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Multiparameter persistence vs parametrized persistence

Abstract

One of the key properties of 1-parameter persistent homology is that its output can entirely encoded in a purely combinatorial way via persistence diagrams or barcodes. However, many applications of topological data analysis naturally present themselves with more than 1 parameter. Multiparameter persistence suggests itself as the natural invariant to use, but the problem here is that the moduli space of multiparameter persistence diagrams has a much more complicated structure and we lack a combinatorial diagrammatic description. An alternative approach was suggested by work of Giansiracusa-Moon-Lazar, where they investigated calculating a series of 1-parameter persistence diagrams as the other parameter is varied. In this talk I will discuss work in progress to produce a refinement of their perspective, making use the Algebraic Stability Theorem for persistent homology and work of Bauer-Lesnick on induced matchings.