

Fačevicová, Kamila; Hron, Karel; Todorov, Valentin; Templ, Matthias
Compositional tables analysis in coordinates. (English) Zbl 1373.62338
Scand. J. Stat. 43, No. 4, 962-977 (2016).

Summary: Compositional tables – a continuous counterpart to the contingency tables – carry relative information about relationships between row and column factors; thus, for their analysis, only ratios between cells of a table are informative. Consequently, the standard Euclidean geometry should be replaced by the Aitchison geometry on the simplex that enables decomposition of the table into its independent and interactive parts. The aim of the paper is to find interpretable coordinate representation for independent and interaction tables (in sense of balances and odds ratios of cells, respectively), where further statistical processing of compositional tables can be performed. Theoretical results are applied to real-world problems from a health survey and in macroeconomics.

MSC:

62H99 Multivariate analysis
62H17 Contingency tables
62H25 Factor analysis and principal components; correspondence analysis

Keywords:

[Aitchison geometry on the simplex](#); [balances](#); [compositional data](#); [contingency tables](#); [isometric log-ratio transformation](#)

Full Text: [DOI](#)

References:

- [1] Agresti, 2nd, in: Categorical data analysis (2002) · [doi:10.1002/0471249688](#)
- [2] Aitchison, The statistical analysis of compositional data (1986) · [Zbl 0688.62004](#) · [doi:10.1007/978-94-009-4109-0](#)
- [3] Billard, Symbolic data analysis: Conceptual statistics and data mining (2007) · [Zbl 1117.62002](#)
- [4] Eaton, Multivariate statistics. A vector space approach (1983) · [Zbl 0587.62097](#)
- [5] Egozcue, Reply to "On the Harker Variation Diagrams" by J.A. Cortés, Math. Geosci. 41 pp 829– (2009) · [Zbl 1178.86018](#) · [doi:10.1007/s11004-009-9238-0](#)
- [6] Egozcue, Proceedings of CODAWORK'08, The 3rd Compositional Data Analysis Workshop (2008)
- [7] Egozcue, Groups of parts and their balances in compositional data analysis., Math. Geol. 37 pp 795– (2005) · [Zbl 1177.86018](#) · [doi:10.1007/s11004-005-7381-9](#)
- [8] Egozcue, Isometric logratio transformations for compositional data analysis, Math. Geol. 35 pp 279– (2003) · [Zbl 1302.86024](#) · [doi:10.1023/A:1023818214614](#)
- [9] Egozcue, Independence in 2015. contingency tables 2015, Gabriel 1971 and Pawlowsky-Glahn 2001. using simplicial geometry, Commun. Stat. Theory 44 (18) pp 3978– (2015) · [Zbl 1327.62360](#) · [doi:10.1080/03610926.2013.824980](#)
- [10] Eurostat 2013 Body mass index (BMI) by sex, age and educational level - collection round 2008 http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjanind&lang=en
- [11] Eurostat 2013 Population on 1 January: Structure indicators http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjanind&lang=en
- [12] Fačevicová, Logratio approach to statistical analysis of 2 $\{(\times)\}$ 2 compositional tables, J. Appl. Stat. 41 pp 944– (2014) · [Zbl 1352.62029](#) · [doi:10.1080/02664763.2013.856871](#)
- [13] Fišerová, On interpretation of orthonormal coordinates for compositional data, Math. Geosci. 43 pp 455– (2011) · [doi:10.1007/s11004-011-9333-x](#)
- [14] Gabriel, The biplot graphic display of matrices with application to principal component analysis, Biometrika 58 pp 453– (1971) · [Zbl 0228.62034](#) · [doi:10.1093/biomet/58.3.453](#)
- [15] Greenacre, 2nd edition, in: Correspondence analysis in practice (2007) · [Zbl 1198.62061](#) · [doi:10.1201/9781420011234](#)
- [16] Pawlowsky-Glahn, Geometric approach to statistical analysis on the simplex, Stoch. Env. Res. Risk. A. 15 pp 384– (2001) · [Zbl 0987.62001](#) · [doi:10.1007/s004770100077](#)
- [17] Pawlowsky-Glahn, Modeling and analysis of compositional data (2015) · [Zbl 1177.86018](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically

matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.