TOPOLOGY SEMINAR

"Small covers over a product of simplices"

By

Aslı Güçlükan
(Dokuz Eylül University)

Abstract: Choi shows that there is a bijection between Davis–Januszkiewicz equivalence classes of small covers over an n-cube and the set of acyclic digraphs with n-labeled vertices. Using this, one can obtain a bijection between weakly $(\mathbb{Z}/2)^n$-equivariant homeomorphism classes of small covers over an n-cube and the isomorphism classes of acyclic digraphs on labeled n vertices up to local complementation and reordering vertices. To generalize these results to small covers over a product of simplices we introduce the notion of ω-weighted digraphs for a given dimension function ω. It turns out that there is a bijection between Davis–Januszkiewicz equivalence classes of small covers over a product of simplices and the set of acyclic ω-weighted digraphs. After introducing the notion of an ω-equivalence, we also show that there is a bijection between the weakly $(\mathbb{Z}/2)^n$-equivariant homeomorphism classes of small covers over $\Delta^{n_1}\times\cdots \times \Delta^{n_k}$ and the set of ω-equivalence classes of ω-weighted digraphs with k-labeled vertices $\{v_1, \cdots, v_k\}$ where ω is defined by $\omega(v_i)=n_i$ and $n=n_1+\cdots+n_k$. As an example, we obtain a formula for the number of weakly $(\mathbb{Z}/2)^n$-equivariant homeomorphism classes of small covers over a product of three simplices.

Date: 12 October 2020
Time: 13:40
Place: Zoom
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