

# Optimal transportation between unequal dimensions

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In this talk, we describe some recent developments concerning the Monge-Kantorovich problem of optimal transportation between probability densities on manifolds with different dimensions. We show the general case can be reduced to a nonlocal differential equation, whose solutions are not generally smooth. Under suitable topological conditions, we also prove that solutions are smooth if and only if a local variant of the same equation admits a smooth and elliptic solution. We go on to establish conditions for regularity when the target is one-dimensional.

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