

PRACTICAL EFFICIENCY OF PERSISTENT HOMOLOGY COMPUTATIONS

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In this talk I summarize a number of algorithmic techniques that enhance the efficiency of persistent homology computations. While the existing algorithms are at least quadratic in the number of input cells in the worst case, careful optimizations yield roughly linear behavior for practical data sets. I focus on discrete Morse theoretical preprocessing, which is especially useful for cubical (e.g. image) data. Additionally, efficient variants of the standard matrix reduction algorithm are discussed.

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