Errata: Elements of Large-Sample Theory - Erich L. Lehmann (1999)
Errata Update: 20 July, 2021

Original document: sites.psu.edu/drh20/david-hunters-home-page/asymptotics-notes/errata/
This document (19th November, 2024): github.com/zekiakyol/compact-erratas

Location	Correction
Page 2, footnote at bottom of page	"connction" should be "connection"
Page 7, Lemma 1.1.1	"symptotically" should be "asymptotically"
Page 8, line above (1.1.28)	"formula" should be plural
Page 11, Tables 1.2.3 and 1.2.4	The bottom row in each table should be labeled with the Poisson parameter λ, not γ.
Page 11, the three lines above Table 1.2.4	$\gamma = \alpha$ should be $p = \alpha$ and $\gamma = .02$ should be $p = .02$.
Page 12, second paragraph, sentence beginning with "The third row ..."	Since γ should not be in Table 1.2.4, the parenthetical expression "(with λ in place of γ)" seems unnecessary.
Page 15, Expression (1.3.3)	denominator should be i^{α}, not i^{a}
Page 16, Equation (1.3.9)	**1** should not be bold
Page 17, Example 1.3.5	If α is a non-negative integer, the series has infinite radius of convergence.
Page 21, bottom right entry of Table 1.4.3	.0197 should be .0192
Page 22, top line	"number" should be plural
Page 27, Inequality (1.5.3)	Missing "$< \epsilon$". Should be $\lvert f(x) - a \rvert < \epsilon$.
Page 29, second paragraph	Should read "at x_0 is continuous at x_0."
Page 36, Problem 1.17	Should be $\gamma^n \to 0$
Page 37, Problem 1.18 in the hint	Should say "Suppose $\gamma > 1$."
Page 37, Problem 2.5	Both terms asymptotically equivalent to $P_n(x)$ should be divided by $x!$.
Page 42, Problem 5.1	Definition 1.5.1 does not apply to this situation. The problem might be rephrased "Extend Definition 1.5.1 and use it to show that..."
Page 43, Problem 5.10, second line	lowercase f should be capital
Page 43, Problem 5.11, Hint for (i)	The first sentence of the hint is false. Nothing is harmed by deleting it.
Page 44, Problem 5.14	The statement is not true. It could be made true by (for example) specifying that the b_n are non-decreasing.
Page 45, Problem 6.9	"id" should be "is"
Page 47, line 6	"give" should be "gives"
Page 52, 5 lines from bottom	should read, "which tends to $a + 1$ if ..."
Page 54, Equations (2.1.19)	These results are identical to (2.1.18) and are therefore redundant.
Page 57, sentence beginning 'By Theorem 2.1.1, a sufficient..."	Y_n should be δ_n.
Page 58, line above (2.2.11)	relative efficiency is defined in Section 4.3, not 4.2
Page 58, Caption of Table 2.2.1	word "of" should be omitted
Page 59, expression for variance of $\widehat{\beta}$	numerator of rightmost fraction should be σ^2, not 1
Page 59, Equation (2.2.19)	numerator of second fraction should be $\overline{v}^2$, not 1
Page 62, limits of summation in (2.2.31); **Page 63** limits of summation below (2.2.34)	Should start with $k = 0$, not $k = 1$ (this is irrelevant unless σ^2 is infinite)
Page 62, Example 2.2.7	While there is nothing technically wrong here, the sequences defined are actually $(m-1)$-dependent in addition to being m-dependent.
