ABSTRACT

Statistical quality control deals with controlling and investigating the production process to improve the efficiency of a product. The quality control chart is the basic tool used to retain the process variability under control. There are two basic types of control charts that are used for the monitoring of production process such as; memory less and memory based control chart. The memory less control chart only deals with current observation while memory based control chart are those chart which take into account current as well as past information. The exponentially weighted moving average (EWMA) and Cumulative sum (CUSUM) control chart are frequently used charts as a memory based chart for the monitoring of process mean and variance. These control charts are designed under different sampling schemes such as; simple random sampling (SRS); ranked set sampling (RSS); median ranked set sampling (MRSS); extreme ranked set sampling (ERSS) etc. the present study developed a new scheme charts such as; EWMA_S^2 charts for the monitoring of sample variance under ranked set sampling schemes such as: RSS, MRSS and ERSS. The designed variance charts under RSS, MRSS and ERSS are evaluated based on different performance measures such as average run length (ARL), median of run length (MDRL) and standard deviation of run length (SDRL). The simulation results indicate that the proposed charts under ranked set schemes show better performance compared to charts based on simple random sampling. The variance charts for imperfect ranking are slightly better the variance charts based SRS while RSS based charts under perfect ranking outperform the competing variance chart. The increase in sample size also improves the performance of proposal as well as competing charts. The proposed variance charts under MRSS show better performance compared to other charts in this study.