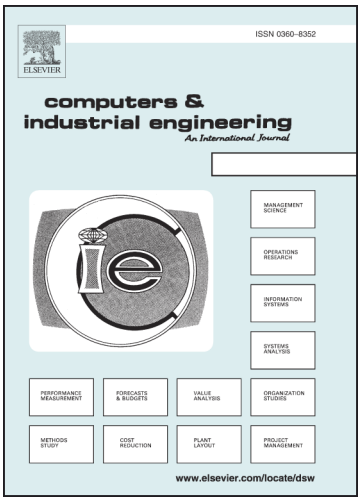

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Robust Bootstrap Control Charts for Percentiles Based on Model Selection Approaches

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Abstract

This paper presents two model selection approaches, namely the random data-driven approach and the weighted modeling approach, to construct robust bootstrap control charts for process monitoring of percentiles of the shape-scale class of distributions under model uncertainty. The generalized exponential, lognormal and Weibull distributions are considered as candidate distributions to establish the proposed process control procedures. Monte Carlo simulations are conducted with various combinations of the percentiles, false-alarm rates and sample sizes to evaluate the performance of the proposed robust bootstrap control charts in terms of the average run lengths. Simulation results exhibit that the two proposed robust model selection approaches perform well when the underlying distribution of the quality characteristic is unknown. Finally, the proposed process monitoring procedures are applied to two data sets for illustration.

Keywords: Bootstrap control chart; maximum likelihood estimate; model discrimination; percentiles; shape-scale distribution.

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