard Floer homology of the double-branched covers of alternating links. This new class of links is defined in a recursive way which is not easy to use in order to determine whether a given link is quasi-alternating. In this talk, we shall review some of the obstruction criteria that have been established to characterize quasi-alternating links and discuss the behavior of polynomial invariants of quasi-alternating links.

Gyo Taek Jin (KAIST)

JEON'S WORK ON SUPERBRIDGE INDEX

Although there are infinitely many knots with superbridge index n for every even integer $n > 2$, there are only finitely many knots with superbridge index 3.

In fact, the list $\{3_1, 4_1, 5_2, 6_1, 6_2, 6_3, 7_2, 7_3, 7_4, 8_4, 8_7, 8_9\}$ contains all 3-superbridge knots. Later 8_7 was eliminated from the list by Colin Adams.

Hwa Jeong Lee (Dongguk University Gyeongju)

GRID DIAGRAM FOR SINGULAR LINKS

In this talk, we define the set of singular grid diagrams which provides a unified description for singular links, singular Legendrian links, singular transverse links, and singular braids. We also classify the complete set of all equivalence relations on the singular grid diagrams which induce the bijection onto each singular object. This is a joint work with Byung Hee An.

Jung Hoon Lee (Jeonbuk National University)

DISK SURGERY AND THE PRIMITIVE DISK COMPLEXES OF THE 3-SPHERE

It is known that the primitive disk complex for a genus-2 Heegaard splitting of the 3-sphere is closed under disk surgery operation. We show that, for a genus-g Heegaard splitting of the 3-sphere with $g \geq 3$, the primitive disk complex for the splitting is not weakly closed under disk surgery operation. That is, there exist two primitive disks in one of the handlebodies of the splitting such that any disk surgery on one along the other one yields no primitive disks. This is a joint work with Sangbum Cho and Yuya Koda.

Sangyop Lee (Chung-Ang University)

TWISTED TORUS KNOTS WHICH ARE TORUS KNOTS

A twisted torus knot $T(p, q, r, s)$ is obtained from a torus knot $T(p, q)$ by twisting r adjacent strands of a torus knot $T(p, q)$ fully s times. We discuss the determination problem of parameters (p, q, r, s) for which $T(p, q, r, s)$ is a torus knot.

Hitoshi Murakami (Tohoku University) (Canceled)

Recent developments of the volume conjecture and its generalizations

The volume conjecture states that the asymptotic behavior of the colored Jones polynomial of a knot would determine the volume of the knot complement. In this talk, I will give a survey of the recent development of the conjecture and its generalizations.

Ryo Nikkuni (Tokyo Woman's Christian University)

Spatial linear complete graphs and generalized Conway-Gordon theorems

A spatial graph is said to be linear if any spatial edge of the graph is a straight line segment. In this talk, we review generalized Conway-Gordon theorems for linear spatial complete graph on n vertices, and introduce several problems on the behavior of the non-trivial Hamiltonian knots and links in a linear spatial complete graph presented by Jeon et al.

Reiko Shinjo (Kokushikan University)

On complementary n-gon faces associated to the knot and link diagrams

The number f_i of the i-gons of a knot diagram on the 2-sphere satisfying the equation $\sum_{i=2}^{\infty}(4-i)f_i = 8 \cdots (*)$, which follows from the well-known Euler's formula. In graph theory and geometry, there is a long history of investigations into those sequences of values that satisfy $(*)$ and that represent actual 4-valent graphs on the 2-sphere. In this talk, we introduce previous study and give a partial answer to the following problem: For any knot K and every sequence of non-negative integers $\{f_2, f_3, f_5, f_6, \ldots, f_n\}$ satisfying the equation $(*)$, does there exist an integer f_4 and a knot projection of K that has exactly f_k k-gons for all $2 \le k \le n$? Our result is an extension of Jeong's theorem in graph theory. This is a joint work with Kokoro Tanaka.

Hideo Takioka (Kyoto University)

On the Γ-polynomial and its cabling for knots

The Γ-polynomial is an invariant for oriented knots in the three sphere, which is the common zeroth coefficient polynomial of the HOMFLYPT and Kauffman polynomials. Let $p(> 0)$ and q be coprime integers. For a knot invariant I, we consider the (p, q)-cabling of I, that is, the map sending a knot K to the value $I(K^{(p,q)})$, where $K^{(p,q)}$ is the (p, q)-cable knot of K. In this talk, we focus on the (p, q)-cabling of the Γ-polynomial and show some results on the cases $p = 1, 2, 3$.

Kokoro Tanaka (Tokyo Gakugei University)

Shifting chain maps in quandle homology and cocycle invariants

Both of quandle cocycle invariants and shadow cocycle invariants are refinements of quandle coloring numbers. The formers are defined by using quandle 2-cocycles and the latters are defined by using quandle 3-cocycles. In this talk, we introduce a shifting chain map in quandle homology and give a relation between two invariants. This is a joint work with Yu Hashimoto.

Toshifumi Tanaka (Gifu University)

Symmetric unions and essential tori

A symmetric union in the 3-space is a knot, obtained from a knot and its mirror image, which are symmetric with respect to a 2-plane, by taking the connected sum of them and moreover by connecting them with some vertical twists along the plane. This is a generalized operation of the connected sum. A symmetric union is known to be an example of a ribbon knot. In this talk, we will consider satellite symmetric unions and show that a satellite symmetric union with minimal twisting number one such that the order of the pattern is an odd number ¿1 has two disjoint non-parallel essential tori in the complement. In particular, the pattern link complement contains an essential torus.

<div align="right">(February 16, 2020)</div>