

ABSTRACT

Process monitoring through control charts is a quite popular practice in statistical process control. From a statistical point of view, a superior control chart is the one which has an efficient design structure intended to detect the changes in the manufacturing process. Here we developed repetitive exponentially weighted moving average (EWMA) control charts using five popular ratio estimators based on ranked set sampling (RSS) design for monitoring the process mean. The proposed control charts have double control limits, inner and outer control limits with two control coefficients. The control coefficients for proposed charts are determined by considering the prescribed values of the average run length, while the process is in control. The performance and efficiency of the proposed repetitive EWMA-RSS control charts are evaluated in terms of ARLs, separately and collectively. The proposed control charts have double control limits so that they can be sensitive to small changes or a gradual drift in the process by the choice of the weighting factor, λ and ρ . In all cases under each proposed repetitive EWMA-RSS control chart we observed a rapid decrease in ARLs, when the values of ρ increases. All the proposed repetitive EWMA-RSS control charts are sensitive towards the process mean, when mean is shifted due to some random causes. Moreover, all the proposed repetitive EWMA-RSS control charts are proficient to detect small shifts in the process mean more quickly for the large values of ρ . However, the proposed repetitive EWMA-RSS control chart based on Khan et al. (2014) exponential ratio-type estimator is founded more efficient, generally among all the proposed repetitive EWMA-RSS control charts.