Probability: A Graduate Course, 2nd edition

Misprints and Corrections

11 May 2024

Page 37, L4_: (α has not been defined yet, therefore) If $\alpha := F_{ac}^{*}(+\infty) = 0$ or 1

Page 51, L13: $\geq EZ_m - EZ_m I\{A_n^C\} - \epsilon$

Page 52, L7_ and 9_: X (not X_n)

Page 105, L3: Chebyshev's inequality appears only on page 121.

Page 119, L2_ and 4_: $P(X > x) \leq \frac{Eg(X)}{g(x)}$ and accordingly in the proof (This slightly more general statement will be needed later whereas the printed inequality follows trivially.)

Page 121, L8_: "*Suppose also, for simplicity, that c = 0.*" This can be deleted as it is not used in the proof. The constant in (1.1) need not be the same everywhere, cf. page 433.

Page 123, L10: Note that a direct application of Lemma 1.1 to the left-hand side (Chebyshev's inequality does not exactly apply here.)

Page 126, L9_: Moreover, $E(S_k^2 I\{A_j\}) \geq E(S_j^2 I\{A_j\})$

Page 126, L6_ and 7_: Delete

$$\sum_{j=1}^{n} \sum_{k=1}^{n} c_k^2 \, Var \, X_k I\{A_j\} =$$

(The equality above this assumes $EX_k = 0$ and cannot be applied to $X_k I\{A_j\}$ instead of X_k whereas the second line follows immediately.)

Page 132, L1_: "(provided that $EX = 0$)" should be dropped.

Page 135, L8: The third bullet point is neither true nor used in the proof.

Page 139, L8_: $|S_k|$ instead of S_k matches better Chebyshev's and Kolmogorov's inequalities.

Page 140, L14: $P(X \geq \lambda_\alpha(X)) \geq \alpha$ *and* $P(X \leq \lambda_\alpha(X)) \geq 1 - \alpha$. (analogous to the definition of the median)

Page 145, L10: A_k^C (not A_n^C)

Page 146: Fig. 3.1 does not match the definition. r_n are defined for $0 \leq t \leq 1$, but more importantly, the left figure displays r_1 instead of r_2 and the right figure displays r_2 instead of r_3.

Page 148, at the end of the proof: (A_p depends on c_k, which it shouldn't:) which shows that

$$\int_0^1 |f_n(t)|^p dt \geq \left(\int_0^1 |f_n(t)|^4 dt\right)^{(p/2)-1} = \left(\int_0^1 \sum_{i,j,k,l} c_i c_j c_k c_l r_i(t) r_j(t) r_k(t) r_l(t)\, dt\right)^{(p/2)-1}$$

$$= \left(\int_0^1 \left(\sum_i c_i^4 + \sum_{i,j} c_i^2 c_j^2\right) dt\right)^{(p/2)-1} = \left(\int_0^1 \left(\sum_i c_i^4 + 1\right) dt\right)^{(p/2)-1}$$

$$\geq \left(\int_0^1 (1+1) dt\right)^{(p/2)-1} = 2^{(p/2)-1} =: A_p$$

Given the negative exponent, in the integrand $\sum_i c_i^4$ attains its maximum at 1 as is obvious but can also be shown by calculating the extremal values under the constraint $\sum_i c_i^2 = 1$.

Page 152, L10: or (not and)

Page 153, L4: $\leq$ (not =)

Page 153, L11: can be replaced by 1 (not ½)

Page 164, Theorem 1.7 (b): For φ to be periodic, λ in the lattice on page 163 must be 0.

Correction of the *Proof*: Only sufficiencies remain to be proved. Thus, suppose that $\varphi(t_0) = 1$ for some $t_0 \neq 0$. Then

$$0 = 1 - \varphi(t_0) = E\left(1 - e^{it_0X}\right) = E(1 - \cos t_0X),$$

where the last equality is a consequence of the fact that the expectation is real (equal to 0). Since the integrand is non-negative and the expectation equals 0 we must have $\cos t_0x = 1$ for all *x* with $P(X = x) > 0$. Because of the periodicity of the cosine function these points must be situated on a lattice with a span proportional to $2\pi/\, t_0$ and $\lambda = 0$, which proves (b).

Page 184, L4: By Theorem 5.2

Page 220, L1: Lemma 5.1 (There is no other Lemma 5.1 and this is referred to in the proof of Theorem 5.3)

Page 234, L7_: $d\, F_{n_k}(x)$

Page 236, L2: X_n instead of *X*

Page 245, L15: Alternatively try Problem 14.23 first.

Page 251, L7_: In Sect. 11 we studied

Page 253, L12_: $P\left(\bigcap_{m=1}^{\infty} \bigcup_{n=m}^{\infty} A_n^{(m)}\right) = \lim_{m\to\infty} P\left(\bigcup_{n=m}^{\infty} A_n^{(m)}\right) = 0,$

Page 256, L14_: $n, m \to \infty,$

Page 257, L3: $n, m \to \infty,$

Page 258, L9: $F(x - \varepsilon) < \omega^* < F(x).$

Page 293, L8_ and 9_: 3 should be replaced by $\frac{3}{h^2}$ at four places. A minus sign is missing in the right term in L9_.

Page 298, L5: The first term $P(|Y_k| > A)$ = should be deleted.

Page 299, L9: $1/r$ is missing.

Page 300, L6/7_: Proposition 3.6.3

Page 308, L3_: via Theorem 8.1

Page 309, L12_; Theorem 2.6.3

Page 321, L9/10: Theorems 12.1 and 2.12.1.

