

Conditional independence copula models with graphical representations

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For multivariate Gaussian with a large number of variables, there are several approaches to obtain parsimonious dependence models. Sometimes the variables can be divided into non-overlapping groups, and it can be desirable to first construct models for each group of variables followed by a second stage of combining the groups. Various constructions with parsimonious dependence are done via conditional independence relationships. Examples are common factor models, structured factor models, structural equation models, factor models with residual dependence, and Bayesian networks. Graphical representations can be made with path diagrams, vines, and directed acyclic graphs. Through some concrete examples, I will show how some of these Gaussian models can be extended to copula models with vine representations. The extension from Gaussian models to copula models is typically needed when there is tail dependence or tail asymmetry relative to Gaussian joint tails.

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