Cross-Covariance Functions for Multivariate Random Fields based on Latent Dimensions

by

Marc G. Genton Texas A&M University Department of Statistics, TAMU College Station, TX 77843-3143, USA genton@stat.tamu.edu

Abstract

The problem of constructing valid parametric cross-covariance functions is challenging. We propose a simple methodology, based on latent dimensions and existing covariance models for univariate random fields, to develop flexible, interpretable, and computationally feasible classes of cross-covariance functions in closed form. We focus on spatio-temporal cross-covariance functions that can be nonseparable, anisotropic, and asymmetric. We discuss estimation of these models and perform a small simulation study to demonstrate our approach. We illustrate our methodology on a trivariate spatio-temporal pollution dataset from California.

This is joint work with Tatiyana V. Apanasovich.