Course: Toric Topology

Teacher(s): Đorđe Baralić, PhD

Course status: elective

ECTS: 12+6

Prerequisites: required finished course Algebraic topology

Goal

The aim is introduction of toric actions and their applications in topology, combinatorics and other disciplines to the students.

Outcomes

Students can read and follow advanced subjects in toric topology with help of relevant literature.

Contents

Theoretical teaching

Poencare serie and vectors of a simplicial complex. Simplicial and simple polytopes. Stanley-Reisner ring of a simplicial complex. Tor-algebras. Polyhedral product functors. Momment angle complexes. Hochster's formula and cohomology of moment angle complex. Quasitoric manifold. Cohomology of quasitoric manifolds. Homotopy properties of toric spaces. Real moment angle complexes and small covers. Buchstaber's invariant.

Practical teaching

Computations of the bigraded Betti numbers in software Macaulay 2. Applications of toric topology in combinatorics.

Recommended bibliography

- 1. Victor Buchstaber and Taras Panov, *Toric Topology*, Mathematical Surveys and Monographs Volume 204, American Mathematical Society, 2015
- 2. Victor Buchstaber and Taras Panov, Torus actions and their applications in topology and combinatorics, University Lecture Series, Volume 24, American Mathematical Society, 2002

Active teaching hours: 40	Theoretical: 34	Practical: 6
Methods of teaching		
34 theoretical sessions, monologue-dialogue method		

6 classes of practical training and project in homological algebra software and computations

Knowledge estimation: (max 100 points)

Seminar 35+Written exam 65