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Inference for a covariate-adjusted semiparametric Gaussian copula model

We consider a multivariate (linear) regression model in which the dependence of the errors terms is described by a Gaussian copula. We investigate statistical inference for the copula parameter in this semiparametric Gaussian copula regression model. We consider estimators based on residual ranks instead of the usual but unobservable oracle ranks. We first study two estimators for the copula correlation matrix, one via inversion of Spearman's rho and the other via a normal scores rank correlation estimator. We show that these estimators are asymptotically equivalent to their counterparts based on the oracle ranks. Then, for the copula correlation matrix under constrained parametrizations, we show that the classical one-step estimator in conjunction with the residual ranks remains semiparametrically efficient for estimating the copula parameter. The accuracy of the estimators based on residual ranks is confirmed by simulation studies.

Joint work with Zhao Yue and Ingrid Van Keilegom.