

Distribution-Free Exponentially Weighted Moving Average Control Charts for Monitoring Process Variability

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Abstract : Distribution-free control chart is an oncoming area from the statistical process control charts in recent years. Some researchers have developed various nonparametric control charts and investigated the detection capability of these charts. The major advantage of nonparametric control charts is that the underlying process is not specifically considered the assumption of normality or any parametric distribution. In this paper, two nonparametric exponentially weighted moving average (EWMA) control charts based on nonparametric tests, namely NE-S and NE-M control charts, are proposed for monitoring process variability. Generally, weighted moving average (GWMA) control charts are extended by utilizing design and adjustment parameters for monitoring the changes in the process variability, namely NG-S and NG-M control charts. Statistical performance is also investigated on NG-S and NG-M control charts with run rules. Moreover, sensitivity analysis is performed to show the effects of design parameters under the nonparametric NG-S and NG-M control charts.

Keywords : Distribution-free control chart, EWMA control charts, GWMA control charts

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