

# Partial $L^1$ Monge-Kantorovich Problem

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We consider the Monge-Kantorovich problem with transportation cost equal to distance and a relaxed mass balance condition: instead of optimally transporting one given distribution of mass onto another with the same total mass, only a given amount of mass,  $m$ , has to be optimally transported.

In this partial problem the given distributions are allowed to have different total masses and  $m$  should not exceed the least of them. We derive and analyze a variational formulation of the arising free boundary problem in optimal transportation [1]. Furthermore, we introduce and analyze the finite element approximation of this formulation using the lowest order Raviart-Thomas element. Finally, we present some numerical experiments where approximations to both the optimal transportation domains and the optimal transport between them are computed.

## References

- [1] J. W. Barrett and L. Prigozhin, Partial  $L^1$  Monge-Kantorovich Problem: Variational Formulation and Numerical Approximation, *Interfaces and Free Boundaries* **8** (2009) 201–238.

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