Page 332, L1_: 2 is missing in the denominator on the left-hand side in from of s_n^2, cf. the middle line on page 333

Page 338, L3_: $E\ min\ \{2, |tX/s_n|\}$

Page 338, L1_ and page 339, L2: s_n, not S_n

Page 354, L5 and 6: X_k instead of *X* at four places

Page 361, L10_: minus sign in from of $\frac{4|t|^3\gamma_k^3}{3s_n^3}$

Page 362, L2_: $\sum_{k=1}^{n} |r'_k + r''_k|$

Page 369, L8: $\left|\Phi\left(\frac{z}{x}\right) - \Phi\left(\frac{z}{y}\right)\right|$

Page 371, L11: By Theorem 2.12.1

Page 372, L14_: Note the relation to Theorem 6.11.2.

Page 373, L4_: $y^{\frac{2r}{2-p}-1}$ belongs to the integrand, not the boundary.

Page 391, L7: $\frac{\varepsilon}{\delta\sigma^2}$ as two lines below

Page 393, L2: square root of the variance

Page 397, L15: X_k instead of *X* at two places and $S'_n - S_n$ on the right-hand side

Page 398, L3: 1 instead of *i*

Page 402, L3_: $< \infty$, not $= \infty$

Page 403, L10: for $\varepsilon < \sigma\varepsilon^*$

Page 404, L10_: is not sparse.

Page 407, L3_: α_k instead of α^k

Page 408, L1: α_k instead of α

Page 409, L3: log *P* as stated in the Lemma

Page 409, L10_: as in the proof of Theorem 5.2,

Page 409, L9_: $< \infty$, not $= \infty$

Page 411, L9_: $\varepsilon^* = \sqrt{2}$

Page 413, L4: γ^3 instead of γ

Page 417, L4_ and 5_: e^e and e^{e^e} should be interchanged between these two lines

Page 426, L7: For $\alpha > 2$ this means that $\varphi(t) = 1 + o(t^2)$

Page 426, L8: by Theorem 4.4.2

Page 426, L17: Theorem 4.4.4

Page 429, L13_: $= \frac{U - b\sum_{k=0}^{n-1} a^k}{a^n}$

Page 429, L11_: $\sup_n |b| \sum_{k=0}^{n-1} a^k < \infty$,

Page 436, L4: $E|X|^{\alpha/4} \cdot |X|^{1-\alpha/4}$

Page 445, L3: $\mu = \lambda$

Page 446, L2: $x(Y - \lambda)$

Page 455, L10: $\beta(u) = u^c$

Page 455, L12: $(-x)^{1/c}$ also on the right-hand side

Page 455, L1_: which contradicts (6.1)

Page 461, L4: $X_k = I\{Y_k \geq 1\} + I\{Y_k = 0\}I\{Z_k = 1\}$,

Page 463, L8: $\lambda g_{\lambda_n,A}(S_n + 1)$

Page 463, L9_ and 10_: $\sum_{j=1}^{n}$

Page 463, L4_ and 2_: $g_{\lambda_n,A}(j + 1) - g_{\lambda_n,A}(j)$

Page 469, L7_: $\Lambda = \bigcup_{j \in J} \Lambda_j$

Page 469, L4_: Λ_j, not λ_j

Page 473, L12_: $\inf_{k \geq n} X_k$

Page 494, L6/7_: $\{\tau \geq n\} = \bigcap_k \{\tau_k \geq n\} \in \mathcal{F}_n$ and $\{\tau \leq n\} = \bigcup_k \{\tau_k \leq n\} \in \mathcal{F}_n$

Page 495, L8: in general does *not* belong to $\mathcal{F}_{\tau_1}$.

Page 497, L9_: $EX_{\tau \wedge n} \leq EX_n$.

Page 504, L4, 5, 6: c_{j+1} instead of c_{j-1} at three places

Page 512, L4_: $\frac{C + |a|}{b - a}$

Page 513, L8: Theorem 7.4

Page 513, L4_: $\frac{C + |a|}{b - a}$

Page 519, L8_: $X_0 = 1$

Page 519, L3_: Theorem 2.18.1

Page 520, L3: recall section 2.15.1

Page 526, L7_: first success random variable, not geometric

Page 526, L5_: $\tau \in Fs(p)$.

Page 527, L7: Let $p = P(\text{Player } B \text{ wins one round})$ (so that this is consistent with the changes in the document *Misprints from 21 October 2020*)

Page 529, L7:

$$= \frac{1}{p-q}\left(-b + (a+b)\frac{1-(p/q)^b}{(q/p)^a - (p/q)^b}\right).$$

Page 535, L2_: $E\, S_{\tau\wedge n} \leq E\, S_\tau$

Page 535, L1_: $E\, S_{\tau\wedge n} \leq t + M$

Page 548, L2: $X_n = U_{-n}$

Page 564, L5: $+\,(1-a)^{r-2}$ as in the line below

Page 564, L10: Now, $g'(0) = 0$ and

Page 567, L6_: The monotonicity condition of Lemma 7.2 is missing in Lemma 7.1 (e)

Page 568: In the proof of Lemma 7.2 the monotonicity condition is needed not just if $\rho = 0$ as stated in the lemma.

Page 569: The proof of Lemma 8.1 requires that the interval is not arbitrary but closed under addition.

Page 571, L9_: The total number of points in $\mathbb{J}_G^{(n)}$ is at most $n(n+1)$

Page 572, L4: $G(u) \leq G_D(y)$

Page 573, L7_: (2 changes!) $\sup_{x\in\mathbb{J}} |J_n(x)| \leq \sup_{x\in\mathbb{J}} (|G_n(x) - G(x)| + |G(x-) - G_n(x-)|)$

Page 574, L2: $G(A) + G(-A)$ (no brackets here because the factor 2 refers to both summands)

Page 574, L13_: $-J_{n_{k_j}}(x)$