A SPATIAL COPULA INTERPOLATION IN A RANDOM FIELD WITH APPLICATION IN AIR POLLUTION DATA

Ishapathik Das

Indian Institute of Technology, Tirupati

Abstract. Interpolating a skewed conditional spatial random field with missing data is cumbersome in the absence of Gaussianity assumptions. Copulas can capture different types of joint tail characteristics beyond the Gaussian paradigm. Maintaining spatial homogeneity and continuity around the observed random spatial point is also challenging. Especially when interpolating along a spatial surface, the boundary points also demand focus in forming a neighborhood. As a result, importing the concept of hierarchical clustering on the spatial random field is necessary for developing the copula model with the interface of the Expectation-Maximization algorithm and concurrently utilizing the idea of the Bayesian framework. This article introduces a spatial cluster-based C-vine copula and a modified Gaussian distance kernel to derive a novel spatial probability distribution. To make spatial copula interpolation compatible and efficient, we estimate the parameter by employing different techniques. We apply the proposed spatial interpolation approach to the air pollution of Delhi as a crucial circumstantial study to demonstrate this newly developed novel spatial estimation technique.