ASA GEORGIA CHAPTER

Winter Lecture Series

4:00 PM, Thursday, December 7th, 2023

Zoom Link: https://zoom.us/j/99347646840

Richard Davis

Howard Levene Professor of Statistics, Columbia University

Sample Splitting for Assessing Goodness of Fit in Time Series

A fundamental and often final step in time series modeling is to assess the quality of fit of a proposed model to the data. Since the underlying distribution of the innovations that generate a model is often not prescribed, goodness-of-fit tests typically take the form of testing the fitted residuals for serial independence. However, these fitted residuals are inherently dependent since they are based on the same parameter estimates. Thus standard tests of serial independence, such as those based on the autocorrelation function (ACF) or distance correlation function (ADCF) of the fitted residuals needs to be adjusted. The sample splitting procedure in Pfister et al. (2018) is one such fix for the case of models for independent data, but fails to work in the dependent case. In this talk we show how sample splitting can be leveraged in the time series setting to perform tests of serial dependence of fitted residuals using the ACF and ADCF. Here the first half of the time series are used to estimate the parameters of the model and then using these parameter estimates, the entire time series is used to compute the estimated residuals. The ACF and ADCF tests of serial independence tests will then have the same limit distributions as though the underlying residuals are indeed iid. (This is joint work with Leon Fernandes.)

About the Speaker

Richard Davis the Howard Levene Professor of Statistics at Columbia University. He received his Ph.D. degree in Mathematics from the University of California at San Diego in 1979 and has held academic positions at MIT, Colorado State University, and visiting appointments at numerous other universities. He was Hans Fischer Senior Fellow at the Technical University of Munich (2009-12), Villum Kan Rasmussen Visiting Professor (2011-13) at the University of Copenhagen, and Chalmers Jubilee Professor at Chalmers University of Technology. Davis is a fellow of the Institute of Mathematical Statistics and the American Statistical Association, and is an elected member of the International Statistical Institute. He was president of IMS in 2015-16 and Editor-in-Chief of Bernoulli Journal 2010-12. He is co-author (with Peter Brockwell) of the bestselling books, Time Series: Theory and Methods, Introduction to Time Series and Forecasting, and the time series analysis computer software package, ITSM2000. Together with Torben Andersen, Jens-Peter Kreiss, and Thomas Mikosch, he co-edited the Handbook in Financial Time Series and with Holan, Lund, and Ravishanker) the book, Handbook of Discrete-Valued Time Series. In 1998, he won (with collaborator W.T.M Dunsmuir) the Koopmans Prize for Econometric Theory. He has advised/co-advised 34 PhD students and has delivered numerous short courses on time series and heavy-tailed modeling. His research interests include time series, applied probability, extreme value theory, heavy-tailed modeling with applications to network models, and spatial-temporal modeling.

For more information, please contact us at:
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