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Regression for Compositional Predictor Data

UNIVERSITY OF NEW BRUNSWICK

REPORT DEFENCE AND EXAMINATION

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Abstract

Compositional data refer to proportions of a whole. This type of data arise in many different disciplines, such as geology, biology, economics, and sociology, and require nontraditional methods for their analysis. In this report we consider regression methods for compositional data and introduce two new regression methods for compositional predictor data. The first method is unconstrained log-contrast (ULC) regression which is a less restrictive form log-contrast (LC) regression. The second proposed method is Greenacre's transformation regression which is an extension of ULC that allows for zeros in the compositional data. In this report we are interested in evaluating an F-test, in terms of its type I error rate and power, to compare LC regression with ULC regression for various sample sizes and composition dimensions.

Lastly, we used cross validation to assess the two new methods on three real-life datasets.