Institut f. Geometrie

Gastvortrag

Dienstag, 17.4.2018, 8:30

Seminarraum 2 Geometrie, Kopernikusgasse 24

Multi-Parameter Persistence

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The basic goal of topological data analysis is to apply algebraic topology tools to understand and describe the shape of data. In this context, homology is one of the most relevant topological descriptors. Persistent Homology (PH) tracks homological features along an increasing one-parameter sequence of spaces and its descriptors are well-appreciated for comparing and recognizing changes in the shape of data. The focus of this talk is on a generalization of Persistence Theory to the analysis of multivariate data, called Multiparameter Persistent Homology (MPH).

At the moment, MPH requires both computational optimizations towards the applications to real-world data, and theoretical insights for finding and interpreting suitable descriptors. We address the problem of reducing computational costs in MPH by proposing a fully discrete preprocessing algorithm. In doing so, we propose a new notion of optimal preprocessing algorithm for MPH and show that our proposed algorithm satisfies it for low dimensional domains. We provide experimental results in comparing our approach to other similar approaches, and in evaluating the impact of our approach on MPH computations.

Michael Kerber