ABSTRACTS

Dong Youp Suh (KAIST)
Introduction to Toric Topology I, II

In this lecture we will discuss some basics from toric geometry and Hamiltonian actions on symplectic manifolds. We then discuss topological analogue of these arguments

Yunhi Cho (Seoul Univ.)
Extended hyperbolic space and its problems I, II

We define and study an extended hyperbolic space which contains the hyperbolic space and de Sitter space as subspaces and which is obtained as an analytic continuation of the hyperbolic space. And we discuss the advantages of this new geometric model as well as some of its applications and problems.

Sungbok Hong (Korea Univ.)
Curve complex and low dimensional topology

We will overview curve complex and disc complex. And then we will discuss their applications to (1) classification of tunnel number 1 knots (due to Darryl McCullough), (2) bridge numbers of hyperbolic tunnel number one knots (due to Jesse Johnson) and (3) distance of Heegaard splittings of knot complements (due to Maggy Tomova).

Sang Jin Lee (Konkuk Univ.)
Braid groups and related groups I, II

In the first part of the talk, we survey the connections of braid groups with knots and links, reflection groups, and Artin groups. In the second part, we explain the notion of Garside group which is a lattice theoretic generalization of braid groups and Artin groups of finite type.

Alexander Stoimenow (KAIST)
Lie groups, Burau representation, and non-conjugate braids with the same closure link

We use the unitarization of the Burau representation, found by Squier, to prove that if Squier's form is definite the image of the representation is dense in the unitary group.
We can also prove that if Budney's form unitarizing the Lawrence-Krammer representation is definite and the representation is irreducible, its image is dense in the unitary group. This implies that, except possibly for closures of full-twist braids, all links have infinitely many conjugacy classes of braid representations on any non-minimal number of (and at least 4) strands.

Yongjin Song (Inha Univ.)
Loop space structures of some geometric groups I, II

From a small category we obtain a CW-complex via classifying space construction. The group completion of the classifying space of a monoidal category is homotopy equivalent to a loop space. Moreover, the group completion of the classifying space of a symmetric (resp. braided) monoidal category is homotopy equivalent to an infinite (resp. a double) loop space. The collection of some geometric groups (eg. braid groups, mapping class groups of surfaces) form a certain monoidal category, hence gives rise to a certain loop space. We study the loop space structures of those spaces.

Joonkook Shin (Choongnam Univ.)
Free actions of finite groups on the 3-dimensional nilmanifold

According to Thurston's conjecture, there are 8 kinds of geometries in dimension 3. A question naturally arisen is the problem of the classification of closed 3-dimensional manifolds with a geometric structure modeled on one of these eight types. The general question of classifying finite group actions on a closed 3-manifold is very hard. However, the actions on a 3-dimensional nilmanifold can be understood easily by the works of Bieberbach, L. Auslander and Waldhausen. In this talk, we review free actions of cyclic, abelian and finite groups on the 3-torus and study free actions of finite groups on 3-dimensional nilmanifolds.

Younggi Choi (Seoul National Univ.)
Homology of loop spaces

The homology of an iterated loop space is one of the main topics in topology. Besides its own interest it has many applications to other branches. Especially the homology of the triple loop space is very interesting from the gauge theoretic view point.

Sang-Eon Han (Honam Univ.)
Applied Topology and Computer Science

Applied topology has strongly contributed to the study of computer science . As a survey-type talk, we review various utilities of applied topology and show several topological methods to use in computer science.

Yanghyun Byun(Hanyang Univ.)
Is a Poincare duality group necessarily the fundamental group of an
Aspherical closed manifold?

The lecture begins with an introduction, in both algebraic and geometric contexts, of the notion of a Poincare duality group. Then we overview the question given by the title itself from the viewpoint of geometric topology in general. In the process we will review the closely related problems and results. We then introduce a recent result by the lecturer which shows that a Poincare duality group possesses a tangential property in a same way.

Cheol-Hyun Cho (Seoul National Univ.)
Introduction to A-infinity algebra and its deformations.

We explain the definitions and properties of A-infinity algebras or strong homotopy associative algebras and explain basic properties including Maurer Cartan element and its deformation theory.