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Tests of symmetry for bivariate copulas

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Abstract Tests are proposed for the hypothesis that the underlying copula of a continuous random pair is symmetric. The procedures are based on Cramér–von Mises and Kolmogorov–Smirnov functionals of a rank-based empirical process whose large-sample behaviour is obtained. The asymptotic validity of a re-sampling method to compute P values is also established. The technical arguments supporting the use of a Chi-squared test due to Jasson are also presented. A power study suggests that the proposed tests are more powerful than Jasson's procedure under many scenarios of copula asymmetry. The methods are illustrated on a nutrient data set.

Keywords Empirical copula process · Exchangeability · Multiplier Central Limit Theorem · Ranks · Symmetry