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(1) Kiban (A-15H02061) (M. Taniguchi, Research Institute for Science & Engineering, Waseda University)
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Hakone Seminar
Recent Developments in Statistics

November 12 - 14, 2015
Hotel Green Plaza Hakone:
http://www.hgp.co.jp/language/english/sp/

Organizer:
Masanobu TANIGUCHI
(Research Institute for Science & Engineering, Waseda University)

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November 12

14:30 - 15:00: Akashi, F. (Waseda University)
Frequency domain self-weighted empirical likelihood for stable processes

15:00 - 15:30: Liu, Y. (Waseda University)
Variance Stabilization and Robust Permutation Tests

Coffee Break

16:00 - 16:30: Nagahata, H. (Waseda University)
Discriminant and cluster analysis of high-dimensional time series data by a class of disparities

16:30 - 17:00: Suto, Y. (Waseda University)
Improved Estimation for the Autocovariance Matrix of Vector-valued Gaussian Stationary Processes

November 13

9:30 - 10:10: Hirukawa, J. (Niigata University)
Investigating long run linear relationships between non constant variances of economic variables

10:10 - 11:00: Huang, H.C. (Academia Sinica)
Graphical Regression

Coffee Break

11:20 - 12:10: Koenker, R. (University of Illinois)
Frailty, Profile Likelihood and Mortality

Lunch

14:00 - 14:50: Kutoyants,Y. (Universite du Le Mans)
On misspecification in regularity and properties of estimators

Coffee Break

15:10 - 16:00: Negri, I. (University of Bergamo)
Goodness-of-fit Testing for Ergodic Diffusion Process with Shift Parameter

16:00 - 16:50: Taniguchi, M. (Waseda University)
Robust portfolio estimation under skew-normal return processes

November 14

9:30 - 11:30: General Discussion

Abstracts:

Akashi, F. (Waseda University)
Frequency domain self-weighted empirical likelihood for stable processes

Abstract: In this talk, we construct nonparametric inference for a stable autoregressive process, which is one of infinite variance processes. In particular testing problems for unknown quantities of the stable processes such as autocorrelations are focused on. To overcome difficulty of the infinite variance of the process, we make use of the method called self-weighting, and the frequency domain self-weighted empirical likelihood (FDSWEL) statistic is proposed. We elucidate the asymptotic distribution of the FDSWEL statistic, and show that the limit distribution is pivotal without assuming that we know neither the dependent structure of the process nor the distribution of the innovation process. Furthermore, the advantage of our method is shown via some simulation experiments.

Liu, Y. (Waseda University)
Variance Stabilization and Robust Permutation Tests

Abstract: The purpose of this talk is twofold. First, we consider the variance stabilization of Box-Cox transformation. Box-Cox transformation is one of the most famous transformations to stabilize the variance of estimators. We focus on the dependent random variables with the multivariate Tweedie distributions. Under a new condition between dispersion parameters, we derive the formula for power parameter in the Box-Cox transformation for variance stabilization. The result shows that even in the dependent case, the same formula as that for identically and independent distributed random variables holds. In the second part, we consider the robust permutation test from the point of view of variance stabilization. As a consideration, we give the asymptotic properties of permutation tests in the frequency domain with some numerical examples.

Nagahata, H. (Waseda University), with Liu, Y., Uchiyama, H., and Taniguchi, M.
Discriminant and cluster analysis of high-dimensional time series data by a class of disparities

Abstract: We introduce a class of disparities for discriminant and cluster analysis of high-dimensional time series analysis. Although a scale adjusted disparity function was proposed for high-dimensional independent and identically distributed data, it is shown that the method is not preferable in the case when the observations are dependent. The disparity given in this paper is based on the Mahalanobis distance with the jackknife type adjustment. We compared the misclassification error of several classifier for high-dimensional time series data by numerical experiments. Then, the proposed disparity

provides smaller error rates. The performance is also verified by real data of companies listed with the first and second sections of the Tokyo Stock Exchange. We conclude that our adjustment method of jackknife type is suitable for the discriminant and cluster analysis of high-dimensional dependent data.

Suto, Y. (Waseda University)
Improved Estimation for the Autocovariance Matrix of Vector-valued Gaussian Stationary Processes

Abstract: We discuss the problem of shrinkage estimation for the autocovariance matrix of a Gaussian stationary vector-valued process. To improve on the usual sample autocovariance matrix with respect to the mean squares error, some kinds of empirical Bayes estimator are proposed when both the mean of the stochastic process is zero and that is non-zero. We evaluate the asymptotic risk differences, and consider the conditions which the shrinkage estimators improve on the usual estimators. We also illustrate the improvements by the shrinkage estimators in case of a simple VAR(1) model and a VMA(1) model.

