An Introduction to the Directional Dependence in the Copula Regression Setting

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Abstract

In this presentation, we are going to define and study the concept of directional dependence in regression setting by using copulas. Copulas are multivariate distribution functions that connect marginal distributions and joint distributions. The directional dependence model is critical because it can be easily adopted to wide range of applications, such as financial risk assessment and actuarial analysis. Directional dependence in joint behavior between two variables is defined as the form of the regression functions being different. By doing so, copulas transfer marginal distributions into uniform on the interval $(0, 1)$. They eliminate the influence of marginal behavior and provide a clear look at dependence structure. In the research we developed how to define and create facts to identify directional dependence between two variables, how to get the empirical cumulative probability distribution function of each variable in the data set, as well as how to search for a copula with the regression function that has the similar features as the smoothed data. The approach that has been developed applied to various data sets.