TOPOLOGY SEMINAR

An introduction to Vietoris-Rips complexes

By

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Abstract: I will give an introduction to Vietoris-Rips complexes and their uses in applied and computational topology. If a dataset is sampled from some unknown underlying space (say a manifold), then as more and more samples are drawn, the Vietoris-Rips persistent homology of the dataset converges to the Vietoris-Rips persistent homology of the manifold. But little is known about Vietoris-Rips complexes of manifolds. An exception is the case of the circle: I will describe how as the scale parameter increases, the Vietoris-Rips complexes of the circle obtain the homotopy types of the circle, the 3-sphere, the 5-sphere, ..., until finally they are contractible. Much less is known about Vietoris-Rips complexes of spheres. I will also briefly explain how Vietoris-Rips complexes relate to generalizations of the Borsuk-Ulam theorem and to Gromov-Hausdorff distances between spheres.

Date: Mar 14, 2022
Time: 13:30 UTC+3
Place: Zoom
To request the event link, please send a message to cihan.okay@bilkent.edu.tr