

MULTIPARAMETER PERSISTENCE LANDSCAPES

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An important problem in the field of Topological Data Analysis is defining topological summaries which can be combined with traditional data analytic tools. In recent work Bubenik introduced the persistence landscape, a stable representation of persistence diagrams amenable to statistical analysis and machine learning tools. In this talk we generalise the persistence landscape to multiparameter persistence modules providing a stable representation of the rank invariant. We show that multiparameter landscapes are stable with respect to the interleaving distance and persistence weighted Wasserstein distance, and that the collection of multiparameter landscapes faithfully represents the rank invariant. Finally we provide example calculations and statistical tests to demonstrate a range of potential applications and how one can interpret the landscapes associated to a multiparameter module.

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