Bickel–Doksum. Mathematical Statistics. Volume I.

Errata for the First Printing

1. Corrections

p. 11, Ex. 1.1.5. Label the expression on line 9 as (1.1.4). On line 15, replace "model (a)" with "model (1.1.4)".

p. 19, l. -7. Switch $\mathcal{N}(\mu+\Delta,\sigma^2)$ with $\mathcal{N}(\mu,\sigma^2)$.

p. 20, l. -16. After "of $\hat{\nu}$", insert "If $\text{Bias}(\hat{\nu})=0$, then $\hat{\nu}$ is called *unbiased*".

p. 20, l. 8 and l. 10. $\delta(\mathbf{x})$ should be $\delta(\mathbf{X})$.

p. 20, l. -12. "$[E(\hat{\nu})-\mu]$" should be "$[E(\hat{\nu})-\nu]$".

p. 21, l. -14. "$E(\hat{x}-\mu)^2$" should be "$E(\hat{X}-\mu)^2$".

p. 21, l. 7. "$n_0=\sigma_0/\epsilon$" should be $n_0=(\sigma_0/\epsilon)^2$".

p. 23, l. 12. After "providing a small bound ... to minimize the probability of a Type II error," insert "The bound on the probability of a Type I error is called the *level of significance* and deciding Θ_1 is referred to as "Rejecting the hypothesis $H:\theta\in\Theta_0$ at level of significance α".

p. 35, $p(z,y)$ table. Should be "$p(1,0)=0.025$, $p(1,1)=0.025$".

p. 35, Bottom of page, Last equation. "$\sum_x$" should be "$\sum_z$".

p. 39, Thm. 1.4.4. "best MSPE" should be "best linear MSPE".

p. 46, l. 3. "μ" should be "θ" in the equation.

p. 51, l. 9. natural sufficient statistics $T^{(m)}(x)=\sum_{i=1}^m T(x_i)$.

p. 59, Thm. 1.6.3. c) nonempty interior $\mathcal{E}^0$ in R^k and $\boldsymbol{\eta}_0\in\mathcal{E}^0$.

p. 62, (1.6.16). "$\pi^{-p/2}$" should be "$(2\pi)^{-p/2}$".

p. 70, l. 2. "if the events $T_1\geq t,\ldots,T_k\geq t$" should be "if and only if the events $T_1>t,\ldots,T_k>t$".

p. 70, l. 10. "scale parameter δ" should be "scale parameter δ^{-1}".

p. 70, l. 14. "T_0 and Y" should be "T and Y".

p. 78, l. 10. $E(X-\mu)^4=3\sigma^4$.

p. 78, Prob. 1.3.8. (ii) "Let $\hat{\sigma}_0^2=$" should be "Let $\hat{\sigma}_c^2=$".

p. 90, l. 8. Should be "π_L is the projection matrix onto $\mathcal{L} = \{\boldsymbol{\eta} : \boldsymbol{\eta} = B\boldsymbol{\theta}, \boldsymbol{\theta} \in R^l\}$.".

p. 90, Hint to Prob. 1.6.16(ii). After "degrees of freedom," insert "$Y_0 = 0$".

p. 90, Prob. 1.6.17, l. 3. "$\mathbf{c}_{l\times 1}$" should be "$\mathbf{c}_{k\times 1}$".

p. 90, Hint to Prob. 1.6.16(ii). "$\sum_1^t Z_i$" should be "$\sum_1^r Z_i$".

p. 90, Prob. 17(a). "projection matrix of $\mathbf{T}$" should be "projection matrix". "$\boldsymbol{\eta} = B\boldsymbol{\theta} + \mathbf{c}$" should be "$\boldsymbol{\eta} = B\boldsymbol{\theta},\ \boldsymbol{\theta} \in R^l$".

p. 91, Prob. 1.6.29. "$\mathbf{Y}_{ij}$" should be "Y_{ij}".

p. 99, Formula (2.1.1). The gradient should be evaluated at the point $\boldsymbol{\theta} = \boldsymbol{\theta}_0$.