Page 63, bottom of page in (2.3.1)	Limit is as $n \to \infty$, not $x \to \infty$
Page 65, Example 2.3.3, equation underneath "have cdf H_n' ..."	$F\left(x - \frac{1}{n}\right)$ should be $P\left(x - \frac{1}{n}\right)$
Page 69, line above Equation (2.3.11)	Problem 1.17 should be Problem 1.1.17
Page 72, Example 2.3.9, equations underneath "then"	First F should be f
Page 78, second line from bottom	pronoun "it" has wrong antecedent

Page 79, Limit (2.4.13)	In the denominator, the p and q could have subscripted n (this one is a bit questionable, but would probably improve readability)
Page 81, Limit (2.4.19)	Convergence in distribution symbol is missing the L
Page 81, second to last line	word "the" is repeated
Page 82, Table 2.4.2, first column, rows 5, 8, 11, 14, and 17	$1 - G_n(X)$ should be $1 - \Phi(X)$
Page 82, equation in middle of page	Numerator of fraction should be $\chi^2_n n$, not χ^2_n
Page 82, 9 lines from bottom	χ^2_{2k} should be χ^2_k
Page 83, line above Equation (2.4.21)	σ^2 should be σ^3
Page 83, Equation (2.4.21)	$[1 - x^2\phi(x)]$ should be $[1 - x^2]\phi(x)$
Page 83, 9 lines from bottom	"Balakrishman" should be "Balakrishnan"
Page 86, limit at bottom of page; **Page 87**, limit at top of page	convergence in distribution symbol is missing L
Page 88, limit (2.5.9)	convergence in distribution symbol is missing L
Page 89, Equation (2.5.11)	$\overline{X}$ should be under a radical everywhere it appears
Page 90, limit at top of page	One of the convergence in distribution symbols is missing L
Page 90, both limits in Example 2.5.5; **Page 91**, first limit in Example 2.5.6	convergence in distribution symbol is missing L
Page 93, Equation (2.6.1)	P should be P_θ (questionable)
Page 94, line beginning "For any fixed n, ..."	"tends to 0" should be "tends to 1"
Page 99, bottom of page; **Page 101**, equation (2.7.14); **Page 102**, equation (2.7.16); **Page 102**, equations in proof of Theorem 2.7.4	expressions such as $o(x)^3$ are not actually defined and should be $o[(x)^3]$
Page 101, sentence above Theorem 2.7.2	"(A')" should be "(B)"
Page 101, Equation (2.7.13)	Var X_n should be Var $\overline{X}_n$
Page 103, Example 2.7.5	The assumptions given do not imply asymptotic normality as claimed. Sufficient conditions that do work are as follows: Suppose that Y_i is defined as given, and suppose that $E\|Y_i\|^3 < M$ for all i for some finite M. Then the assumptions of Theorem 2.7.3 are NOT satisfied; instead, though, we can use Theorem 2.7.2 directly to obtain the desired asymptotic normality.
Page 103, Equation (2.7.21) and the equation just above it	The square root of the sum of $1/\sigma_j^2$ should be in the numerator of each fraction, not the denominator
Page 105, line above Theorem 2.7.5	(7.27) should be (2.7.27)
Page 105, three lines above (2.7.29)	"hence by (7.25)" should be "hence by (2.7.25)"
Page 105, equation on last line	missing factor of $(1 - p_i)$ just to the left of the last equals sign
Page 106, summary items 1 and 2	The roles of (A') and (B) are switched. This happens 3 times.
Page 110, lines 6-7	The fact that the X_i are identically distributed is necessary but not sufficient for stationarity
Page 111, line above equation (2.8.22)	"(8.20)" should be "(2.8.21)"
Page 111, 4 lines below Equation (2.8.24)	"(2.8.20)" should be "(2.8.21)"
Page 111, equation following "Using the fact that"	γ_{k-1} should be γ_k
Page 117, sentence before equation (2.8.48)	"(2.8.45)" should be "(2.8.46)"
Page 119, Problem 1.3 at the end of the hint	First, there's a missing "]" to match the one before Hint. Second, $\|Y_n - c\| > b$ should be $\|Y_n - c\| < b$.
Page 120, Problem 2.1	The statement is false. The absolute value of the sample mean tends to infinity in this case, but with probability 1, the sample mean itself does not converge to any value, finite or infinite.
