PROGRAM

September 22, Thursday

10:00-11:00	**Semra Pamuk** Rank conditions for pseudo-free group actions on four manifolds
11:00-11:15	**Coffee Break**
11:15-12:15	**Neslihan Güğümcü** The Kauffman Skein module of multi-linkoids
12:15-13:30	**Lunch Break**
13:30-14:15	**Murat Altunbulak** Binary linear constant weight codes and n-ary symmetric difference
14:15-14:25	**Coffee Break**
14:25-15:25	**Fatma Altunbulak Aksu** Groups, algebras and linear codes
15:25-15:35	**Coffee Break**
15:35-16:35	**İpek Tuvay** On permutation automorphisms of linear codes

September 23, Friday

10:00-11:00	**Souyoung Choi (Webinar)** Cohomological rigidity problems in toric topology
11:00-11:15	**Coffee Break**
11:15-12:15	**Aslı Güçlükan İlhan** Small covers over a product of simplices
12:15-13:30	**Lunch Break**
13:30-14:15	**Sabri Kaan Gürbüzer** On Stiefel-Whitney classes of generalized real Bott manifolds
14:15-14:25	**Coffee Break**
14:25-15:10	**Celal Cem Sarıoğlu** Resonance varieties and arrangements
15:10-15:25	**Coffee Break**
15:25-16:10	**Ayşe Borat (Webinar)** A survey on homotopic distance

Binary linear constant weight codes and n-ary symmetric difference

Murat ALTUNBULAK

Dokuz Eylül University

A binary linear code C of length n is a subspace of the vector space F_2^n. The elements of C are called codewords. For a non-zero codeword c in C, the support of c is the set of positions of the coordinates of c which are non-zero. The Hamming weight of c, denoted by wt(c), is the number of elements of support of c. The minimum weight of C, denoted by wt(C), is defined as the minimum of Hamming weights of all non-zero codewords in C. A binary linear code is called constant weight code if every non-zero codeword has the same Hamming weight. In this talk we use the n-ary symmetric difference of the supports of the codewords in order to give a construction for the binary linear constant weight codes. Moreover, we give a characterization for the constant weight codes with given parameters in terms of supports of the codewords. The arguments in this characterization lead us to construct binary linear constant weight codes up to permutation equivalence. We also consider the permutation automorphism group a constant weight code and prove that the order of the permutation automorphism group of any given constant weight code of the dimension bigger than 2 is a multiple of six

Groups, algebras and linear codes

Fatma ALTUNBULAK AKSU

Mimar Sinan Fine Arts University

A linear code is a subspace of the vector space F_q^n. There are many different ways to characterize and construct linear codes. One direction is to investigate the codes by checking their permutation automorphism groups. One another direction is to consider them as ideals of group algebras. In both directions, there are more algebraic tools to measure the parameters and some specific structures of codes. In this talk, I will give a general overview about these related subjects and the problems on which researchers in the area are interested in.

A survey on homotopic distance

Ayşe BORAT

Bursa Technical University

In this talk, we will give a brief survey on the homotopic distance which is defined by Macias-Virgos and Mosquera-Lois. We will talk about its relation with TC and cat, introduce its higher analogues and describe how to discretized it.

Cohomological rigidity problems in toric topology

Suyoung Choi

Ajou University

A toric manifold is a compact non-singular toric variety. Little is known about the smooth classification of toric manifolds, but the following problem, called the cohomological rigidity problem for toric manifolds, was proposed by Masuda and Suh in 2008; Are two toric manifolds diffeomorphic if their integral cohomology rings are isomorphic as graded rings? This problem is still open, but only partial results have been known.

In this talk, I will introduce remarkable results on the cohomological rigidity problems including recent developments, and introduce some related problems in toric topology.

