

## ABSTRACT

It is a common process in statistical quality control to obtain an improved monitoring process for the detection of small shifts in a process, average run length (ARL) should be smaller but unfortunately memory based control charts using simple random sampling (SRS) is sensitive to provide the sufficiently smaller results for ARL and fail to detect the smaller shifts quickly. In this research we proposed mixed memory based control chart for process monitoring using rank set sampling (RSS) scheme to detect small shifts in process. It is revealed that the memory based control chart using RSS scheme offer better protection against the process monitoring in terms of ARL's.

In this research the CUSUM statistic is used as an input to the EWMA charting structure. The proposed mixed EWMA-CUSUM control chart are used for simple random sampling (SRS), rank set sampling (RSS), median rank set sampling (MRSS) and extreme rank set sampling (ERSS) respectively. Sample is collected through these sampling technique to enhance the performance of mixed EWMA-CUSUM control charting scheme. Average run length (ARL), standard deviation run length (SDRL) and median run length (MDRL) have been used as performance measures to evaluate to performance of mixed EWMA-CUSUM control chart based on RSS. The performance of proposed scheme is compared on the basis of SRS and RSS scheme. The charting performance of mixed EWMA-CUSUM control chart has been improved by using RSS scheme at different level of ARL's. The simulation study showed a significance effect of RSS scheme in the performance of control charting scheme by using mixed memory based control chart for process monitoring.