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Abstract

Title: Vine copulas and health applications

Vine copulas (vine-copula.org) provide a wide class of multivariate dependence models. They allow for arbitrary marginal models and the dependence is characterized by a copula, which is build using only bivariate copulas. They are joined to form a valid multivariate copula using conditioning arguments, which is identified in a set of linked trees called the vine structure. Since all terms can be chosen independently they can accommodate different tail dependence both symmetric and asymmetric for groups of variables. I will introduce the construction, discuss the selection of vine structure and the step wise estimation procedure. This allows to select and fit models in very high dimensions. After this I will show how these models can be used to build copula based quantile regression models and models for longitudinal data structures. Applications of these models involving the mass index after an heart valve implant and prediction of infant mortality.