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ERRATUM

Erratum to: Model selection by LASSO methods in a change-point model

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The proof of Lemma 3(ii) in the paper of Ciuperca (2014), contains a mistake, although the claim is correct. We are grateful to Fuqi Chen and Dr. Sévérien Nkurunziza, from the University of Windsor, for pointing out the mistake. We give here a corrected proof.

In the proof of Lemma 3(ii) of the paper of Ciuperca, the author proves that $|t_n(\hat{\phi}_{n_1+n_2})| = o_{I\!P}(1)$, using the inequality $|a^2 - b^2| \leq (a-b)^2$. This inequality is wrong. The result $|t_n(\hat{\phi}_{n_1+n_2})| = o_{I\!P}(1)$ can be proved easily otherwise, by elementary and short calculation. By the claim (i) of Lemma 3, we have, with probability 1, that $\|\hat{\phi}_{n_1+n_2} - \phi_1^0\| \leq n^{-(u-v-\delta)/2}$. Then $\hat{\phi}_{n_1+n_2} = \phi_1^0 + \mathbf{C}n^{-(u-v-\delta)/2}$, where $\mathbf{C}$ is a deterministic bounded p-vector $\|\mathbf{C}\| < \infty$.

Let us consider the following decomposition for $t_n(\hat{\phi}_{n_1+n_2})$:

$$t_n(\hat{\phi}_{n_1+n_2}) = \sum_{i=n_1+1}^{n_1+n_2} [(\varepsilon_i - \mathbf{X}_i'(\phi_1^0 - \phi_2^0 + \mathbf{C}n^{-(u-v-\delta)/2}))^2 - (\varepsilon_i - \mathbf{X}_i'(\phi_1^0 - \phi_2^0))^2]$$

$$= n^{-(u-v-\delta)} \sum_{i=n_1+1}^{n_1+n_2} (\mathbf{X}_i'\mathbf{C})^2 - 2n^{-(u-v-\delta)/2} \sum_{i=n_1+1}^{n_1+n_2} \mathbf{X}_i'\mathbf{C}(\varepsilon_i - \mathbf{X}_i'(\phi_1^0 - \phi_2^0)). \quad \text{(T1)}$$

For the first sum of (T1), using assumption (H2) and condition (2) of the paper of Ciuperca, together with the fact $\|\mathbf{C}\| < \infty$, we have:

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$$n^{-(u-v-\delta)} \sum_{i=n_1+1}^{n_1+n_2} (\mathbf{X}_i'\mathbf{C})^2 = n^{-(u-v-\delta)} O(n_2) = O(n^{-(u-2v-\delta)}) = o(1). \tag{T2}$$

For the second sum of (T1), using assumptions (H2), (H3) and condition (2) of the paper of Ciuperca, together with the Cauchy-Schwarz inequality and the fact $\|\mathbf{C}\| < \infty$, we have

$$n^{-(u-v-\delta)/2} \sum_{i=n_1+1}^{n_1+n_2} \mathbf{X}_i'\mathbf{C}\varepsilon_i = n^{-(u-v-\delta)/2} O_{I\!P}(n^{v/2}) = O_{I\!P}(n^{-(u-2v-\delta)/2}) = o_{I\!P}(1) \tag{T3}$$

and

$$\begin{aligned} n^{-(u-v-\delta)/2} \sum_{i=n_1+1}^{n_1+n_2} \mathbf{X}_i'\mathbf{C}\mathbf{X}_i'(\phi_1^0 - \phi_2^0) &= n^{-(u-v-\delta)/2} O(n_2) \\ &= O(n^{-(u-3v-\delta)/2}) = o(1). \end{aligned} \tag{T4}$$

Relations (T1), (T2), (T3), (T4) imply that $|t_n(\hat{\phi}_{n_1+n_2})| = o_{I\!P}(1)$.

References

Ciuperca G (2014) Model selection by LASSO methods in a change-point model. Statistical Papers 55: 349–374. doi:10.1007/s00362-012-0482-x