Abstract

On quandle 4-cocycles of Alexander quandles on finite fields

Sukuse Abe (RIMS Kyoto University, M2)

When non-trivial quandle 3, or 4-cocycles are given, quandle (shadow) cocycle invariants for linked surfaces can be defined, and thus it is important to calculate 3, 4-cohomology groups. In this lecture, non-trivial 4-cocycles are introduced.

Connection between a weighted Poincaré model and a Lipschitz type holomorphic function space

Seungmin Baek (Pusan National University, M2)

We study properties of a weighted Poincaré model and connection with some Lipschitz type holomorphic function space. And we will prove that for each $0 < \alpha < 1$ there exists a weighted Poincaré distance d_α on $\mathbb{H}$ such that a holomorphic function f on $\mathbb{H}$ belong to Λ_α if and only if $|f(z) - f(w)| \leq C d_\alpha(z, w)$ for some $C > 0$ and all z, w in $\mathbb{H}$.

The cohomology ring of the GKM graph of a flag manifold of type G_2

Yukiko Fukukawa (Osaka City University, D1)

Let M be a closed smooth manifold with an action of a torus T satisfying some conditions. Then it is known that the equivariant cohomology of M is determined by combinatorial information called "GKM graph". In this talk, I would like to introduce the definition of GKM graph and the ring structure of $H_T^*(M)$ when M is a flag manifold of type G_2.

On pre-fiber surfaces of level n

Yukari Funakoshi (Nara Woman's University, D3)

The theory of pre-fiber surface was introduced by Kobayashi in [Ko]. In the paper, it is shown that

any pre-fiber surface is transformed into a fiber surface by twisting along an arc properly embedded in it, or by adding a band to it. In this talk, we give the definition of pre-fiber surface of level n for each $n \geq 1$, and show that any pre-fiber surface of level n is transformed into a fiber surface by twisting it along properly embedded arcs successively n times, or by adding bands successively n times. This gives a natural generalization of Kobayashi's result.

[Ko] T.Kobayashi, Fibered links and unknotting operations, Osaka J. Math. 26(1989), 699–742

Studies on a Bergman type mixed space

Sukyung Han (Pusan National University, M2)

I study the Mixed space Mp consisting of all holomorphic functions in H(G). I show that reproducing kernels, orthogonal projections and toeplitz operators on Mixed spaces.

Geometric mean inequalities via positive linear maps

Young A Han (Kyungpook National University, M2)

In this talk, we introduce the matrix geometric mean and their properties. As a main results, we prove matrix inequalities for the matrix geometric mean and positive linear maps. Using examples of positive linear maps, we can obtain several inequalities including well-known Cauchy's inequality and Hölder-McCarthy inequality.

Construction of a toric variety

Miho Hatanaka (Osaka City University, M1)

A complex n-dimensional normal algebraic variety having an effective torus action and a dense orbit is called a toric variety. A toric variety corresponds to a fan, and we can read geometrical properties of a toric variety from the corresponding fan. In this talk, we discuss how to construct a toric variety from a fan.

The arrow polynomial and 2-braid virtual links

Jieon Hong (Pusan National University, D1)

We discuss the arrow polynomial for virtual links which is a multi-variable polynomial and an extension of Jones polynomial. By using the arrow polynomial we investigate virtual 2-braid links.

Young Tableaux and Schur Polynomials

Tatsuya Horiguchi (Osaka City University, M1)

Young Tableaux are remarkable constructions of combinatorial study. Schur polynomials are defined by using it. These are applied to representations of symmetric groups and general linear groups. In this talk, I introduce Young Tableaux and Schur polynomials.

On normalized arrow polynomials of checkerboard colorable virtual links

Takanori Imabeppu (Hiroshima University, D1)

It is known that a certain property of Jones polynomials of checkerboard colorable virtual links is similar to that of classical links. Normalized arrow polynomials introduced by Kauffman are a generalization of Jones polynomials. I give a necessary condition for a virtual link to be checkerboard colorable in terms of the normalized arrow polynomial. Using this condition, we show that some virtual links are not checkerboard colorable.

