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**Federico Castillo, Jeremy L. Martin\*** (jlmartin@ku.edu) and **José A. Samper**. *Hopf monoids of ordered simplicial complexes*.

We study pure ordered simplicial complexes (i.e., simplicial complexes with a linear order on their ground sets) from the Hopf-theoretic point of view. We define a *Hopf class* to be a family of pure ordered simplicial complexes that give rise to a Hopf monoid under join and deletion/contraction. The prototypical Hopf class is the family of ordered matroids. The idea of a Hopf class allows us to give a systematic study of simplicial complexes related to matroids, including shifted complexes, broken-circuit complexes, and *unbounded matroids* (which arise from unbounded generalized permutohedra with 0/1 coordinates). Using the topological methods of Aguiar and Ardila, we compute a multiplicity-free and cancellation-free antipode formula for ordered generalized permutohedra. (Received August 05, 2021)