

**Title:** Covariance modulated optimal transport

**Abstract:** We study the properties of a generalized Wasserstein metric space, where the L2 inner product of the dynamical formulation is weighted by the covariance metric at this point in probability space. Such a metric arises for example as the mean-field limit of certain Ensemble Kalman methods such as the Kalman-Bucy filter and the Ensemble Kalman Sampler, providing a gradient flow structure. We introduce a splitting into shape and moments that allows to generalize a number of results for the classical Wasserstein metric.