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**The Persistence Mayer Vietoris spectral sequence**

**Abstract**

In this talk, linear algebra for persistence modules will be introduced, together with a generalization of persistent homology. This theory permits us to handle the Mayer–Vietoris spectral sequence for persistence modules, and solve any extension problems that might arise. The result of this approach is a distributive algorithm for computing persistent homology. That is, we restrict simplicial data to local matrices, while merging homological knowledge by means of the higher spectral sequence differentials. This approach has the added advantage that one can recover local information relative to the used cover. This addresses the common complaint that persistent homology barcodes are ‘too blind’ to the geometry of the data. To conclude, we will present PerMaViss, a python3 library that implements these ideas, together with some experimental results.