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**The Möbius distribution on the disc.** (English) Zbl 1078.62009

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Summary: A simple new family of distributions is proposed which has support the unit disc in two dimensions. The density functions of the family are unimodal, monotonic or uniantimodal. The bivariate symmetric beta distributions, which include the uniform distribution, are special cases, but many members of the family are skew. The distributions have three parameters, one controlling orientation, one controlling degree of concentration and the third controlling skewness, or more precisely off-centredness. Importantly, these parameters are globally orthogonal. An illustrative example of fitting the model to data is given. Conditional and marginal distributions are considered. The new distributions are compared favourably with an earlier suggestion of the same author.

**MSC:**

**62E10** Characterization and structure theory of statistical distributions

Cited in **5** Documents

**60E05** Probability distributions: general theory

**Keywords:**

beta distribution; bivariate distribution; circular law; Möbius transformation; Pearson type II distribution

**Full Text:** [DOI](#)

**References:**

- [1] Abramowitz, M. and Stegun, I. A. (eds.) (1965). Handbook of Mathematical Functions with Formulas, Graphs and Mathematical Tables, Dover, New York. · [Zbl 0171.38503](#)
- [2] Cox, D. R. and Hinkley, D. V. (1974). Theoretical Statistics, Chapman and Hall, London. · [Zbl 0334.62003](#)
- [3] Davies, R. B. (1977). Hypothesis testing when a nuisance parameter is present only under the alternative, *Biometrika*, 64, 247–254. · [Zbl 0362.62026](#) · [doi:10.2307/2335690](#)
- [4] Fang, K. T., Kotz, S. and Ng, K. W. (1990). Symmetric Multivariate and Related Distributions, Chapman and Hall, London. · [Zbl 0699.62048](#)
- [5] Gradshteyn, I. S. and Ryzhik, I. M. (1994). Table of Integrals, Series, and Products, 5th ed. (ed. A. Jeffrey), Academic Press, San Diego. · [Zbl 0918.65002](#)
- [6] Johnson, M. E. (1987). Multivariate Statistical Simulation, Wiley, New York. · [Zbl 0604.62056](#)
- [7] Johnson, R. A. and Wehrly, T. (1977). Measures and models for angular correlation and angular-linear correlation, *Journal of the Royal Statistical Society, Series B*, 39, 222–229. · [Zbl 0366.62064](#)
- [8] Jones, M. C. (2002). Marginal replacement in multivariate densities, with application to skewing spherically symmetric distributions, *Journal of Multivariate Analysis*, 81, 85–99. · [Zbl 0998.60016](#) · [doi:10.1006/jmva.2001.1993](#)
- [9] Jones, M. C. and Pewsey, A. R. (2004). A family of distributions on the circle (under consideration). · [Zbl 1117.62365](#)
- [10] Kotz, S. (1975). Multivariate distributions at a cross road, *Statistical Distributions in Scientific Work, Volume 1-Models and Structures* (eds. G. P. Patil, S. Kotz, and J. K. Ord), 247–270, Reidel, Dordrecht.
- [11] Krantz, S. G. (1999). Handbook of Complex Analysis, Birkhäuser, Boston, Massachusetts. · [Zbl 0946.30001](#)
- [12] Mardia, K. V. and Jupp, P. E. (1999). Directional Statistics, Wiley, Chichester. · [Zbl 0935.62065](#)
- [13] Seshadri, V. (1991). A family of distributions related to the McCullagh family, *Statistics and Probability Letters*, 12, 373–378. · [Zbl 0747.60018](#) · [doi:10.1016/0167-7152\(91\)90025-M](#)
- [14] Shimizu, K. and Iida, K. (2002). Pearson type VII distributions on spheres, *Communications in Statistics. Theory and Methods*, 31, 513–526. · [Zbl 1009.62518](#) · [doi:10.1081/STA-120003131](#)

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