

R. Clifton Bailey Statistics Seminar Series

A Spectral-Based Kolmogorov-Smirnov Method for Detecting the Information Loss of Temporal Aggregation

Bu Hyoung Lee

Department of Mathematics and Statistics

Loyola University Maryland

Johnson Center – Room 239A
4400 University Drive, Fairfax, VA 22030
September 14, 2018
11:00 A.M. - 12:00 Noon

Abstract: In this research, we develop a new statistical method for detecting the information loss of the process structure in an aggregate time series. Temporal aggregation, defined as the periodic non-overlapping sums of a time series process, is a simple and efficient technique accumulating sequential observations and so reducing their size. However, the aggregation is known to cause substantial changes in a process structure, called loss of process information, because a non-aggregate series of a relatively high frequency is transformed into an aggregate series of a relatively low frequency. Those structural changes are associated with the fact that the autocorrelation function of the aggregates is closely linked but completely different to the autocorrelation function of the non-aggregates. Thus, the effects of temporal aggregation can be characterized in terms of “changes in autocorrelation” and “information loss of model structure.” Using those properties, we will propose a spectral-based Kolmogorov-Smirnov method for identifying a periodic aggregation-order which causes an aggregate series to lose all the initial information and to behave like a white noise series.