

Multivariate control chart based on robust estimator

ABSTRACT

A Hotelling T^2 control chart has been widely used for monitoring first phase of multivariate statistical process control. However, this classical control chart which is based on classical estimators is not effective in detecting multivariate outliers. As an alternative, T^2 statistics based on robust minimum volume ellipsoid or the minimum covariance determinant are proposed. The performance of these robust control charts are investigated extensively by real examples and Monte Carlo simulation. The result indicates that the robust control charts is more effective in detecting outliers than the classical control charts.

Keyword: Multivariate control chart; Multivariate outliers; Minimum volume ellipsoid; Minimum covariance determinant; Probability of detecting a shift