【CL4-3】

Multidimensional Persistence: Computation and Applications

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Multidimensional persistent homology is highly relevant in the analysis of noisy data, as it offers the ability to filter by two or more parameters simultaneously. However, the algebraic complexity of multidimensional persistence modules makes it difficult to extract useful invariants in this setting, and until recently there was no available software for using multidimensional persistence in practice. In this talk, I will describe current work, part of the RIVET software project, to enable the use of multidimensional persistence in real-world applications. This talk will describe recent algorithmic and computational advances related to RIVET, such as the parallelization of the main RIVET algorithm, as well as current work with students at St. Olaf College to apply RIVET to real data.