Lattice presentation of links

Tsuyoshi Inazumi (Osaka City University, M2)

Let $x = (x_1, x_2, \cdots, x_n)$ be the lattice of a prime link. Let $|x|_N = (|x_{i_1}|, |x_{i_2}|, \cdots, |x_{i_n}|)$ be a permutation of $|x| = (|x_1|, |x_2|, \cdots, |x_n|)$ such that $|x_{i_1}| \leq |x_{i_2}| \leq \cdots \leq |x_{i_n}|$. In this talk , we estimate the number of $|x|_N$ of the prime links with respect to the length n.

Symplectic real Bott manifolds

Hiroaki Ishida (Osaka City University, D2)

A real Bott manifold is the total space of an iterated projective line bundle over a point such that each fibration is the projectivization of the Whitney sum of two real line bundles. In this talk, we determine the necessary and sufficient condition for a real Bott manifold to have a symplectic form.

Flatness of Weighted Shifts Associated by Hamburger Moment Sequences

Ju young Jin(Kyungpook National University, M2)

The flateness of weighted shifts has been studied to detect gaps between subnormality and hyponormality. A new notion of Hamburger $H(n)$-property is introduced via Hamburger moment matrix in this paper. More precisely, if W_α is a weighted shift with weight sequence $\alpha = \{\alpha_i\}_{i=0}^{\infty}$ with $H(n)$-property, $n \geq 2$ and $\alpha_{2k+2} = \alpha_{2k+3}$ for $k \geq 0$, then $\alpha_{2k+1} = \alpha_{2k+2} = \cdots = \alpha_{2k+n+1}$. In particular, if W_α has $H(\infty)$-property with $\alpha_{2k+2} = \alpha_{2k+3}$ for $k \geq 0$, then $\alpha_{2k} = \alpha_{2k+1} = \alpha_{2k+2} = \alpha_{2k+3} = \alpha_{2k+4} = \cdots$..

On the alternation number of the torus knots

Yewon Joung (Pusan National University, D1)

Recently, A. Kawauchi introduced a new numerical invariant for classical knots and links, called the alternation number, which is defined to be the minimum number of crossing changes that are necessary to convert a knot or link into an alternating one. In this talk, we review recent study for the alternation number of the torus knots and give a further estimation for the alternation number of a certain class of torus knots.

Example of Nil-Armendariz rings

Dawoon Jung (Pusan National University, D1)

We continue the study of nil-Armendariz rings initiated by Antoine. We firrst examine a kind of ring coproduct in which the Armendariz, nil-Armendariz, and weak Armendariz conditions are equivalent. We next observe the structure of nil-Armdnariz rings via the upper nilradicals. It is also shown that a ring R is Armendariz if and only if R is nil-Armenariz if and only if R is weak Armendariz, when R is a von Neumann regular ring.

Harmonic maps and loop groups

Daichi Kajio (Osaka City University, M1)

In this talk I shall explain the zero curvature forms and the harmonic map equation of surfaces into

compact Lie group and the construction of certain holomorphic maps into loop groups. This is very fundamental of the loop group approach to the harmonic map theory.

On p-Quasihyponormal Weighted Shifts on Directed Trees

A Lam Kim (Kyungpook National University, M2)

In [1], a weighted shift on directed trees was introduced and well-developed. Also, a lot of results in [1] generalize those of classical weighted shift. In this paper we characterize the p-quasihyponormal weighted shifts on directed trees. In addition some models of p-quasihyponormal weighted shifts on directed trees are discussed. In particular, such a model with two variables is considered for distinction the p-quasihyponormal weighted shifts on directed trees with respect to $p > 0$.

References : [1] Z. Jablonski, I. B. Jung and J. Stochel, Weighted shifts on directed trees, *Memoirs Amer. Math. Soc.* (in press).

Geometric mean in Toeplitz matrices

Hyun Duk Kim (Kyungpook National University, M2)

In this talk, we will introduce geometric mean of Toeplitz matrices. Recently, there are many geometry means on positive definite cone. But geometry mean of Toeplitz matrices is NOT Toeplitz matrix in general. So, we define bijective map from $\mathbb{T}_n$ to $\mathbb{R}_+^* \times \mathbb{D}^{n-1}$, where $\mathbb{T}_n$ is the set of Toeplitz matrices of order n and $\mathbb{D} = \{z \in \mathbb{C} : |z| < 1\}$, which is obtained by solving $Yule - Walker\ equation$. We define geodesic in $\mathbb{D}$ and using this, define geometric mean in $\mathbb{D}$. Finally, we define geometric mean in $\mathbb{T}$.

