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Variants for Estimating the Process Capability Index for a Folded Normal Distribution

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Abstract: This paper studies the estimation of the Process Capability Index (PCI) of a quality characteristic that has a Folded Normal distribution. In industry, quality characteristics such as alignment, position and straightness that are normally distributed with zero-mean are often inspected. When the algebraic sign of these variables is disregarded, the resulting distribution is a FN distribution. Some authors have presented different methods of estimating the PCI by estimating the parameters of a normal distribution based on the estimator of the FN. When a FN distribution is presented in practice, it is difficult to find a transformation to normalize the data. This is the reason to search for an easier approach to estimate the PCI for a FN than the former ones. In this article, a simulation study is presented where samples from known normal distributions are drawn and both CPI are estimated to study the relationship between them. Also, the PCI based on the gamma distribution were estimated and the relationship among them was found. Several values of variance of a zero-mean normal distribution were studied.

Keywords: Process Capability Index, Folded Normal, Non-Normal