

CORRECTIONS - Lecture notes on RWRE

Page numbers refer to the published version, Springer Lecture Notes in Mathematics, Volume 1837, pp. 191–312.

1. Page 200, line 6, reverse $<$ to $>$ in first indicator.
2. Page 202, lines 2,3,10,12,13, replace $\rho_{(-i)}$ by ρ_i .
3. Page 206: the right side of equation (2.1.23) should be replaced by

$$\prod_{\ell=1}^L \binom{m+k}{k} (\omega_i^0)^{m_\ell} (\omega_i^-)^{k_\ell} \omega_i^+.$$

Last line, right most E_ω^o should be erased.

4. Page 207, last line, $\bar{\omega}(n)$ should be replaced by $\bar{\omega}(j)$.
5. Page 209, display below (2.1.29), the sum $\sum_{i=2}^\infty$ should be multiplied by $1/\omega_1^+$ and the sum $\sum_{i=1}^\infty$ should be multiplied by $1/\omega_0^+$.
6. Page 212, line -2 (Remark): As F. Rassoul-Agha pointed out to me, the argument given only shows that

$$P \left(\left| P_\omega^o \left(\frac{X_n - v_P n - Z_n}{\sqrt{n} \sigma_{P,1}} > x \right) - \Phi(-x) \right| > \delta \right) \rightarrow_{n \rightarrow \infty} 0,$$

which gives less than a full-blown quenched CLT; To give a full quenched CLT requires an additional estimate. *Update: Jon Peterson, in his thesis, has completed the details of this argument, by using hitting times. See arXiv:0810.0257v1 [math.PR], and also Ilya Goldsheid's article "Simple transient random walks in one-dimensional random environment: the central limit theorem", Probab. Theory Related Fields 139 (2007), pp. 41–64.*

7. Page 213, section 2.3: A better version of this argument, that avoids some of the coupling arguments and hence gives better conditions, is available at
Dembo, A., Gantert, N., and Zeitouni, O., "Large Deviations for Random Walk in Random Environment with holding times", *Annals Probab.* 32 (2004), pp. 996–1029.
8. Page 219, line 2, replace $\leq \delta$ by $< \delta$.
9. Page 228: line 1, write $M_1^{s,\epsilon} = M_1^{s,\epsilon,P}$ and erase in line 5 the sentence "Let}."
10. Page 230, last display, last line: add (twice) $h(\eta|P)$.
11. Page 232, display below (2.3.47), last line: replace $\lambda_0(u)$ by $\lambda_0(u, \eta)$.
12. Page 239, line below (2.4.13), replace $\tilde{\tau}_k$ by $\tilde{\tau}_k^{(i)}$.

13. Page 240, (2.4.14) and (2.4.15): (2.4.14) does not follow from the α mixing condition (D3). It does follow if one assumes β mixing instead. Alternatively, (2.4.14) holds true if instead of the last summand in the right hand side one writes $n^2 m_k \alpha(2k)/4 + m_k \mathbb{P}^o(\bar{\tau}^{(1)} > n^2)/4 =: B(n)$. Using Lemma 2.4.16 and the definition of $\alpha(2k)$, one then replaces (2.4.15) by the estimate $B(n) \leq o(n^{1-s})$.

14. Page 247, (2.4.34), a factor $(1 - v/v_P)^{1/3}$ is missing on the right hand side.

15. Page 250, line 5, it would be clearer to write

$$LHS \leq \frac{1}{1 + \frac{\exp\{(\log n)(W^n(\bar{a}_\delta^n) - W^n(\theta_n))\}}{J(\log n)^2}}$$

where θ_n is the location of the maximum of W^n on $(0, \bar{b}_\delta^n)$, and then continue (using the good event) with the current inequalities; line 9, replace $\omega_{a_\delta^n-1}^+$ by $\omega_{a_\delta^n+1}^+$. Line 12, replace $2J^2$ by $2(J \log n)^2$.

16. Page 251, lines 3 and 19, replace $P_\omega^{\bar{b}^n}$ by $P_\omega^{b^n}$. Line 19, last display in proof, replace in right side $(\bar{b}^n + \delta)$ by J .

17. Page 252, equation (2.5.12), replace $B_{-\alpha}$ by B_α (recall $\alpha < 0!$).

18. Page 255, display (2.5.17): replace $\mathcal{Q}(E_{\mathcal{Q}}(\bar{b}(h) = \bar{b}(1)|\Gamma(h)))$ by $E_{\mathcal{Q}}(\mathcal{Q}(\bar{b}(h) = \bar{b}(1)|\Gamma(h)))$.

19. Page 255, display below (2.5.17): remove $s_-(1) = s_-(t)$ from the conditioning.

20. Page 256, line 4 and (2.5.19), condition on $s_+(1) = s_+(t)$. Line 5, add) at end of line. Line 16, replace $f(z, \omega)$ by $f(z, w)$ and replace $e^{-w-(t-1)}$ by $e^{w-(t-1)}$.

21. Page 258: all of the multi-dimensional chapter 3 actually assumes that $P(\omega(0, 0) > 0) = 0$, that is no holding times. This should have been stated explicitly as part of **(A2)**.

22. Page 262, line -2, erase the words *is omitted*.

23. Page 263, last line, add) after h .

24. Page 264: in lines 5 and 9, P should be replaced by $\bar{\mathbb{P}}^o$ (twice in each line). In line 11, \mathbb{Q}^P should be \mathbb{Q}^o . Finally, in line -7, X_{τ_k+y} should be replaced by $X_{\tau_k} + y$.

25. Page 265, in the left hand of (3.2.8), one should divide by τ_k , not by k .

26. Page 268, line 8, replace \liminf by \limsup .

27. Page 270, change the index of summation in both sums in (3.3.7) from i to k , replace X_{i-1} by X_{k-1} , and $\bar{\omega}(i)$ by $\bar{\omega}(k)$.

28. Page 279, line 15, should have $\mathcal{A} := [2\varepsilon, 1-2\varepsilon(d-1)]$. Line 19, $Y_n^{\hat{\alpha}} = X_n \cdot e_1$. Display below (3.3.24), $g_{n+1,\omega}(x+1)$ should be $g_{n-1,\omega}(x+1)$.
29. Page 300, lines 5,6, replace x by x_1 (x_1 is as in (3.5.19)). Line 8, replace \inf in the right hand side by \sup , and α by $\bar{\alpha}$. In (3.5.20), replace x_0 by x , and in lines -4 and -3, replace i by i_0 . It is a good idea to replace X_i by ξ_i in the second half of the page.
30. Page 303, first displayed equation, replace $\varepsilon^{2(d-1)}L_0^\gamma$ by $\varepsilon^{2(d-1)}L_0^\gamma$. Line -2, replace “ $P(B_1(0))$ is a bad block” by $P(B_1(0))$ is a bad block).
31. Page 304, (3.5.25), replace $\tau_2 - \tau_2$ by $\tau_2 - \tau_1$.

Thanks to Antar Bandyopadhyay, Conrado Costa, Nina Gantert, Ryoki Fukushima, Ghaiith Hiary, Achim Klenke, Jon Peterson, Mike Weimerskirch, and Firas Rassoul-Agha for their comments.