

國立中山大學應用數學系

學術演講

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講題：Ball Divergence: Multivariate Imbalance Test

時間：2017/1/11（星期三）14:10 ~ 15:00

地點：理學院四樓理 SC 4009-1 室

茶會：15:00 於理 SC 4010 室（系辦公室）

摘要

In this talk, we first introduce Ball Divergence, a novel measure of the difference between two probability measures in Banach space, and show that the Ball Divergence of two probability measures is zero if and only if these two probability measures are identical. Using Ball Divergence, we present a metric rank test procedure to detect the equality of distribution measures underlying independent samples. We show that this multivariate two sample test statistic is consistent with the BallDivergence, and it converges to a mixture of χ^2 distributions under the null hypothesis and a normal distribution under the alternative hypothesis. Importantly, we prove its consistency against a general alternative hypothesis. Even without the moment assumption, the test based on BallDivergence is robust to the heavy-tail data. Moreover, the result does not depend on the ratio of the two imbalanced sample sizes, ensuring that the test is robust and can be applied to imbalanced data. Numerical studies confirm that our test is superior to several existing tests in terms of Type I error and power. We conclude our paper with two applications of our method: one is for virtual screening in drug development process and the other is for genome wide expression analysis in hormone replacement therapy.

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