Page 122, Problem 3.5	"arbitrary" should be "arbitrarily". Also, a right bracket is missing after the hint.
Page 124, Problem 3.17	This is exactly the same as Problem 3.6 on p. 122.
Page 125, Problem 4.5, second line of hint	X_{m-1} should be $X_{(m+1)}$
Page 132, Problem 8.16(i)	The equality is not true (however, it is true as an asymptotic equivalence).
Page 136, Equation (3.1.19)	θ_n should be θ_0

Page 138, Lemma 3.1.1	It must be stated that U and V are independent, or the lemma can fail.
Page 140, big fraction on left above "and hence by Slutsky's theorem"	In the denominator, σ and τ should not have hats.
Page 142, Expression (3.1.39)	"for all $n > n_0(\vartheta)$" should be deleted.
Page 144, Equation (3.1.48)	X and Y are missing bars in denominator.
Page 145, Expression (3.1.54)	The $\widehat{\tau}_n'$ on the left hand side should not be primed.
Page 149, Equation (3.2.12)	Denominator is missing a factor of $\sqrt{1/m + 1/n}$.
Page 150, just above (3.2.15)	"such as sequence" should be "such a sequence".
Page 150, statement (3.2.16)	∞ should be 1.
Page 151, second to last line	(3.2.31) should be (3.2.13).
Page 154, statement (3.2.26)	"assignment" is misspelled.
Page 159, line immediately following proof of Theorem 3.3.2	3.2.2 should be 3.3.2.
Page 162, Table 3.3.1	"Level" should appear above "Exact" and "Approx." instead of above the column of p_0 values.
Page 162, Table 3.3.1	"Power at $\Delta = .1$" should be "Power at $\Delta = 1$" or "Power at $p - p_0 = .1$".
Page 162, 4th line below table	"tables" should be "table".
Page 162, 7th line below table	"as p_0 moves away from 1/2" should be "as p_0 moves toward 1/2".
Page 163, last line of Theorem 3.3.4	$\tau^2(\theta_0, \vartheta)$ should be $\widehat{\tau}_n^2$.
Page 164, Expressions (3.3.23)	convergence in distribution symbols are missing L.
Page 165, Equation (3.3.27)	Denominator should have $\sqrt{\lambda}$ instead of λ.
Page 170, first line of text	3.2.2 should be 3.3.2.
Page 175, 3 lines from bottom	"assumptions" is misspelled.
Page 181, 2nd line of Example 3.4.6	3.4.3 should be 3.4.4.
Page 206, first identity in Hint for Problem 2.4	$\frac{m}{n}$ should be $\frac{m}{N}$.
Page 207, Problem 2.10(i)	Should say $E(Z_i^2) = \sigma^2$, not $E(Z_i) = \sigma^2$.
Page 247, Equation (4.3.37)	Denominator is missing a factor of 12.
Page 278, first line and equation (5.1.1)	$\|\underline{x}, \underline{y}\|$ should be replaced by $\|\underline{x} - \underline{y}\|$ or $d(\underline{x}, \underline{y})$.
Page 280, Figure 5.1.1	Figure (b) has an extra space and S is not defined for either figure.
