

**Use of the R packages `rocbc` and `trinROC` for inference after
the Box-Cox transformation in the ROC framework
(and an outlook for future research)**

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Abstract

Receiver Operating Characteristic (ROC) curve analysis is widely used in evaluating the effectiveness of a diagnostic test/biomarker or classifier score. A parametric approach for statistical inference on ROC curves based on a Box-Cox transformation to normality has been discussed in the literature along with extensions in the ROC surface framework. Many investigators have highlighted the difficulty of taking into account the variability of the estimated transformation parameter(s) when carrying out such an analysis. This variability is often ignored and inferences are made by considering the estimated transformation parameter(s) as fixed and known. In this talk, we will discuss the use of the Box-Cox transformation in the general ROC framework and the methodology for accounting for the estimation of the Box-Cox transformation parameter(s) in the context of ROC analysis in practice. We will also detail its application to a number of problems, along with implementation options using the R packages `rocbc` and `trinROC`. Implications on their use and of the Box-Cox transformation in the ROC framework in general will be discussed along with possible workarounds.