

## Two sample test for high dimensional data using Monge-Kantorovich transform

Consider two samples  $X_1, \dots, X_n$  and  $Y_1, \dots, Y_n$  in  $\mathbb{R}^d$  of the same size  $n$ . We suppose that all observations are independent, and each sample is i.i.d. with the underlying distribution  $P$  resp.  $Q$ . The null hypothesis means  $P = Q$ . The test procedure uses the recent idea of mapping the pooled dataset  $\mathbf{X}, \mathbf{Y}$  into the uniform discrete set on the unit ball by the Monge-Kantorovich transform.

### Workpackages:

1. Efficient scalable implementation of the test working for large dimension  $d$ ;
2. application to change point detection problem;
3. application to tracking problem.

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### Literature

[CHE17] Chernozhukov, Victor, et al. "Monge-Kantorovich depth, quantiles, ranks and signs." *The Annals of Statistics* 45.1 (2017): 223-256.

[RAM17] Ramdas, Aaditya, Nicolás García Trillos, and Marco Cuturi. "On Wasserstein Two-Sample Testing and Related Families of Nonparametric Tests." *Entropy* 19.2 (2017): 47.