Implementation of C_{pk}^{T} Index for Processes with Multiple Characteristics

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Abstract

Processes yield has been the most basic and important criterion to evaluate the process performance. Particularly, in semi-conductor manufacturing industry, the required product fraction of defectives is very low. Process capability index C_{pk} have been widely used in the manufacturing industry to provide a quantitative measure on process yield. A generalization of C_{pk} index, referred to as C_{pk}^{T}, is proposed. An approximate sampling distribution of the natural estimator $\hat{C}_{pk}^{T}$ is developed to investigate the problems of process capability evaluation, product acceptance determination and supplier selection. In practice, processes with multiple characteristics or multiple manufacturing lines are very common. The Gaussian mixture model is employed to deal with this situation. For convenience of applications, various tables are presented for decision making.