Hirukawa, J. (Niigata University) with Raïssi, H., and Saumard, M.
Investigating long run linear relationships between non constant variances of economic variables

Abstract: In this talk a methodology for investigating long run linear relationships between the non constant variance structures of time series variables is developed. The asymptotic behavior of a cumulative sum (CUSUM) test statistic for detecting departures from a linear relationship in variance is established. Noting that the processes under study have unknown time-varying variances structures our tools are based on a wild bootstrap technique. The theoretical outputs are illustrated by means of Monte Carlo experiments.

Huang, H.C. (Academia Sinica)
Graphical Regression

Abstract: Graphical models have proven useful in describing relations among interacting units. Motivated from neuroimaging analysis, we propose graphical regression to link the inverse of covariance matrix to covariates, to locate the structural change of a graph as a function of covariates. Statistically, a constrained likelihood method is constructed to estimate the model parameters. Computationally, a computationally efficient algorithm is developed based on an alternating direction method of multipliers. Some numerical and theoretical properties will also be provided.

Koenker, R. (University of Illinois)
Frailty, Profile Likelihood and Mortality

Abstract: Unobserved heterogeneity is an increasingly common feature of statistical survival analysis where it is often referred to as frailty. Parametric mixture models are frequently used to capture these effects, but it is sometimes desirable to consider nonparametric mixture models as well. We illustrate the latter approach with a reanalysis of a well-known large scale medfly mortality study. Recent developments in convex optimization are exploited to expand the applicability of the Kiefer-Wolfowitz nonparametric maximum likelihood estimator for mixture models. Some resulting problems of profile likelihood will also be addressed. Joint work with Jiaying Gu (U. of Toronto).

[1] Kiefer, J., and J. Wolfowitz (1956). “Consistency of the Maximum Likelihood Estimator in the Presence of Infinitely Many Incidental Parameters," *The Annals of Mathematical Statistics*, 27, 887-906.

Kutoyants,Y. (Universite du Le Mans)
On misspecification in regularity and properties of estimators

Abstract: We consider the problem of parameter estimation by the continuous time observations of signals in white Gaussian noise. The properties of the MLE are described in the situations, where the statistician uses wrong theoretical models. In particular, the real observations contain the smooth with respect to the unknown parameter signal, but the statistician supposes that the observed signal has a discontinuity or cusp-type singularity. We describe the rates of convergence and characterize the limit distributions of the MLE in the different situations of such types. (Joint work with O. Chernoyarov, A.P. Trifonov and S. Dachian)

Negri, I. (University of Bergamo)
Goodness-of-fit Testing for Ergodic Diffusion Process with Shift Parameter

Abstract: A problem of goodness-of-fit test for ergodic diffusion processes is presented. In the null hypothesis the drift of the diffusion is supposed to be in a parametric form with unknown shift parameter. Two Cramer-Von Mises type test statistics are studied. The first one is based on local time estimator of the invariant density, the second one is based on the empirical distribution function. The unknown parameter is estimated via the maximum likelihood estimator. It is shown that both the limit distributions of the two test statistics do not depend on the unknown parameter, so the distributions of the tests are asymptotically parameter free. Some considerations on the consistency of the proposed tests and some simulation studies are also given. (Joint work with Li Zhou)

Taniguchi, M. (Waseda University), with Petkovic, A., Kase, T., DiCiccio, T. and Monti, A.C.

Robust portfolio estimation under skew-normal return processes

Abstract: In this talk, we discuss influence of skewness parameter δ of skew-normal distribution for return processes and the central sequence of the local asymptotic normality (LAN) of the family of probability distribution of observations. Based on the asymptotic distribution of portfolio estimators $\hat{\theta}$ for Non-Gaussian dependent return process, we evaluate an influence of δ on the asymptotic variance V(δ) of $\hat{\theta}$. From this, we can see robustness and sensitivity of portfolio estimator, and provide numerical examples, which show some interesting features of the influence. Next, we discuss an influence IMC of skewness on the central sequence of LAN assuming that mean vector and coefficient matrices which are specified by unknown parameter θ. Here we use some fundamental LAN results by Taniguchi and Kakizawa (2000) and Shiraishi and Taniguchi (2007). We also provide numerical examples for IMC.