Huele, A. Freek; **Engel, Jan**
A response surface approach to tolerance design. (English) ‖ Zbl 1108.62133 ‖
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Summary: In spite of *G. Taguchi*'s robust parameter design [Introduction to quality engineering: designing quality into products and processes. (1986)], tolerance design is still important at the design stage of products and processes. Taguchi's proposal and related methods for tolerance design, however, do not efficiently use the information that can be obtained from the parameter design experiment.

We introduce a new method for tolerance design based on the response surface approach to parameter design. It is a flexible method because non-normal distributions of the noise factors and the quality characteristic are allowed. Moreover, it is unnecessary to perform a new physical experiment. Essentially, tolerances of noise factors are maximized, subject to constraints to ensure that the mean value of the quality characteristic remains on target and the fraction nonconforming is below a pre-specified maximum. Some aspects of model uncertainty are discussed and the method is illustrated by means of an example.

MSC:

62P30	Applications of statistics in engineering and industry; control charts
62K20	Response surface designs

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Keywords:

fraction nonconforming; quality loss; process capability; model uncertainty

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