Naseda Seminar on Time Series

Statistics

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December 264& 27, 2019 Waseda University, Nishi-Wased Meeting Room (Access map: https://www.wasedarip/top/en/ac

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 JSPS KAKENHI Kiban (S) Grand in A (M. Taniguchi)
Waseda Research Institute for Science

Waseda University, Rikou-Danwakai

Waseda Seminar on Time Series & Statistics

Date: December 26 & 27, 2019

Venue: Waseda University, Nishi-Waseda Campus Building 63 - 1 Meeting Room

(Access map: <u>https://www.waseda.jp/top/en/access/nishiwaseda-campus</u>)

This seminar is supported by:

- JSPS KAKENHI Kiban (S) Grand-in-Aid No. 18H05290 (M. Taniguchi)
- Waseda Research Institute for Science & Engineering, Institute for Mathematical Science
- Waseda University, Rikou-Danwakai

December 26

Talk (I) 14:15 - 14:30

Title: Parameter Estimation of Circular Distribution of MA(p) Type based on Binary Series

Speaker: Yuichi Goto, Waseda University

Abstract: Directional statistics have received a great deal of interest in recent years, and a variety of distributions on the circle have been proposed. In this talk, we propose circular distributions of a moving average model of order \$p\$ type which includes the cardioid distribution, and discuss the problem of parameter estimation based on binary series.

We give an explicit form of the root \$n\$ consistent estimator based on clipped series, which enables us to construct an efficient estimator by the Newton--Raphson iterative method. We also show a robustness of the proposed estimator when the probability density function is contaminated with a noise term.

Talk(II) 14:30 - 14:45

Title: Modified LASSO estimators for linear quantile regression models with long-memory disturbances

Speaker: Yujie Xue, Waseda University

Abstract: It is the fundamental task of statistics to find out internal relationship of diversity of scientific observations. Quantile regression offers the opportunity for a more complete view of the relationships among stochastic variables. In this talk, the properties of modified LASSO estimators for linear quantile regression models is discussed when the disturbances are long-memory which implies the dependence on the disturbances before decays very slowly. We derive the asymptotic distributions of the estimators when there is no zero parameter and also derive the property of the estimators when zero parameters exist under some appropriate regularity conditions. Furthermore, when the dimension of parameters increases with respect to n, the consistency on the probability of the correct selection of penalty parameters is shown under certain regularity conditions.

Talk(III) 14:45 – 15:00 Title: Robust regression on hyper-cylinders Speaker: Fumiya Akashi, Graduate School of Economics, The University of

Tokyo

(Joint work with Holger Dette, Ruhr-Universität Bochum)

Abstract: This talk considers the nonlinear regression model whose predictor is a random vector on a hyper-sphere. This setting has various applications such as seismic wave analysis, analysis for orientation of wild fire, etc. It is well known that the classical method in "linear statistic" does not work for spherical random vectors. To construct a robust estimator for the nonlinear regression function, this talk employees L1-regression method and kernel-type objective function. The proposed local-linear estimator has asymptotic normality even if the error process has infinite variance, dependent structure or heteroscedasticity. Some simulation experiments illustrate desired finite sample properties of the proposed method.

Talk(IV) 15:00 - 15:15

Title: Discriminant and cluster analysis of possibly high-dimensional time series

Speaker: Yan Liu, Institute for Mathematical Science, Waseda University (Joint work with Hideaki Nagahata and Masanobu Taniguchi)

Abstract: Discriminant and cluster analysis of high-dimensional time series data have been an urgent need in more and more academic fields. To set- tle the always-existing problem of bias in distance-based classifiers for high-dimensional models, we consider a new classifier with jackknife- type bias adjustment for stationary time series data. The consistency of the classifier is theoretically shown under suitable conditions, including the situations of possibly high-dimensional data. We also conduct the cluster analysis for real financial data.

Coffee Break 15:15 - 15:30

Invited Talk: 15:30 - 17:00

Title: Modeling of High-Dimensional Time Series: Another Look at Factor Models with Diverging Eigenvalues

Speaker: Ruey S. Tsay, Booth School of Business, University of Chicago (Joint with Zhaoxing Gao)

Abstract: We propose a new approach to modeling high-dimensional time series data by providing a simple and natural way to understand the mechanism of factor models. We treat a p-dimensional time series as a nonsingular linear transformation of certain common factors and idiosyncratic components. Unlike the approximate factor models, we assume the factor process is dynamically

dependent and the idiosyncratic component is a white noise process, and allow the largest eigenvalues of the covariance matrix of the idiosyncratic components to diverge as the dimension p increases. Therefore, under the proposed model, the temporal-dependence of the data is explained by the factors and the crosssectional dependence is explained by both the factors and the idiosyncratic components.

We propose a white noise testing procedure for high-dimensional random vectors to determine the number of common factors, and introduce a projected Principal Component Analysis (PCA) to eliminate the diverging effect of the noises. Asymptotic properties of the proposed method are established for both fixed p and diverging p as the sample size n tends to infinity. Both simulated and real examples are used to assess the performance of the proposed method. We also compare our method with two commonly used methods in the literature and find that the proposed approach not only provides interpretable results, but also performs well in out-of-sample forecasting.

17:30 – Buffet Party

December 27 10:00 – 12:30 Discussion with Professor Ruey S. Tsay, Booth School of Business, University of Chicago