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Tamal K Dey* (dey.8@osu.edu), Dept. of CSE, The Ohio State U., 2015 Neil Avenue, Columbus, OH 43210, and **Fengtao Fan** and **Yusu Wang**. *Computing Topological Persistence for Simplicial Maps*.

Algorithms for persistent homology and zigzag persistent homology are well studied for homology modules where homomorphisms are induced by inclusion maps. However, the same is not true for homomorphisms induced by other continuous maps such as simplicial ones. In this work, we propose a practical algorithm for computing persistence and zigzag persistence with homology under \mathbb{Z}_2 coefficients for a sequence of general simplicial maps. We leverage the fact that every simplicial map can be simulated by inclusion maps. This helps to convert a (possibly zigzag) filtration induced by simplicial maps into another zigzag filtration induced by only inclusion maps sharing the same persistence diagram. Furthermore, the persistent homology for a non-zigzag filtration connected by simplicial maps can be directly computed using the recently introduced concept of annotations. The maintenance of a consistent annotation implies the maintenance of a consistent cohomology basis, which by duality, also implies a consistent homology basis. With this new tool, we also provide an alternative way to approximate the persistence diagram of a filtration of Rips complexes where vertex collapses are used to tame the blow-up in size. (Received August 22, 2012)