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ON OPTIMAL MATCHING OF GAUSSIAN SAMPLES III

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Abstract. This article is a continuation of the papers [10], [11] in which the optimal matching problem and the related rates of convergence of empirical measures for Gaussian samples are addressed. A further step in both the dimensional and Kantorovich parameters is achieved here, proving that, given independent random variables $X_1, \dots, X_n$ with common distribution the standard Gaussian measure μ on $\mathbb{R}^d$, $d \geqslant 3$, and $\mu_n = \frac{1}{n}\sum_{i=1}^n \delta_{X_i}$ the associated empirical measure,

$$\mathbb{E}[\mathrm{W}_p^p(\mu_n, \mu)] \approx \frac{1}{n^{p/d}}$$

for any $1 \leqslant p < d$, where W_p is the pth Kantorovich–Wasserstein metric. That is, in this range, the rates are the same as in the uniform case. The proof relies on the pde and mass transportation approach developed by L. Ambrosio, F. Stra and D. Trevisan in a compact setting.

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