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Distribution-free control charts for monitoring scale in finite horizon productions

Distribution-free (also known as nonparametric) control charts have been shown to be useful for on-line monitoring of lot production within a finite horizon production (FHP) process. Despite the partial process knowledge at the beginning of production in a FHP process, a distribution-free control chart can be started without any restrictive assumption about the underlying distribution of the quality characteristic. In this work, three nonparametric Shewhart-type control charts are investigated to monitor the unknown scale parameter in FHP processes based on some well-known nonparametric tests for scale. To this end, the violation of the assumption of equal medians of the reference and the test population distributions is investigated and a fourth control chart based on the Moses test, which does not require this assumption, is considered. An extensive numerical analysis is performed to examine chart performance based on some metrics suitable in the FHP setting. A real industrial example is presented to show a practical implementation of the investigated charts. Conclusions and future research ideas are provided.

Special/ Invited session

Classification

Keywords

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