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DISTRIBUTION-FREE CUSUM CONTROL CHART FOR JOINT MONITORING OF LOCATION AND SCALE

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Mukherjee and Chakraborti (2012) proposed a single distribution-free (nonparametric) Shewhart-type chart based on Lepage (1971) test statistic for simultaneously monitoring both the location and the scale parameters of a continuous distribution when both of these parameters are unknown. In the present work, we consider a single distribution-free CUSUM chart based on Lepage statistic, referred to as CUSUM-Lepage (CL) chart. Our proposed chart is nonparametric and therefore, in control (denoted IC) properties of the chart remain invariant and known for all continuous distributions. Control limits are tabulated for implementation in practice. The IC and out of control (denoted OOC) performance properties of the chart are investigated through simulation studies in terms of the average, the standard deviation, the median and some percentiles of the run length distribution. Detailed comparison with the Shewhart-type chart is presented. We also examine the effect of the reference value (k) of CUSUM chart on the performance of CL chart. The proposed chart is illustrated through a real data. Summary and conclusions are presented.

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