

On the contractibility of the Rips complexes of \mathbb{Z}^n

Žiga Virk

Seminar za geometrijsko topologijo, 29.05.2024

We will prove that the Rips complexes of \mathbb{Z}^n are contractible for large parameters r when using the word metric (i.e., as the Cayley graphs). The current bounds for the relevant scale parameters are derived from the Jung constants. We will explain the conjecture on how to obtain the optimal bounds for the scale parameters. The result is motivated by the geometric group theory, by the reconstruction results in topology, and by the stability theorems for persistent homology. Our approach is based on a novel concept of combinatorial topology: the local domination of a vertex in a simplicial complex.