

A New Procedure to Monitor the Mean of a Quality Characteristic

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ABSTRACT

The Shewhart, the Bonferroni-adjustment and the analysis of means (ANOM) control charts are usually applied to monitor the mean of a quality characteristic. The Shewhart and the Bonferroni-adjustment procedures are used to recognize special causes into process where the control limits are constructed by using normal distribution for known parameters (mean and standard deviation), and approximately normal distribution for unknown parameters. The analysis of means procedure is an alternative of the analysis of variance method. It can be used to establish the mean control charts by applying equicorrelated multivariate non-central t distribution. In this paper, we establish a new control chart that is exactly based on normal and t distributions for known and unknown parameters, respectively. The out-of-control average run length (ARL_1) and the use of exact distribution are some of the advantages of the proposed approach against the Shewhart, the Bonferroni-adjustment, and the analysis of means approaches. Furthermore, the small sample size is another advantage of the proposed approach over the Shewhart and the Bonferroni-adjustment approach.

KEY WORDS: Shewhart, Bonferroni-adjustment, Analysis of means, New procedure, Average run length, False alarm probability.