

# Analyzing dependent data with vine copulas

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The copula approach from Sklar will be introduced and we show how it can be used to separate marginal from the dependence behavior. Bivariate parametric copula classes are discussed with respect to dependence concepts such as Kendall's tau and tail dependence coefficients. These bivariate copula terms are the building block for vine copulas and the basic construction in 3 dimensions is shown. Next regular vine copulas in arbitrary dimensions are studied. For this the building plan identified by the vine tree structure is introduced. Further the set of pair copula families and the parameters have to be chosen. Next necessary data preparation and exploration for vine based modelling will be illustrated. Finally it is shown how to select among the many vine copula models using the Dissmann Algorithm. All concepts will be illustrated using a data set with measurements on abalone shells.

## References:

- Joe, H. (2014). Dependence modeling with copulas. CRC press.
- Czado, Claudia. Analyzing Dependent Data with Vine Copulas. Lecture Notes in Statistics, Springer (2019).
- Web page: [vine-copula.org](http://vine-copula.org)