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Corrigendum

Corrigendum to "Robust smoothing of gridded data in one and higher dimensions with missing values" [Comput. Statist. Data Anal. 54 (2010) 1167–1178]

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On page 1170, Eq. (14) converges, for any initial conditions, if the matrix A is positive definite.

In the original paper, it was asserted that D is nonsingular. This is obviously wrong since one eigenvalue is zero (see Eq. (8)). Thus the positive definiteness of A still remains to be proved.

We assume that the non negative weights w_i are not identically zero. By definition, $A = sD^{\mathrm{T}}D + W$ and $s > 0$. Since, for any X, we have $X^{\mathrm{T}}(D^{\mathrm{T}}D)X = \|DX\|^2 \geq 0$ and $X^{\mathrm{T}}WX = \sum_{i=1}^{n} w_i x_i^2 \geq 0$, one has $X^{\mathrm{T}}AX \geq 0$. Since A is symmetric, A is positive semidefinite.

Now, let X be a vector such that $X^{\mathrm{T}}AX = 0$; then (1) $DX = 0$ and (2) $X^{\mathrm{T}}WX = 0$.

(1) From Eq. (8), the $n \times n$ matrix D has n distinct eigenvalues, one of them being zero. Therefore, the kernel of D is of dimension 1. Since it is clear that any constant vector belongs to this kernel, the latter consists of the set of the constant vectors. Therefore, since $DX = 0$, we deduce that X is constant.

(2) We write $X^{\mathrm{T}}WX = \sum_{i=1}^{n} w_i x_i^2 = \left(\sum_{i=1}^{n} w_i\right) x_1^2 = 0$ (because X is constant). But $\left(\sum_{i=1}^{n} w_i\right) > 0$, by hypothesis. Therefore, $x_1 = 0$, and hence, $X = 0$.

As a consequence $X^{\mathrm{T}}AX = 0$ implies $X = 0$. The matrix A is thus positive definite.

According to Theorem 3 of Keller (1965), the convergence of (14) is ensured.

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