

**Hijazi, Rafiq H.; Jernigan, Robert W.**

**Modeling compositional data using Dirichlet regression models.** (English) Zbl 1166.62053  
*J. Appl. Probab. Stat.* 4, No. 1, 77-91 (2009).

Summary: Compositional data are non-negative proportions with unit-sum. These types of data arise whenever we classify objects into disjoint categories and record their resulting relative frequencies, or partition a whole measurement into percentage contributions from its various parts. Under the unit-sum constraint, the elementary concepts of covariance and correlation are misleading. Therefore, compositional data are rarely analyzed with the usual multivariate statistical methods.

*J. Aitchison* [The statistical analysis of compositional data. Chapman and Hall (1986; [Zbl 0688.62004](#))] introduced the logratio analysis to model compositional data. *G. Campbell* and *J. Mosimann* [ASA Proc. Sect. Stat. Graphics, 10–17 (1987)] suggested the Dirichlet covariate model as a null model for such data. In this paper, maximum likelihood estimation methods in Dirichlet regression models are developed and the sampling distributions of these estimates are investigated. Measures of total variability and goodness of fit are proposed to assess the adequacy of the suggested models in analyzing compositional data.

**MSC:**

- [62J99](#) Linear inference, regression
- [62F12](#) Asymptotic properties of parametric estimators
- [62J20](#) Diagnostics, and linear inference and regression
- [62J02](#) General nonlinear regression
- [62P12](#) Applications of statistics to environmental and related topics

Cited in **6** Documents

**Keywords:**

compositional data; Dirichlet distribution; logratio analysis; maximum likelihood estimation

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