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Title: Flexible validity conditions for the multivariate Matérn covariance in any space dimension and for any number of components

Abstract:

Flexible multivariate covariance models for spatial data are in demand. This work addresses the problem of parametric constraints ensuring positive semidefiniteness of the multivariate Matérn model. Much attention has been given to the bivariate case, while highly multivariate cases have been explored to a limited extent only. The existing conditions often imply severe restrictions on the upper bounds for the collocated correlation coefficients, which makes the multivariate Matérn model appealing for the case of weak spatial cross-dependence only. We provide a collection of validity conditions for the multivariate Matérn covariance model that allows for more flexible parameterizations than those currently available and prove that, under these new conditions, much higher upper bounds can be obtained for the collocated correlation coefficients.