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Joint Monitoring of Multivariate Process Using Synthetic Control Charts*

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Abstract

Control chart techniques have been widely used in industries to monitor a process in quality improvement. Whenever we deal with multivariate data, we usually employ a combination of the Hotelling's T^2 chart and the $|S|$ chart to monitor both the mean and the variability of a process. In this paper we consider joint monitoring of both the mean and the variability using a combined scheme involving simultaneous use of the synthetic T^2 and the synthetic $|S|$ charts. Average run length comparison shows that combination of the synthetic control charts scheme performs better than the combination of the traditional T^2 chart and the $|S|$ chart for entire range of shifts in the process parameters.

Key words and phrases: Hotelling's T^2 chart, average run length, conforming run length, covariance matrix, process variability.

AMS 2000 subject classifications. Primary ; secondary .

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