

## A Bayesian estimator of process capability index

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### Abstract

Process capability and process performance index studies are to assess a process relative to specification criteria. Quantification of this measurement is often reported using various indices. One such index namely  $C_p$  has been considered in this paper. The equations for process capability indices are basically very simple; however, they are very sensitive to the input value for standard deviation, as it is not known. Unfortunately there can be difference of opinion on how to determine standard deviation for a given situation. Thus the basic problem is to estimate the standard deviation and thereby estimating the process capability index. The paper provides a Bayes estimator for process capability index  $C_p$  when a priori or guessed interval of standard deviation is available. To express the belief of the experimenter, an improper prior distribution is considered. The squared error loss function has been used to assess goodness of the suggested estimator. The Bayes estimator thus obtained has been compared theoretically and empirically with the minimum mean squared error estimator.

*Keywords* : Normal distribution, process capability index  $C_p$ , guessed interval, Bayesian estimation, squared error loss function.

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