Castelnuovo-mumford regularity of simplicial complexes and graphs

Yusuf Civan

Suleyman Demirel University

This will be a short introductory lecture on the (Castelnuovo-Mumford) regularity of simplicial complexes and graphs. After briefly describing the main terminology, I will provide a survey of recent results and state some central open problems. If time permits, I plan to discuss its connection to the collapsibility theory of simplicial complexes introduced by Wegner. (joint work with T. Bıyıkoğlu)

Small covers over a product of simplices

Aslı Güçlükan İlhan

Dokuz Eylül University

A small cover is a smooth closed manifold M^n which admits a locally standard Z_2^n-action whose orbit space is a simple convex polytope P of dimension n. Two small covers over P are said to be Davis-Januskiewicz equivalent if there is a weakly Z_2^n-equivariant homeomorphism between them covering the identity on P. In 2008, Choi shows that there is a bijection between the set of small covers over an n-cube up to Davis-Januskiewicz equivalence and the set of acyclic digraphs on n-labeled vertices. Using this observation, Choi-Masuda-Oum (2017) characterize the small covers over a cube up to diffeomorphism in terms of some graph operations on acyclic digraphs. After giving a short overview of these results, we introduce the notion of an ω-weighted digraph and give a classification of small covers over a product of simplices up to weakly Z_2^n-equivariant homeomorphism in terms of some operations on acyclic ω-weighted digraphs.

The Kauffman Skein module of multi-linkoids

Neslihan Güğümcü

İzmir Insitute of Technology

Skein modules were independently introduced by Turaev and Przytycki in the end of 1980s. They can be viewed as generalizations of invariants based on the skein relation for knots in 3-manifolds, and yield invariants of the 3-manifolds. A multi-linkoid in a closed connected orientedsurface is a union of a number open-ended knots with closed knots.

In this talk, we introduce the idea behind our construction of the Kauffman skein module of multi-linkoids, that we first construct a space of all possible linear combinations of multi-linkoids and in this space impose the skein and framing relation, which characterize the bracket polynomials. This is a joint work with Bostjan Gabrovsek at the University of Ljubljana.

On Stiefel-Whitney classes of generalized real Bott manifolds

Sabri Kaan Gürbüzer

Dokuz Eylül University

In this talk, we will briefly introduce the generalized real Bott manifolds and give formulas for their first and second Stiefel-Whitney classes. We also give an interpretation of this result to the associated acyclic w-weighted digraphs. Using the Wu's formula, we specify the conditions under which some Stiefel-Whitney classes vanish. This is a joint work with Joint work with Aslı Güçlükan İlhan and Semra Pamuk.

Rank conditions for pseudo-free group actions on four manifolds

Semra Pamuk

Middle East Technical University

It has been shown by Edmonds'98 that, if a finite group G acts on a simply-connected, closed four manifold with $\beta(M) \geq 3$, homologically trivially, locally linearly and pseudo-freely than G must be cyclic. In this talk, we will try to extend this result to non-simply connected case by answering the following question: Given a closed, orientable 4-manifold M, what is the maximum value of rank(G) over all finite groups G which acts effectively, locally linearly, homologically trivially and pseudo-freely on M?

This is a joint work with Ian Hambleton.

Resonance varieties and arrangements

Celal Cem Sarıoğlu

Dokuz Eylül University

In this talk, we will first introduce the Orlik-Solomon algebra for hyperplane arrangements and resonance varieties of them. Then we will explain that how the first resonance variety of an arrangement can be determined by its combinatorics. Finally, we will discuss some results for higher dimensional resonance varieties.

On permutation automorphisms of linear codes

İpek Tuvay

Mimar Sinan Fine Arts University

A linear q-ary [n, k]-code is a k-dimensional subspace of F_q^n, where F_q is a finite field with cardinality q. There is a natural action of S_n on F_q^n which permutes the set of its coordinates. For a linear q-ary [n, k]-code C, the group of permutations in S_n which stabilizes C is called the permutation automorphism group of C and is denoted by PAut(C). Suppose that PAut(C) contains a non-trivial group G, then what can one say about C in terms of G? This is the problem that is of interest. In the first half of the talk, a brief introduction of these concepts will be given. Then recent results on this problem regarding binary linear codes will be given. This is a joint work with Fatma Altunbulak Aksu and Roghayeh Hafezieh.