Department of Statistics

DISSERTATION PRESENTATION AND DEFENSE

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Asymptotic Theory for Simultaneous Inference Under Dependence

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ABSTRACT

This thesis is an attempt towards providing some interesting new result for simultaneous inference under dependence. One of the key idea behind establishing such asymptotic theory is an invariance principle where the partial sums are approximated by Gaussian analogue. The first work extends achieving the popular KMT-type optimal bound to non-linear, nonstationary and weakly dependent vector-valued processes. In the second work, we use the invariance principle to construct simultaneous confidence intervals for time-varying coefficient models. Using Bahadur representation, it was possible to construct such confidence bands for models as complicated as ARMA-GARCH or generalized regression under a single framework. The third work in this thesis talks about the change-point estimation problem which is a widely popular topic in statistics, electrical engineering and computer science. As a summary, this thesis is a systematic presentation of several interesting problems in simultaneous inference for vector-valued processes that can be explored with the help of a powerful invariance principle.

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