1139-13-385 **Ezra Miller*** (ezra@math.duke.edu). *Data structures for real multiparameter persistence modules.*

Persistent homology with multiple real parameters is multigraded commutative algebra over polynomial rings with real exponents. For that context and beyond, a theory of modules over arbitrary posets is developed to define computationally feasible, topologically interpretable data structures, in terms of birth and death of homology classes. The noetherian hypothesis, which routinely fails in the presence of real exponents, is replaced in the general setting of modules over posets by a *finitely encoded* condition, defined combinatorially and developed algebraically. The finitely encoded hypothesis captures topological tameness of persistent homology, and poset-modules satisfying it can be specified by *fringe presentations* that reflect birth-and-death descriptions of persistent homology. The geometric and algebraic theory of modules over posets is further developed along classical lines over real-exponent semigroup rings, with complete theories of minimal primary and secondary decomposition, associated and attached faces, minimal generators and cogenerators, socles and tops, Matlis duality, and minimal fringe presentation. (Received February 17, 2018)