

COLLOQUIUM



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Title: Kernel Two-sample Metrics in High-dimensio

Abstract: Motivated by the increasing use of kernel-based metrics for high-dimensional and large-scale data, we study the asymptotic behavior of kernel two-sample tests when the dimension and sample sizes both diverge to infinity. We focus on the maximum mean discrepancy (MMD), including MMD with the Gaussian kernel and the Laplace kernel, and the energy distance as special cases. We derive asymptotic expansions of the kernel two-sample statistics, based on which we establish the central limit theorem (CLT) under both the null hypothesis and the local and fixed alternatives. The new non-null CLT results allow us to perform asymptotic exact power analysis, which reveals a delicate interplay between the moment discrepancy that can be detected by the kernel two-sample tests and the dimension-and-sample orders. The asymptotic theory is further corroborated through numerical studies.

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