THE MÖBIUS DISTRIBUTION ON THE DISC

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Abstract.   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.

Key words and phrases: Beta distribution, bivariate distribution, circular law, Möbius transformation, Pearson type II distribution.