

Scaling limit of Wasserstein metric on Gaussian mixture models (A12)

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Motivation:

Optimal transport on the family of Gaussian distributions is related to the geometry of positive definite matrices and has rich structure. How about the OT over the family of Gaussian mixture distributions?

Main results I:

Following the dynamical formulation and metric perspective of OT, we derive a limit metric on 1D equidistant lattice model:

- An advanced Laplace asymptotic
- Limit metric is diagonal, facilitating fast natural gradient calculation
- Relate to graph Laplacian and OT on graph

- **Main results II:**
- Generalize the metric to several complex lattice models
 - Inhomogeneous lattice
 - Second order metric
 - Mixture model with moving support, illustrate connection with moving mesh method and information geometry.
- **Main results III:**
- Application to numerical simulation of the partial differential equation:
 - Structure preserving properties inherited from Wasserstein gradient flow
 - Low computational cost as the scaling metric is easily invertible

