

X and S Control Charts based on Weighted Standard Deviation Method

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Abstract : A Shewhart chart based on normality assumption is not appropriate for skewed distributions since its Type-I error rate is inflated. This study presents X and S control charts for monitoring the process variability for skewed distributions. We propose Weighted Standard Deviation (WSD) X and S control charts. Standard deviation estimator is applied to monitor the process variability for estimating the process standard deviation, in the case of the W SD X and S control charts as this estimator is simple and easy to compute. Unlike the Shewhart control chart, the proposed charts provide asymmetric limits in accordance with the direction and degree of skewness to construct the upper and lower limits. The performances of the proposed charts are compared with other heuristic charts for skewed distributions by using Simulation study. The Simulation studies show that the proposed control charts have good properties for skewed distributions and large sample sizes.

Keywords : weighted standard deviation, MAD, skewed distributions, S control charts

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