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Complete List of Authors	Xiongtao Dai, Hans-Georg Müller and Wenwen Tao
Corresponding Author	Xiongtao Dai
E-mail	xdai@iastate.edu
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CORRECTION: Derivative principal components for representing the time dynamics of longitudinal and functional data

Xiongtao Dai[1], Hans-Georg Müller[2], and Wenwen Tao[3]

[1]*Iowa State University,* [2]*University of California, Davis, and* [3]*Quora*

Abstract: We provide corrections to *Dai, X., Tao, W., Müller, H.G. (2018). Derivative principal components for representing the time dynamics of longitudinal and functional data* in the rates of convergence of the local polynomial estimates for the derivative mean and covariance functions.

Key words and phrases: Derivatives, Empirical dynamics, Functional principal component analysis, Growth curves, Best linear unbiased prediction.

We are grateful to Dr. Hassan Sharghi (Shahid Beheshti University), who pointed out some errors in this paper, for which we provide corrections in the following.

The definitions of the a_n in display (4.1)–(4.2) missed some factors h_μ and h_G in the denominators. The corrected version is

$$a_{n1} = h_\mu^2 + \sqrt{\frac{\log(n)}{nh_\mu^3}}, \quad b_{n1} = h_G^2 + \sqrt{\frac{\log(n)}{nh_G^6}}, \tag{4.1}$$

$$a_{n2} = h_\mu^2 + \sqrt{\left(1 + \frac{1}{mh_\mu}\right)\frac{\log(n)}{nh_\mu^2}}, \quad b_{n2} = h_G^2 + \left(1 + \frac{1}{mh_G}\right)\sqrt{\frac{\log(n)}{nh_G^4}}. \tag{4.2}$$

As a consequence, conditions (A5) and (A7) need to be changed to

(A5) $h_\mu \to 0$ and $\log(n)\sum_{i=1}^n N_i w_i^2/h_\mu^3 \to 0$, $\log(n)\sum_{i=1}^n N_i(N_i-1)w_i^2/h_\mu^2 \to 0$.

(A7) $h_G \to 0$, $\log(n)\sum_{i=1}^n N_i(N_i-1)v_i^2/h_G^6 \to 0$, $\log(n)\sum_{i=1}^n N_i(N_i-1)(N_i-2)(N_i-3)v_i^2/h_G^4 \to 0$.

In the first paragraph after Theorem 1, the optimal rate of convergence for $\hat{G}^{(1,1)}$ and $\hat{\phi}_{k,1}$ should be $O((\log(n)/n)^{1/5})$ almost surely, achieved for example if $h_\mu \asymp (\log(n)/n)^{1/7}$, $h_G \asymp (\log(n)/n)^{1/10}$, $\alpha > 14/5$, and $\beta > 10/3$ as in (A6) and (A8). In the dense case, root-n rate can no longer be achieved because of the variance term b_{n2}.

In the proof of Theorem 1, for $h_\mu \hat{\mu}^{(1)}(t) = h_\mu \hat{\alpha}_1 = |\mathbf{S}|^{-1}(C_{12}R_0 + C_{22}R_1 + C_{32}R_2)$, the cofactors of $[\mathbf{S}]_{1,2}$, $[\mathbf{S}]_{2,2}$, and $[\mathbf{S}]_{3,2}$ should instead be defined as

$$C_{12} = -\begin{vmatrix} S_1 & S_3 \\ S_2 & S_4 \end{vmatrix}, \quad C_{22} = \begin{vmatrix} S_0 & S_2 \\ S_2 & S_4 \end{vmatrix}, \quad C_{23} = -\begin{vmatrix} S_0 & S_2 \\ S_1 & S_3 \end{vmatrix},$$

respectively. The second order terms in the Taylor expansion of $h_\mu(\hat{\alpha}_1 - \mu^{(1)}(t))$ should be divided by an additional factor of 2. The asymptotic variance terms in the last equation on page 1604 and the first display on page 1605 should be divided by an additional factor of h_μ.

Department of Statistics, Iowa State University, Ames, IA 50011 USA

E-mail: xdai@iastate.edu

Department of Statistics, University of California, Davis, CA 95616 USA

E-mail: hgmueller@ucdavis.edu

Quora, Mountain View, CA 94041 USA

E-mail: wenwen@quora.com