

By Yan-Xia Lin

Title :

A Graphical Method for Identifying Potential Domains for Change Points in Generalized Bernoulli Processes

Abstract:

Consider a sequence of observations $\{y_t\}_{t \leq T}$ drawn from a generalized Bernoulli process $\{Y_t\}$. If $\{Y_t\}_{t \leq T}$ has structure change(s) and if there is no prior information on potential locations of the change points, it might be not an efficient approach to obtain the estimation of the change points by directly applying standard inference methods to $\{y_t\}_{t \leq T}$. An example of the inefficiency is given in this talk. Time series plot is a common and useful graphical method for stochastic processes in identifying potential locations of their change points. However, it is not suitable for generalized Bernoulli processes. A generalized Bernoulli process only takes two possible values '\$0\$' and '\$1\$'. The pattern changes in the time series plot of these '\$0\$' and '\$1\$' are difficult to be observed.

This talk suggests a different graphical approach to cope with the difficulty. Two types of processes, associate process and second-layer process, related to generalized Bernoulli processes are introduced.

We demonstrate that the information on potential domains of change points in a generalized Bernoulli process can be easily observed through the plots of its associate process or second-layer process. As an application, the plots are applied to a DNA sequence for identifying potential domains of change points and providing information for segmental detection in DNA sequence.