Page 281, 2nd equation from bottom	missing comma in $N\left(0, \frac{\sigma^2}{\lambda}\right)$
Page 282, first equation	Convergence in distribution symbol missing L
Page 282, last equation before Example 5.1.2	misplaced parentheses on the left hand side
Page 282, 3rd line of Example 5.1.2	"marginal" is misspelled
Page 282, last equation before bottom	missing minus signs in exponents of e
Page 284, line above (5.1.24)	Theorem 5.1.7 should be Theorem 5.1.8
Page 290, (5.2.10) and (5.2.11)	variances missing factor of n; correlation missing root-n
Page 294, 4th line below (5.2.24)	"tha" should be "the" and "continue" should be "continues"
Page 299, Equation (5.2.50)	term involving μ_3 should be subtracted, not added (occurs twice)
Page 300, matrix in (5.3.2)	The columns are too close together
Page 303, Equation (5.3.16)	lowercase "a" on left hand side should be "A"
Page 305, last line of Theorem 5.3.3	the word "its" is missing between "of" and "off-diagonal"
Page 305, line after (5.3.29)	(5.3.27) should be (5.3.28)
Page 306, last displayed equation on page	C_1' should be inverted
Page 307, Equation (5.3.37)	$\|J\|$ should be replaced by $\|J\|^{-1}$ in two places
Page 309, first line of item 5 in summary	"transformation" is misspelled
Page 309, summary item 6	"the Jacobian" should be "the reciprocal of the Jacobian"
Page 312, second equation from bottom	large summation symbol should be replaced by normal-sized capital Σ
Page 313, Theorem 5.4.3	All the means in part (i) are incorrect due to left-multiplication by $A^{1/2}$
Page 313, 2nd line from bottom	sum with j running from 1 to k should be a double sum, with j from 1 to n and i from 1 to k
Page 314, Equation (5.4.14)	$j \neq 1$ should be $j \neq i$

Page 317, Expression (5.4.34)	X_iY_i should be $(X_i - \xi)(Y_i - \eta)$. Also, convergence in distribution symbol is missing L
Page 318, Expression (5.4.42)	Convergence in distribution symbol is missing L
Page 319, 4th line of item 4 in summary	Convergence in distribution symbol is missing L and capital N (for normal) is missing
Page 322, (5.5.14) and the two preceding expressions	Convergence in distribution symbol is missing L
Page 328, last equation	Convergence in distribution symbol is missing L
Page 329, third line after (5.5.49)	$(0 < \rho < 1)$ should be $(0 < \rho < \infty)$
Page 333, Expression (5.6.23)	Convergence in distribution symbol is missing L
Page 339, top line	"following" should be "falling"
Page 350, Problem 1.2 (ii)	The function given doesn't work; try something like $f(x_1, x_2) = I(x_1x_2 = 0)$
Page 351, last line	missing) in $X_{(n-1)}$
Page 365, equation preceding (6.1.2)	last argument should be X_{i_a}, not X_{i_1}
Page 366, third line	should begin with $0 < \mathrm{Var}(\phi(X_1)) < \infty$
Page 366, line beginning with (a)	"statistics" should be "statistic"
Page 369, Theorems 6.1.2, 6.1.4, 6.2.1	Cannot verify these theorems without assuming that all the σ_i^2 are finite. If it's truly possible that $\sigma_1^2 < \infty$ and $\sigma_2^2 = \infty$ and (6.1.20) still holds, then an example of such behavior would be helpful.
