ID de Contribution: **6** Type: **Non spécifié**

Quantitative Stability of Optimal Transport Maps and Linearization of the 2-Wasserstein Space

lundi 27 janvier 2020 16:20 (50 minutes)

This work studies an explicit embedding of the set of probability measures into a Hilbert space, defined using optimal transport maps from a reference probability density. This embedding linearizes to some extent the 2-Wasserstein space, and enables the direct use of generic supervised and unsupervised learning algorithms on measure data. Our main result is that the embedding is (bi-)Hölder continuous, when the reference density is uniform over a convex set, and can be equivalently phrased as a dimension-independent Hölder-stability results for optimal transport maps. Joint work with A. Delalande and F. Chazal.

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