p. 107, l. 3. "$X \times H$" should be "$X \times \Theta$".

p. 120, l. 16. After "model $\mathcal{P}_0$" insert "(see (2.2.1))".

p. 124, l. 10. "$\hat{\theta}_1 = \surd \quad \overline{n_1}/n$" should be "$\hat{\theta}_1 = \sqrt{n_1/n}$".

p. 128, Thm. 2.4.1. ..."The interior of the convex support of p_T." (Delete (a, b).)
Proof. After "$f(b-)$" insert "if $\mathcal{E} = (a, b)$".

p. 128. Step (3) of bisection algorithm should add "and return x_{final}".

p. 130, Ex. 2.4.2. "$\hat{b}_{\text{old}}$" should be "$\hat{p}_{\text{old}}$".

p. 132, l. -3. "noncave" should be "non-concave".

p. 135, Lem. 2.4.1. "...and θ_{OLD} maximizes $J(\theta \mid \theta_{\text{OLD}})$."

p. 137, Ex. 2.4.26. "$\hat{\theta}_{\text{NEW}} = \frac{2N_{1m}+N_{2m}}{2n} + M_n/(2 - \hat{\theta}_{\text{OLD}})n$."

p. 137, Eqn after (2.4.26). "$\theta^2 - \left(\frac{2+2N_{1m}+N_{2m}}{2n}\right)\theta + \frac{2N_{1m}+N_{2m}+M_n}{n} = 0$.

p. 137, l. 5. "Problem 2.4.12" should be "Problem 2.4.15".

p. 137, l. -5. Replace "and find (Problem 2.4.1)" with "It may be shown directly (Problem 2.4.1)...".

p. 143, Prob. 2.2.6(a). "$E(Y_i) = \alpha z_j$ where the z_j" shoulld be "$E(Y_i) = \alpha z_i$ where the z_i".

p. 143, Prob. 2.2.7. "equations (2.1.5)" should be "equations (2.1.7)".

p. 153, l. 1. "heterogenous" should be "heteroscedastic".

p. 153, 8b). "$\alpha = 1$ and $p = 1$."

p. 158, 2.5.15. "Example 2.4.4".

p. 158, l. 7. Replace with "*Limitations of the Missing Value Model of Example 2.4.6.* The assumptions underlying Example 2.4.6 . . .".

p. 170, l. 7. Possibly randomized *not* permitted.

p. 170, l. 12. $\bar{\mathcal{D}} =$ {set of all *randomized* decision procedures}.

p. 172, Top of Page. "$R(\pi^{**}, \delta^{**})$" should be "$r(\pi^{**}, \delta^{**})$".

p. 172, l. -5. In the integral of formula (3.3.13) replace "$r(\theta, \delta)$" with "$R(\theta, \delta)$".

p. 174, Thm. 3.3.3. In statement "·" after "prior distributions", eliminate "such that $\pi_k\{\theta : R(\theta, \delta^*) = r\} = 1$, and". Continue "Let . . .". In proof, "Because $r(\pi_k, \delta^*) \leq r$ . . .".

p. 196, Remark 3.5.1. "$\Delta_x(t) = 1[t \leq x]$" should be "$\Delta_x(t) = 1[t \geq x]$".

p. 198, Prob. 8, Hint for (a). "$\mathrm{Cov}(\boldsymbol{\theta}_j, \boldsymbol{\theta}_j)$" should be "$\mathrm{Cov}(\boldsymbol{\theta}_i, \boldsymbol{\theta}_j)$".

p. 200, 2b). ". . . for g as above" (eliminate twice differentiable).

p. 203, Prob. 2. "$E(\delta(X) \mid t(X))$" should be "$E(\delta(X) \mid T(X))$".

p. 203, Prob. 3.4.5. "$\mu - \mu_0$" should be "$\mu = \mu_0$".

p. 214, l. 11. $\mathbf{N}_d = (N_{m1d}, N_{m0d}, N_{f1d}, N_{f0d})$ are independent with corresponding distributions $\mathcal{M}(n_d, p_{m1d}, p_{m0d}, p_{f1d}, p_{f0d})$, $1 \leq d \leq D$.

