FALSE ALARMS IN SHEWHART JOINT MONITORING SCHEMES

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Shewhart, Cumulative sum and exponentially weighted moving average control charts are commonly used to monitor the process mean and variance in quality control. Traditionally, the mean and variance charts are plotted and evaluated separately and this can cause an inflated false alarm rate. Sometimes special causes in the industry can result changes in both mean and variance. Therefore, joint monitoring schemes for mean and variance have been developed for simultaneously monitoring the mean and variance of a process. Currently there are four Shewhart joint monitoring scheme available for monitoring mean and variance simultaneously. Gan discussed two types of Shewhart joint monitoring scheme one with rectangular control chart and the other with elliptical control region (Gan, 1995). Chen and Cheng proposed another Shewhart joint monitoring schemes called Max chart (Chen and Cheng, 1998). Shewhart distance scheme was proposed by Razmy (Razmy, 2005). In all these schemes, a state which is having very smaller variance when the mean is in-control, is taken as an out-of-control situation and issues false alarm. Actually this state is very desirable to the process. This study aims to find the false alarm rate for the existing joint monitoring schemes for different shifts in mean and variance. In addition, an attempt is made to introduce a new joint monitoring schemes with a new control region to avoid the false alarms.

Key Words*: Average Run length, False Alarm, Joint Monitoring*