

# INFORMATION CRITERIA AND DETECTION OF CHANGE

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## ABSTRACT

Change-point problem primarily arose from the process of quality control in which one concerns about the outputs of a production line and wishes 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 wish 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 change-point, we also will locate (estimate) the change-point.

In particular, the testing and estimation of multiple covariance change points for a sequence of  $m$ -dimensional ( $m > 1$ ) Gaussian random vectors by using Schwarz information criterion (SIC) have been studied. We will estimate the number of change points as well as their locations. The unbiased SIC is also obtained. Then asymptotic null distribution of the test statistic is derived. The result is applied to the weekly prices of Exxon and General Dynamics stocks ( $m = 2$ ) from 1990 to 1991, and changes are successfully detected.

*Key words and phrases:* change-points; information criterion; SIC; unbiased SIC; asymptotic distribution; faces percentage points.

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