

Survey of Methods for Solutions of Spatial Covariance Structures and Their Limitations

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Abstract : In modelling environment processes, we apply multidisciplinary knowledge to explain, explore and predict the Earth's response to natural human-induced environmental changes. Thus, the analysis of spatial-time ecological and environmental studies, the spatial parameters of interest are always heterogeneous. This often negates the assumption of stationarity. Hence, the dispersion of the transportation of atmospheric pollutants, landscape or topographic effect, weather patterns depends on a good estimate of spatial covariance. The generalized linear mixed model, although linear in the expected value parameters, its likelihood varies nonlinearly as a function of the covariance parameters. As a consequence, computing estimates for a linear mixed model requires the iterative solution of a system of simultaneous nonlinear equations. In order to predict the variables at unsampled locations, we need to know the estimate of the present sampled variables. The geostatistical methods for solving this spatial problem assume covariance stationarity (locally defined covariance) and uniform in space; which is not apparently valid because spatial processes often exhibit nonstationary covariance. Hence, they have globally defined covariance. We shall consider different existing methods of solutions of spatial covariance of a space-time processes at unsampled locations. This stationary covariance changes with locations for multiple time set with some asymptotic properties.

Keywords : parametric, nonstationary, Kernel, Kriging

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