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A modified economic-statistical design of the T^2 control chart with variable sample sizes and control limits

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Abstract

Recent studies have shown that using variable sampling size and control limits (VSSC) schemes result in charts with more statistical power than variable sampling size (VSS) when detecting small to moderate shifts in the process mean vector. This paper presents an economic-statistical design (ESD) of the VSSC T^2 control chart using the general model of Lorenzen and Vance [22]. The genetic algorithm approach is then employed to search for the optimal values of the six test parameters of the chart. We then compare the expected cost per unit of time of the optimally designed VSSC chart with optimally designed VSS and FRS (fixed ratio sampling) T^2 charts as well as MEWMA charts.

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