Emanuele Delucchi (Fribourg/Freiburg)

Fundamental Polytopes of Metric Spaces via Parallel Connection of Matroids

Abstract for the Combinatorics and Geometry/Topology Seminars 2019 October 15

Motivated by applications in phylogenetics, Linard Hoessly and I tackle the problem of a combinatorial classification of finite metric spaces via their fundamental polytopes, as suggested by Vershik in 2010. We consider a hyperplane arrangement associated to every split pseudometric and, for tree-like metrics, we study the combinatorics of its underlying matroid. We give explicit formulas for the face numbers of fundamental polytopes and Lipschitz polytopes of all tree-like metrics, and we characterize the metric trees for which the fundamental polytope is simplicial.
