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Minimizing isoperimetric partitions in higher dimensions via variational autoencoders

In this talk, I will present a numerical algorithm for an isoperimetric partitioning problem with volume constraints. The algorithm is based on a parametrization of each volume as image of reference volumes under diffeomorphisms. These parametrizations are represented via variational autoencoder neural networks that are trained together to minimize total perimeter of their boundaries while respecting volume and partitioning constraints. For the computations we rely on Monte-Carlo methods, thus allowing us to apply our algorithm in high dimensions.