p. 216, l. 16. Insert "As we discussed in Section 1.3 . . ." at the beginning of the sentence.

p. 217, l. 10. Insert "As we have noted in Section 1.3" before "Such tests. . .".

p. 219, l. 18. Replace $d\left(\frac{X}{n}, \theta_0\right)$ by $d\left(\frac{X}{n}, [0, \theta_0]\right)$.

p. 222, l. -5, -6. "$2n$" should be "$2r$".

p. 226, Example 4.2.2, l. 4. $(\mathbf{x} - \mu_1)$ should be $\mathbf{x} - \boldsymbol{\mu}_1$. $(\mathbf{x} - \mu_0)$ should be $\mathbf{x} - \boldsymbol{\mu}_0$.

p. 226, l. -15. Shall read: $Q = (\mathbf{X} - \boldsymbol{\mu}_0)^T \Sigma_0^{-1} (\mathbf{X} - \boldsymbol{\mu}_0) - (\mathbf{X} - \boldsymbol{\mu}_1)^T \Sigma_1^{-1} (\mathbf{X} - \boldsymbol{\mu}_1)$.

p. 228, Ex. 4.3.3. $\eta(\mu) = \sqrt{n}\mu/\sigma$.

p. 229, Ex. 4.3.5. "test δ^* with reject. . ." should be "test δ^* which rejects. . .".

p. 234, First equation at the top. $\geq$ should be $\leq$.

p. 235, Second inequality at top. "$P[\bar{\nu}(X) = \nu]$" should be "$P[\bar{\nu}(X) \geq \nu]$".

p. 236, l. 22, 24, 25. (4.1.1) should be (4.4.1).

p. 236, l. 26. "larger than $1 - \alpha$" should be "smaller than $1 - \alpha$".

p. 237, Ex. 4.4.3. The first equation should use $\approx$, not equality.

p. 237, l. 5. "s" should be "s^2".

p. 238, l. -11. "$n = \frac{k_\alpha}{l_0} - k_\alpha^2$" should be "$n = \left(\frac{k_\alpha}{l_0}\right)^2 - k_\alpha^2$".

p. 242, l. -12. At the right-hand side of the expression, "$(1-\alpha)$" should be "α".

p. 243, Proof of Thm. 4.5.1. In the second equation, "$s(t)$" should be "$S(t)$".

p. 244, l. 13. It should be $\geq$ inside the $C = \{\ \}$.

p. 244, l. 11. "of a test δ" should be "of a level α test δ".

p. 248, Ex. 4.6.1. Define k as the largest integer such that $P(S \geq k) \geq (1-\alpha)$.

p. 248, Formula (4.6.2). The two $\leq$'s inside the brackets should both be $\geq$'s.

p. 253, l. 10. $E([\hat{Y} - \mu] + [Y - \mu])^2$ should read $E([\hat{Y} - \mu] - [Y - \mu])^2$.

p. 253, l. -7. "$Z(Y)$" should be "$Z_p(Y)$".

p. 258, l. 17. Reference should be: See Example 2.2.9.

p. 271, Prob. 9. "Show that the test rejects $H \ldots$" should be "Show that the test that rejects $H \ldots$". "Next let $T^{(1)}, \ldots, T^{(B+1)}$" should be "Next let $T_{(1)}, \ldots, T_{(B+1)}$" and "$T \geq T^{(B+1-m)}$" should be "$T \geq T_{(B+1-m)}$".

p. 278, Prob. 7, Hint. Reference to $\bar{X}_{n_0}$ should be to the previously defined $\bar{X}_0$. Similarly, s_{n_0} should be s_0.

p. 280, Prob. 4.4.18. "Example 4.1.6" should be "Example 4.4.6".

p. 284, l. 2. "$F_U^{-1}(P)$" should be "$F_U^{-1}(p)$".

p. 290, l. 19. "X_i/θ" should be "$2X_i/\theta$".

