

## Accepted Manuscript

Some copula inference procedures adapted to the presence of ties

Ivan Kojadinovic

PII: S0167-9473(17)30026-9

DOI: <http://dx.doi.org/10.1016/j.csda.2017.02.006>

Reference: COMSTA 6422

To appear in: *Computational Statistics and Data Analysis*

Received date: 18 September 2016

Revised date: 5 February 2017

Accepted date: 6 February 2017



Please cite this article as: Kojadinovic, I., Some copula inference procedures adapted to the presence of ties. *Computational Statistics and Data Analysis* (2017), <http://dx.doi.org/10.1016/j.csda.2017.02.006>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Some copula inference procedures adapted to the presence of ties

Ivan Kojadinovic \*

February 5, 2017

## Abstract

When modeling the distribution of a multivariate continuous random vector using the so-called *copula approach*, it is not uncommon to have ties in the coordinate samples of the available data because of rounding or lack of measurement precision. Yet, the vast majority of existing inference procedures on the underlying copula were both theoretically derived and practically implemented under the assumption of no ties. Applying them nonetheless can lead to strongly biased results. Some of the existing statistical tests can however be adapted to provide meaningful results in the presence of ties. It is the case of some tests of exchangeability, radial symmetry, extreme-value dependence and goodness of fit. Detailed algorithms for computing approximate p-values for the modified tests are provided and their finite-sample behaviors are empirically investigated through extensive Monte Carlo experiments. An illustration on a real-world insurance data set concludes the work.

*Keywords:* bootstrap; exchangeability; extreme-value dependence; goodness of fit; parametric bootstrap; radial symmetry; statistical tests; ties.

## 1 Introduction

The copula approach to the modeling of multivariate continuous distributions is increasingly applied in numerous fields such as environmental modeling (Salvadori et al., 2007), quantitative risk management (McNeil et al., 2015) or econometric modeling (Patton, 2012), to name a few.

Let  $\mathbf{X}_1, \dots, \mathbf{X}_n$  be independent and identically distributed (i.i.d.) copies of a random vector  $\mathbf{X}$  with  $d$ -dimensional cumulative distribution function (c.d.f.)  $F$ . The use of copulas to model  $F$  from  $\mathbf{X}_1, \dots, \mathbf{X}_n$  becomes particularly meaningful when the  $d$  univariate marginal c.d.f.s (*margins* for short)  $F_1, \dots, F_d$  associated with  $F$  are assumed continuous.

---

\*Université de Pau et des Pays de l'Adour, Laboratoire de mathématiques et de leurs applications, UMR CNRS 5142, B.P. 1155, 64013 Pau Cedex, France. E-mail: [ivan.kojadinovic@univ-pau.fr](mailto:ivan.kojadinovic@univ-pau.fr)

Download English Version:

<https://daneshyari.com/en/article/4949327>

Download Persian Version:

<https://daneshyari.com/article/4949327>

[Daneshyari.com](https://daneshyari.com)