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Geometric complexity of Voronoi cells in optimal CVTs in 3D

Centroid Voronoi Tessellations (CVT) are tessellations using Voronoi regions of their centroids. This is closely related to Gershó's conjecture, which states that there exists an asymptotically optimal CVT whose Voronoi regions are all rescaled copies of the same polytope. Straightforward in 1D, and proven in 2D, Gershó's conjecture is still open for higher dimensions. One of the main difficulties is that Gershó's conjecture is a strongly nonlocal, infinite dimensional minimization problem (even in 3D). In this talk we will present some recent results which reduce Gershó's conjecture to a local, finite dimensional problem in 3D. Joint work with Rustom Choksi.