Annales de l'Institut Henri Poincaré - Probabilités et Statistiques
2024, Vol. 60, No. 3, 2263–2265
https://doi.org/10.1214/23-AIHP1385
Main article: https://doi.org/10.1214/21-AIHP1182

ANNALES
DE L'INSTITUT
HENRI
POINCARÉ
PROBABILITÉS
ET STATISTIQUES

Erratum: Rates of convergence in the central limit theorem for martingales in the non stationary setting

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Received 12 March 2023; accepted 16 March 2023

There is an error in the statement of the main result of the article [2], namely the Theorem 2.1 (the error concerns only the case $r \in]2, p]$). In this erratum, we give the correct statement of this theorem, and also of Proposition 5.1 of [2], which is the main step to prove the theorem. We also correct some typos in our Corollary 2.1.

We first recall the notations.

Let $(\xi_i)_{i\in\mathbb{N}}$ denote a sequence of martingale differences in $\mathbb{L}^2$, with respect to the increasing filtration $(\mathcal{F}_i)_{i\in\mathbb{N}}$. Let $\mathbb{E}(\xi_i^2) = \sigma_i^2$, $a > 0$, $\alpha = (1 + a^2)/a^2$ and

$$M_n = \sum_{i=1}^n \xi_i, \qquad V_n = \sum_{i=1}^n \sigma_i^2, \qquad \delta_n = \max_{1\le i\le n} |\sigma_i|, \qquad v_n(a) = a^2\delta_n^2 + \alpha V_n,$$

For $p \ge 2$ and $\ell \ge 2$, define

$$U_{\ell,n}(p) = \left\| \left(|\xi_{\ell-1}| \vee \sigma_{\ell-1}\right)^{p-2} \left| \sum_{k=\ell}^n \left(\mathbb{E}_{\ell-1}\left(\xi_k^2\right) - \sigma_k^2\right) \right| \right\|_1, \tag{1}$$

where $\mathbb{E}_i(\cdot) = \mathbb{E}(\cdot|\mathcal{F}_i)$. Let also, for $r \in]0, p]$,

$$L_n(p, r, a\delta_n) = \sum_{\ell=2}^n \frac{U_{\ell,n}(p)}{(V_n - V_{\ell-1} + a^2\delta_n^2)^{(p-r)/2}}$$

and

$$\psi_n(t) = \sup_{1\le k\le n} \frac{\mathbb{E}\inf(t\delta_n\xi_k^2, |\xi_k|^3)}{\sigma_k^2}.$$

When $p \in]2, 3]$ note that

$$\psi_n(t) \le (t\delta_n)^{3-p} \sup_{1\le k\le n} \frac{\mathbb{E}(|\xi_k|^p)}{\sigma_k^2}.$$

Recall that, for $r > 0$, $\zeta_r(\mu, \nu)$ (resp. $W_r(\mu, \nu)$) is the Zolotarev (resp. Wasserstein) distance of order r between two probability measures μ, ν (as defined for instance in Section 1 of [2]).

The correct statement of Theorem 2.1 in [2] is the following:

Theorem 0.1. *Let $p \in]2, 3]$ and $r \in]0, p]$.*