

Estimation problems for some perturbations of the independence copula

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Abstract.

In this work, we consider symmetric copulas with density of the form:

$$C(u, v) = 1 + \sum_{i=1}^{\infty} \lambda_k \varphi_k(u) \varphi_k(v) \quad (1)$$

where $\{\varphi_k(x), k \in \mathbb{N}\}$ is an orthogonal basis of $L^2(0, 1)$ and the sequence $|\lambda_k|$ has a finite number of values or converges to 0. For the finite case, we propose an estimator of the vector $\lambda = (\lambda_1, \dots, \lambda_s)$ by considering the Markov chains generated by the copula using uniform margins as stationary distribution. In order to determine the confidence interval of parameters, we provide a multivariate central limit theorem for the vector λ .

For $s = 2$, several examples are considered such as the *cosine copula*, the *sine-cosine copula* and the *Legendre copula*. For each of those copulas, we determine the estimators of the parameters and the central limit theorem as well. A simulation study is provided with a comparison to other known estimators such as MLE and that of Longla and Peligrad(2021).