



Evading the curse of dimensionality in nonparametric density estimation with simplified vine copulas

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Practical applications of nonparametric density estimators in more than three dimensions suffer a great deal from the well-known curse of dimensionality: convergence slows down as dimension increases. We show that one can evade the curse of dimensionality by assuming a simplified vine copula model for the dependence between variables.

We formulate a general nonparametric estimator for such a model and show under high-level assumptions that the speed of convergence is independent of dimension. Simulation experiments illustrate a large gain in finite sample performance when the simplifying assumption is at least approximately true. But even when it is severely violated, the vine copula based approach proves advantageous as soon as more than a few variables are involved.