p. 296, l. 1,2. Journal reference should be "Statisical Science", 2001.

p. 302, Ex. 5.2.2. "$\hat{P}$" should be "$\hat{p}$".

p. 304, l. -2. $\inf\{D(\boldsymbol{\theta}_0, \boldsymbol{\theta}) : |\boldsymbol{\theta} - \boldsymbol{\theta}_0| \geq \epsilon\} > D(\boldsymbol{\theta}_0, \boldsymbol{\theta}_0)$.

p. 313, l. -10. "Theorem 5.2.2" should be "Proposition 5.2.1".

p. 330, l. -13. After "are called M-estimates" insert "as well as estimating equation estimates — see Section 2.2.1".

p. 387, l. 10. After "minimum contrast" insert "or M".

p. 415, l. -3. "Z_i^T" should be "$\mathbf{Z}_i^T$".

p. 425, Prob. 6.1.15(b). "$x = 0.0289$" should be "$s = 0.0289$".

p. 429, l. -7. "$k(\theta_0, \theta_1)$ is a Kullback–Leibler in formation" should be "$K(\theta_0, \theta_1)$ is the Kullback–Leibler information".

p. 454, l. 6. "1_A" should be "$1(A)$".

p. 454, l. 7. "$1_A(\omega)$" should be "$1(A)(\omega)$".

p. 464, (A.13.17). "$\sqrt{2\pi\sigma}$" should be "$\sqrt{2\pi}\sigma$".

p. 465, l. 1. "$e^{-\lambda}$" should be "$e^{-\lambda x}$".

p. 470, (A.15.10). Renumber as (A.15.11). Renumber unnumbered equation 7 lines above it as (A.15.10).

p. 471. Renumber (A.15.11) as (A.15.12).

p. 478, (B.1.2). "p^y" should be "p^z".

p. 479, (B.1.5) and below. "$n - z$" should be "$N - z$" and "θ^y" should be "θ^z".

p. 486, Thm. B.2.2. "$\mathbf{Y} = g(\mathbf{Y})$" should be "$\mathbf{Y} = g(\mathbf{X})$".

p. 492, (B.3.7). "$S^{\frac{1}{2}(k-2)}$" should be "$s^{\frac{1}{2}(k-2)}$".

p. 495, (B.3.24). "N" should be "n".

p. 496, (B.3.26). "$\sum_{j=1}^{n} a_{ij}$" should be "$\sum_{j=1}^{n} a_{kj}$".

p. 507, (B.6.5). "$|\det(\Sigma)|^{k/2}$" should be "$|\det(\Sigma)|^{1/2}$".

p. 509, Thm. B.6.5, last line. "$\mu^{(1)}-$" should be "$\mu^{(1)}+$".

p. 512 and 513. The subscript n should not be boldfaced throughout these pages.

p. 525, Prob. B.1.8. (iv) and (v) should read:

(iv) $$Y \sim \mathcal{U}(-1, 1),\ Z = Y^2$$

(v) $$Y \sim \mathcal{U}(-1, 1),\ Z = Y^2 \text{ if } Y^2 < \frac{1}{4} \text{ and } Z = \frac{1}{4} \text{ if } Y^2 \geq \frac{1}{4}$$

p. 525, Prob. B.9(b). "X and Y in Problem B.1.8(c)(i)" should be "Z and Y in Problem B.1.8(i)".

p. 526, l. 5. Replace the hint by: Divide the numerator and denominator of the expression for $P[Z = z \mid Y = y]$ on page 479 by $\binom{N}{n}\binom{n}{y}\theta^y(1-\theta)^{n-y}$. This gives the required binomial probability in the numerator. Since the binomial probabilities add to one, the denominator must be one.

p. 534, Prob. B.5.3. "$t_i^{i_1}$" should be "$t_1^{i_1}$".

p. 535, Prob. B.6.3, last line. "Σ_{22}" should be "Σ_{22}^{-1}".

p. 543. Label on the top figure should be $Pr(Z \geq z)$.

