Process monitoring based on multivariate statistical analysis

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Abstract

In recent years interests in multivariate extension of one-dimensional statistical process control have increased. In this paper some methods of detecting shifts in mean vector and covariance matrix of a multivariate process: the T^2 charts with Bonferroni and Roy-Bose control limits and multivariate CUSUM charts are reviewed. The difficulty with T^2 chart is that it gives no indication of which variables are causing the problem. Various techniques using singular value decomposition of data matrix such as biplot and Procrustes analysis may be helpful. These methods provide an elegant way to extract some interesting patterns showing the dynamic of batches of multidimensional processes.

Keywords

Biplot, CUSUM, Multivariate SPC, Procrustes analysis, SPC, T^2 charts.

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