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Erratum

Erratum to "Asymptotic Behavior of the Likelihood Function of Covariance Matrices of Spatial Gaussian Processes"

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In the article titled "Asymptotic Behavior of the Likelihood Function of Covariance Matrices of Spatial Gaussian Processes," some errors have occurred and should be corrected as follows.

(i) Clarification: Equation (2.11) reflects the assumption of a stationary covariance structure, which is the standard setting for Kriging.

(ii) The sentence above (3.1) should read "For the matrix norm induced by the *Euclidean vector norm* and a symmetric matrix R, one can show that...."

(iii) Clarification: the result of Theorem 3.1 holds along sequences $\theta(\tau) = \tau h$, $\tau \rightarrow 0$, along which the directional derivatives of the eigenvalues in direction $h \in \mathbb{R}^d_{>0}$ do not vanish; that is, $d/d\tau|_{\tau=0}\lambda_j(\tau h) \neq 0$, $j = 2, \ldots, n$. The vector $\mathbf{1} := (1, \ldots, 1)^T$ serves here and in the following as a place holder but may without loss of generality be replaced throughout by any other fixed direction $h \in \mathbb{R}^d_{>0}$ with the above property. This comment applies to all the following results in the paper accordingly. In general, the eigenvalue decomposition is guaranteed to be differentiable only for correlation models that are real analytic in $\theta(\tau)$; see [1, Sections 7.2 and 7.7]. The method of Van Der Aa et al., referenced as [22] in the original paper, works to compute eigenvector derivatives for multiple eigenvalues, provided that, for some order $k \in \mathbb{N}$, the kth-order derivatives of the eigenvalues are mutually distinct.

(iv) The third sentence in Remark 3.2 (1) should read "In Appendix A, a relationship between condition 2 and the regularity of $R'(0)$ is established, giving strong support that condition 2 is generally valid, if $R'(0)$ is regular."

Addendum: the conditions of Theorem 3.1 do not apply to the Gaussian correlation model. Here, the first order derivative $R'(0)$ vanishes.

(v) Formally speaking, the proof given for Lemma 3.4 applies only if $p \geq 1$. However, the case $p = 0$, which corresponds to constant regression, may be treated in a similar and in fact more straightforward manner, since introducing the auxiliary matrix $L(\tau)$, as in (3.7), becomes unnecessary.

(vi) The first sentence on page 9 should read "It holds that $X_1(0) = (1/\sqrt{n})\mathbf{1}$; see the proof of Lemma 3.3."

(vii) The first sentence in Remark 3.5 should read "Actually, one cannot prove for $(LF^TQ\Lambda^{-1})$ to be of full rank in general, since...."

(viii) In the appendix, there is a minus sign missing in the vector W defined just before (A.7). It should feature alternate signs in its nonzero components. It is understood that the nonzero entries should appear in reversed order than the entries in the arrow matrix in (A.5) so that W is orthogonal to the arrow matrix' first row.

References

[1] D. Alekseevsky, A. Kriegl, P. W. Michor, and M. Losik, "Choosing roots of polynomials smoothly," *Israel Journal of Mathematics*, vol. 105, no. 1, pp. 203–233, 1998.