ON THE SECONDARY COHOMOLOGY OF
MOMENT-ANGLE COMPLEXES

IVAN LIMONCHENKO

Due to the results of Baskakov, Buchstaber, Panov, and Franz, cohomology algebra $H^*(Z_K; k)$ of a moment-angle complex $Z_K$ over a field $k$ can be described using Hochster decomposition of a Tor-algebra of the Stanley-Reisner ring $k[K]$ into a direct sum of reduced simplicial cohomology groups of all full subcomplexes in $K$.

In this talk we introduce a differential $d'$ acting on the Hochster decomposition leading us to the (bigraded) secondary cohomology $HH^*(Z_K) = H^*[H^*(Z_K), d']$ of $Z_K$, which is also a combinatorial invariant of $K$. We present certain examples of its computation and describe the class of simplicial complexes for which the secondary cohomology of moment-angle complexes equals either $k$, or $k \oplus k$. Furthermore, we show that $HH^*(Z_K)$ is invariant under the operation of doubling $K$ at its vertex. The last property opens a way to applications of toric topology in topological data analysis.

This talk is based on joint works with Anthony Bahri, Taras Panov, Jongbaek Song, and Donald Stanley.

Department of Mathematics, University of Toronto

E-mail address: ilimonch@math.toronto.edu