

Article

On the Folded Normal Distribution

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Abstract: The characteristic function of the folded normal distribution and its moment function are derived. The entropy of the folded normal distribution and the Kullback–Leibler from the normal and half normal distributions are approximated using Taylor series. The accuracy of the results are also assessed using different criteria. The maximum likelihood estimates and confidence intervals for the parameters are obtained using the asymptotic theory and bootstrap method. The coverage of the confidence intervals is also examined.

Keywords: folded normal distribution; entropy; Kullback–Leibler; maximum likelihood estimates

1. Introduction

Mainly studied in the 1960s, the folded normal distribution is a special case of the Gaussian distribution occurring when the sign of the variable is always positive. In 1961, a method of estimating the parameters based upon the estimating equations of the moments was discussed in [1], where they also gave some examples of its applications in the industrial sector. The folded normal distribution was used to study the magnitude of deviation of an automobile strut alignment [2]. The properties of the multivariate folded normal distribution with its possible applications were studied in [3]. In addition, tables with probabilities for a range of values of the vector of parameters were provided, and an application of the model with real data was illustrated. An alternative method using the second and fourth