

Generalizing persistence diagrams to multidimensional persistent homology

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Abstract

Multidimensional persistence modules do not admit a concise representation analogous to that provided by persistence diagrams for real-valued functions. However, there is no obstruction for multidimensional persistent Betti numbers to admit one. Therefore, it is reasonable to look for a generalization of persistence diagrams concerning those properties that are related only to persistent Betti numbers. In this talk, I review some results recently obtained with A. Cerri. The persistence space of a vector-valued continuous function is introduced to generalize the concept of persistence diagram in this sense. The main result is its stability under function perturbations: any change in vector-valued functions implies a not greater change in the Hausdorff distance between their persistence spaces.