Contribution to Quality Control
The General Case of Multivariate Quality Characteristics

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1983

Thesis Summary

In respect of manufactured product or otherwise the conformity between the concept and the reality is looked upon as its inherent quality which may often be defined in terms of multiple measurable characteristics.

The issues involved in the control of quality measured through a single characteristic have so far received adequate attention in the literature resulting in development of necessary statistical theory and techniques. But the efforts in this direction in the case where quality is measured through more than one characteristic do no seem to claim completeness yet and in some sense are rather disconcerted. This work is an effort to fill in the void to some extent: here we have attempted to develop a systematic theory applicable to the latter case. However, we have restricted our attention to the situation where the quality characteristics can be arranged in such a way that effects of various processings, responsible for the overall quality of the product, affect the characteristics strictly in chronological order. In respect of such cases we have developed control charts for ascertaining the control situation in respect of location and / or dispersion parameters for indicating the need for corrective actions on processing which might affect the quality adversely. Certain optimality properties of such procedures have also been established. Possibility of examining the control situation through a composite measure termed as the desirability measure of quality in such situations has also been studied.

Finally, it may be commented that the techniques presented here seem to have wider applicability beyond the boundaries of usual process quality control problems.