

CHAPTER 10

Nonparametric Predictive Inference with Copulas for Bivariate Data

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10.1 INTRODUCTION

Dependencies are important in many real applications. However, identifying and modelling dependencies between two or more related random quantities is a main challenge in statistics. The dependence structure in the models will be identified before any prediction or estimation can be performed toward getting the most efficient and accurate prediction and forecasting. Analyses of dependencies are of considerable importance in many sectors as an aid to better understanding the interaction of variables in a certain field of study and as an input in every aspect of our life, including engineering, health, finance, insurance, and agriculture. Statistical dependence is a relationship between two or more characteristics of units under study or review. These units may, for example, be individuals, objects, or various aspects of the environment. The dependence structure is important in knowing whether a particular model or inference might suit a given application or data set.

Several types of dependence can occur, for example, positive and negative dependence, exchangeable or flexible dependence, and dependence decreasing with lag (for data with a time index) (Joe, 1997). A popular method for modelling dependencies is using a