

1116-55-950

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Interactive Visualization of 2-D Persistent Homology.

In topological data analysis, we often study data by associating to the data a filtered topological space, whose structure we can then examine using persistent homology. However, in many settings, a single filtered space is not a rich enough invariant to encode the interesting structure of our data. This motivates the study of multidimensional persistence, which associates to the data a topological space simultaneously equipped with two or more filtrations. The homological invariants of these “multifiltered spaces,” while much richer than their 1-D counterparts, are also far more complicated. As such, adapting the usual 1-D persistent homology methodology for data analysis to the multi-D setting requires some new ideas.

In this talk, I’ll introduce multi-D persistent homology and discuss joint work with Matthew Wright on the development of a tool for the interactive visualization of 2-D persistent homology. (Received September 15, 2015)