Detection of Multiple Shifts in Covariance Matrices

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Abstract

Change-point problems primarily arose from the process of quality control where one is concerned about the output of a production line and wants to find any departure from an acceptable standard of the product. The problem of abrupt changes is often encountered in various experimental and mathematical sciences. From a statistical point of view, we want to infer (detect) whether there is a statistically significant change-point in a sequence of chronologically ordered data. In the case that there is a statistically significant changepoint, we also will locate (estimate) the change-point. In particular, the testing and estimation of multiple covariance change points for a seuence of m-dimensional $(m > 1)$ Gaussian random vectors by using Schwarz information criterion (SIC) is described We estimate the number of change points as well as their locations. The proposed method is applied to the weekly prices of Exxon and General Dynamics stocks $(m = 2)$ from 1990 to 1991, and changes are successfully detected.