

Identification of Product and Process Variables that May Be Critical for Process Monitoring and Product Quality

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Abstract:

Multivariate quality control problems involve the evaluation of a process based on the simultaneous behavior of quality characteristics and process parameters. Generally, not all quality attributes and process parameters are equally important. Some of them may be very important (critical) for product performance evaluation and monitoring strategies and some of them may be less important.

The paper deals with these problems and statistical evaluation is used to determine variables that may be critical to product quality and for process monitoring. Then these variables are used to ensure effective control of all quality attributes and process parameters. Our approach to build up such control charts consists to monitor the stable level of variability of the process according to the directions settled by the eigenvectors of a generalized PCA based on the critical variables. The proposed methods are illustrate with real applications from the field of automobiles and chemical processes.

Key words and phrases:

Critical process/product attributes, product quality, complex process, multi-factorial relationships, process monitoring, influence function.