The Rasmussen invariant of periodic knots with rational quotients

Jieon Kim(Pusan National University, D1)

J. Rasmussen introduced a smooth concordance invariant of a knot K by using the Khovanov-Lee theory, now called the Rasmussen invariant $s(K)$. In this talk, we discuss the Rasmussen invariant of homogeneous knots and then compute the Rasmussen invariant of periodic knots whose quotients are 2-bridge links. Further, we give some applications.

A polynomial invariant of virtual magnetic link diagrams

Sera Kim (Pusan National University, D2)

We introduce a polynomial invariant of virtual magnetic link diagrams. We show that it gives lower bounds of the classical crossing number and the virtual crossing number of virtual links. Also we give various properties of this polynomial and examples.

A construction of amphicheiral links

Yoji Kobatake (Osaka City University, M2)

A link which is equivalent to its mirror image is called an *amphicheiral link*. In this talk, I am constructing several examples of amphicheiral links using an n-string tangle; in particular, I am giving an amphicheiral link with 21 crossing.

On Alexander polynomial of links admitting group action

In Sook Lee (Kyungpook National University, D3)

In this talk, we will construct symmetric links by using the method adapted from the graph theory, and calculate the Alexander polynomial of a symmetric link from the information of the Alexander polynomial of the base link and the corresponding group action.

On the divisibility of the class number of imaginary quadratic number

Jun Youp Lee (Kyungpook National University, M2)

For integers n and U greater than 1, consider the ideal class group of the imaginary quadratic field $Q(\sqrt{1-4U^n})$. This group contain an element of order n.

Application of modified Eikvil et al.'s method to inspect the defective regions on TFT-LCD panels

Seung Min Lee (Kyungpook National University, M2)

In this paper, we present a thresholding method for a vision-based automated defect inspection system

on the surface image of a thin film transistor liquid crystal display (TFT-LCD) panel. The TFT-LCD image has nonuniform brightness, which is a major difficulty in finding defective regions. There are many kinds of defects size. Our method is combined the Eikvil et al.'s thresholding with multi-scale. The proposed method effectively finds various size defective regions on TFT-LCD surfaces. Experimental results verified the performance of the proposed method.

The multi-variable index polynomial for virtual links and its properties

Sunho Lee (Pusan National University, D1)

We define the multi-variable index polynomial which is an extension of one-variable index polynomial introduced by Im-Lee-Lee and give several properties of this polynomial.

On flat braidzel surfaces of links

Takahiro Miura (Kobe University, D1)

Rudolph introduced a notion of braidzel surfaces as a generalizat ion pretzel surfaces, and Nakamura showed that any oriented link has a braidzel surface. In this talk, we introduce a notion of flat braidzel surfaces as a special type of braidzel surfaces, and show that any oriented link has a flat braidzel surface.

Deformation of a surface in 4-space

Akito Miyoshi (Osaka City University, M1)

The motion picture method is a method to describe a configuration of a closed oriented surface in the 4-space. In this talk, we explain how a surface is deformed into a normal form.

Knotoid and Seifert surface

Akira Ohnishi (Osaka City University, M1)

In this talk, we introduce a knotoid defined by V.Turaev, which is represented by a diagram whose underlying curve is a segment. We also discuss an application to a Seifert surface of a knot.

A construction of a link whose 0-surgery manifold is the 3- sphere

Shin'ya Okazaki (Osaka City University, D3)

It is known that any closed connected orientable 3- manifold is obtained by the 0-surgery of the 3-sphere along a link. Example of links whose 0-surgery manifolds are the 3-sphere are known. In this talk, we give a construction of a link whose 0-surgery manifold is the 3-sphere.

Existence of proper contact CR-product and mixed foliate contact CR submanifolds of $E^{2m+1}(-3)$

Eunmi Pak (Kyungpook National University, D3)

The first purpose of this talk is to study contact CR submanifolds of Sasakian manifolds and to investigate some properties concerning with ϕ-holomorphic bisectional curvature $\bar{H}_B$. The second purpose is to show an existence theorem of mixed foliate proper contact CR submanifold in the standard Sasakian space form $E^{2m+1}(-3)$ with constant ϕ-sectional curvature $c = -3$.