2. Corrections to spelling, punctuation, etc.

p. xiii, l. 5. "terrabytes" should be "terabytes".

p. xiv, l. -20. "Chapters 7–10" should be "Chapters 7–9".

p. 14, l. -14. "Bayes rule" to "Bayes theorem".

p. 44, l. -13. "keeep" should be "keep".

p. 83, l. 13. "(2000)" should be "(2001)".

p. 89, l. -1. After "fixed time." add "The lifetimes are assumed to be exponentially distributed.". (This assumption is actually also given on line 13.)

p. 91, Prob. 27. "genrated" should be "generated".

p. 91, Prob. 1.6.28. "information in theory" should be "information theory".

p. 91, Prob. 28. There needs to be dx in the last integration.

p. 97, l. 6. "Statistics, 2000" should be "Statistics, 2001".

p. 125, Formula (2.3.7). Formula is short one right parenthesis.

p. 132, (2.4.3). There is one extra parenthesis at the end.

p. 141, Prob. 13(b)(iii). "Raleigh" should be "Rayleigh".

p. 152, 2.3.4. "...of Corollary 2.3.1".

p. 162, l. 3. Insert "minimum" before "Bayes risk".

p. 162, End of Paragraph 1. "Bayes procedure" should be "Bayes procedures".

p. 162, Beginning of Paragraph 3. "formulae (1.2.8)" should be "formula (1.2.8)".

p. 167, Ex. 3.2.4. "and μ and the vector $\Delta \ldots$ is independent" should be "and μ and the vector $\Delta \ldots$ are independent".

p. 169, l. -18. "(2000)" should be "(2001)".

p. 182, Ex. 3.4.2. Strike "then".

p. 190, Section 3.5.3. Missing period at end of paragraph 2.

p. 212, l. 5,6. "mimimum" should be "minimum". "2000" should be "2001".

p. 218, Remark 4.1. Replace "the level and size of the test" by "the size of the test".

p. 229, Ex. 4.3.4. "most serious error" should be "more serious error".

p. 232, Paragraph before Ex. 4.3.7. "invariance consideration" should be "invariance considerations".

p. 239, Ex. 4.4.4. "internet subscribers" should be "Internet subscribers".

p. 241, Ex. 4.4.7. "case F supported..." should be "case of F supported...". The right parenthesis after 1992 should actually be a comma, and a right parenthesis should come before the period at the end of the sentence.

p. 245, l. -8. "point o" should be "point of".

p. 254, l. 6. "valid from samples..." should be "valid for samples...".

p. 259, One-third from top. "...is monotone increasing function..." should be "...is a monotone increasing function...".

p. 270, Prob. 4.1.6. There is no b). Delete a).

p. 271, l. -1,-2. "Cramer" should be "Cramér".

p. 295, References. Add the reference (see page 241): "Bickel, P. "Inference and auditing: the Stringer bound," Internat. Statist. Rev., 60, 197–209 (1992).".

p. 296, l. 5. "Aarberge" should be "Aaberge".

p. 297–298. References to "S" should be to "s" (that's the usual notation).

p. 299, l. -3. "Esseen" should be "Esséen".

p. 300, Second paragraph from bottom. "...results such as are..." should be "...results such as these are...".

p. 302, Sentence after Ex. 5.2.2. "suprising" should be "surprising".

p. 306, "Summary". "...sequence of estimates) consistency." should be "...sequence of estimates), consistency.".

p. 361, Prob. 4. "extablish" should be "establish".

p. 458, l. -8 and -13. "Schwartz" should be "Schwarz".

p. 463, l. 10. Insert "a" in front of "random variable".

p. 479, l. 4. "Bayes' Rule" should be "Bayes' theorem".

p. 482. l. -1. "Bayes' Rule" should be "Bayes' theorem".

p. 498, l. 5. "Cor(X, Y)" should be "Corr(X, Y)".

p. 548, l. -16. "Cauchy–Schwartz" should be "Cauchy–Schartz".

p. 549, l. -13. "Cramer" should be "Cramér".

p. 550, l. 12. "Marakov" should be "Markov".