國立中山大學應用數學系 學術演講

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講　題：Comparison of Two Covariance Operators

時　間：2014/06/12（星期四）15：10～16：00

地　點：理學院四樓理 SC 4009-1 室

茶　會：16:00 於理 SC 4010 室（系辦公室）

摘要

The statistical inference where the objects of interest are random functions has recently become popular. Considering two sets of data that are continuous smooth functions we may ask whether the basic stochastic characteristics, i.e. the mean functions as well as covariance operators defined by covariance functions coincide. In the lecture we concentrate on a two-sample decision problem on the equality of two covariance operators A and B. The problem was introduced in Benko et al (2009) and studied by Panaretos et al (2010).

Panaretos et al (2010) suggested to choose a set of functions ϕ_1, …, ϕ_p and check whether $\langle \phi_i, (A - B)\phi_{i'} \rangle =$ 0 for $1 \leq i \leq p$, $1 \leq i' \leq$ p. It is clear that using a finite set of test functions, one cannot generally find all departures from $A = B$ if A and B are infinite dimensional. On the other hand, the test functions $\{ \phi_i \}$ may be chosen to detect departures from $A = B$ that are of special interest to us. Clearly, in test procedures the functions $\{ \phi_i \}$ may be chosen to be functions of observations.

It may happen that we are interested in detection of $A_K \neq B_K$, where A_K, resp. B_K, represent the "main part" of the corresponding operators. If the hypothesis $A_K \neq B_K$ is not rejected and if $\|A - A_K\|$ as well as $\|B - B_K\|$ are relatively small, we may conclude that if A and B differ from each other, then they differ only slightly.

We apply the suggested procedure to daily mean temperatures measured in two stations, namely in Milan in years 1763-1998 and in Padua in years 1766 - 1982.

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