On hypersurfaces in semi-Riemannian space forms and Lagrangian submanifolds of oriented 2-plane Grassmann manifolds

Motoharu Sakurai (Osaka City University, D1)

It is known that the Lagrangian property and the mean curvature form formula for the Gauss map of oriented hypersurface in the standard sphere. This result provides many examples of Lagrangian submanifolds in oriented 2-plane Grassmann manifolds. In this talk I shall discuss how those results can be generalized into the case of oriented hypersurfaces in more general semi-Riemannian space forms and show some related examples.

Toeplitz operators on generalized Fock spaces

Jeongwan Seo (Pusan National University, D2)

We study Toeplitz operators on a certain generalized Fock space F^2_ϕ of entire functions f such that $fe^{-\phi} \in L^2(C, dA)$. Results obtained include characterizations of Carleson measures, bounded Toeplitz operators, compact Toeplitz operators, and Toeplitz operators in the Schatten p-classes.

On rational Seifert matrices

Kenji Shibata (Osaka City University, M2)

A rational knot is a 1-sphere embedded in a rational homology 3-sphere. A rational Seifert matrix of a rational knot is a rational square matrix derived from a Seifert surface of the rational knot whose S-equivalence class is known to be a knot invariant. A rational knot has a Seifert surface and thus has a rational Seifert matrix if and only if the knot is null-homologous in the rational homology 3-sphere. In this talk, we characterize the rational Seifert matrices in terms of a rational square matrix.

On invariants of twisted links

Mihwa Shin (Pusan National University, D3)

In this talk, we discuss a generalization of a polynomial invariant of virtual links to twisted links, which was defined by Y. Miyazawa, and explain various properties of this polynomial and examples.

On the mapping class group of a low dimensional manifold

Woo Yong Shin (Kyungpook National University, M1)

We will study the mapping class groups of 1- manifolds and 2-manifolds.

Infinitely many knots together with the trivial Conway polynomial and the trivial zeroth coefficient polynomial

Hideo Takioka (Osaka City University, M2)

We compute the Conway polynomial and the zeroth coefficient polynomial of the HOMFLYPT polynomial for a certain family of knots to obtain infinitely many knots together with the trivial Conway polynomial and the trivial zeroth coefficient polynomial.

"Gauss parametrization" of a compact orientable finitely branched minimal surface in R^3

Kosuke Tatemichi (Osaka City University, M1)

I study the paper "Index and Flat Ends of Minimal Surfaces" by Norio EJIRI and Motoko KOTANI (1993). In this talk, we define a "Gauss parametrization" of a complete orientable finitely branched minimal surface in R^3 with finite total curvature. By this concept, we can reduce the problem to a study of meromorphic functions on a compact Riemann surface.

On the growth functions of hyperbolic Coxeter groups

Yuriko Umemoto (Osaka City University, D1)

Hyperbolic Coxeter group is a discrete group generated by finitely many reflections in hyperplanes of hyperbolic space. We will introduce the growth functions of them and compare the growth functions of compact simplex hyperbolic Coxeter groups and that of non-compact simplex hyperbolic Coxeter groups.

Intersection of stable and unstable manifolds for invariant Morse functions

Hitoshi Yamanaka (Osaka City University, D3)

In Witten's Morse theory, it is important to consider the negative gradient flows which connect two critical points whose Morse indices differ by 1. However there are too many examples of Morse functions which have no such pairs of critical points. In the case of an invariant Morse-Smale function, we investigate the intersection of a stable manifold and an unstable manifold which corresponds to a pair of critical points whose Morse indices differ by 2. We also consider the group action on it.

On Quasi-$A(n,k)$ Class Weighted Shifts

Hye Yeong Yun (Kyungpook National University, M2)

The class A operator was developed to study the operator inequalities. The quasi-class A operator is a generalization of this operator. In this paper, quasi-$A(n,k)$ class operator for $n \geq 2$ and $k \geq 0$ is introduced as a new notion, which generalizes the quasi-class A operator. We characterize the backward extension of quasi-$A(n,k)$ class weighted shift for n and k. In addition, we discuss an related example with two variables.