Page 371, last line of text	(1.6.30) should be (6.1.30)
Page 373, Equation (6.1.40)	both summation indices should start with 0, not 1
Page 382, 6th line after (6.2.3)	$\widehat{F}_n^{-1}$ should be $\widehat{F}_n^{-1}(p)$
Page 389, line after (6.2.41)	"order statistics" should be "order statistic"
Page 398, Expression (6.2.42)	convergence in distribution symbol is missing L and final) is missing
Page 409, 2nd line	"natural" is misspelled
Page 415, Equation (6.4.44)	no space between $3/4$ and $(1 - z^2)$
Page 420, Caption for Table 6.4.1	(6.4.67) should be (6.4.66)
Page 422, Equation (6.5.5)	misplaced right bracket should be before $\leq$ instead of after a
Page 425, Expression (6.5.14)	missing limit p
Page 425, two lines down from (6.5.15)	period missing at end of sentence
Page 428, 2nd line	"estimator" is misspelled
Page 432-433, Equations (6.5.44), (6.5.45), (6.5.47), (6.5.48), and the equation after (6.5.48)	all $\sqrt{n}$ should be n
Page 438, Problem 1.17	Issue with assumptions; $E(T_n^* - T_n)^2 = Var(T_n) - 4\sigma_1^2$, which only goes to zero if σ_2^2 is finite
Page 438, Problem 1.18	Several corrections: λ should satisfy $\frac{1}{2} \leq \lambda < \frac{1}{\sqrt{2}}$; $-\frac{1}{2}y^2$ should be in exponent of e; in second equation in hint, X_e should be X_3
Page 439, Problem 2.2	Right-hand side of the equation should be divided by n
Page 453, Equation (7.1.5)	last exponent contains unnecessary e
Page 454, 3rd line after (7.1.9)	"density" is misspelled
Page 454, Figure 7.1.1	on x-axis, 0 could be -1 and $\theta - c(\theta)$ and $\theta + c(\theta)$ should be on one line
Page 455, 14th line from bottom	"densities" is misspelled
Page 455, 9th line from bottom	"Examples 7.1.1 and 7.1.2" should be "Examples 7.1.2 and 7.1.3"
Page 456, 13th line	"Section 7.5" should be "Section 7.4"
Page 457, 5th line	7.1.2 should be 7.1.3
Page 457, line after (7.1.17)	"likelihood" is misspelled
Page 457, 3rd line from bottom	"Section 6.3" should be "Section 7.3"
Page 461, first line	"Section 1.3" should be "Section 7.3"
Page 463, first equation	Equation is incorrect; should be $\frac{\partial}{\partial\theta} \log f_\theta(x) = \frac{3\theta^2(x-\theta^3)}{\sigma_0^2}$
Page 463, second equation	$9\theta^4\sigma_0^2$ should be $9\theta^4/\sigma_0^2$
Page 463, line after (7.2.4)	'As was seen in (2.2.17)" should be "As was seen in Example 2.3.7"; "tends" is misspelled
Page 463, 4 lines above (7.2.5)	"According to (7.2.7)" should be "According to (7.1.27)"

Page 463, last equation	Missing factor of θ in both denominators; first should be θ^3, second should be θ^2
Page 472, 3rd line from bottom	7.2.1 should be 7.3.1
Page 473, two lines above (7.3.17)	"of degree k" should be "of degree $2k$"
Page 476, Equation (7.3.26)	One of the θ_n is missing a tilde
Page 476, equation above (7.3.29)	Denominator of first fraction should be $l_n''(\theta_0)/n$ instead of $l_n''(\theta_0)/\sqrt{n}$
Page 483, header	Header has wrong section number and title (should be 7.3)
Page 483, line after (7.3.56)	"variables" should be "variable"
Page 485, 3 lines before Example 7.4.1	"uniformly" is misspelled
Page 486, line 14	"uniformly" is misspelled
Page 486-487, Expressions (7.4.6) and (7.4.7)	Convergence in distribution symbols are missing L
Page 487, Expression (7.4.9)	The 2 and the a^2 are switched
Page 492, 4th line; **Page 495**, line below (7.4.33)	"Jeffreys" should have no apostrophe
Page 495, Equation (7.4.33)	λ^2 should be $1/\lambda^2$
Page 497, general comment on section 7.5	Why have underlines for vectors been abandoned?
Page 497, equations above (7.5.2)	Should be taking the derivatives of the log-likelihood, not the likelihood
Page 500, Corollary 7.5.1	7.5.1(ii) should be 7.5.1(i)
Page 500, equation (7.5.13)	right-hand side should be $(J')^{-1}I(\theta)J^{-1}$
Page 501, 5 different places in (M6) and (M7)	k is already the size of the parameter vector, so it should not be used as a dummy
Page 502, Expression (7.5.19) and last expression on page	convergence in distribution symbols are missing L
Page 508, line below (7.5.51)	"consistent" is misspelled
Page 512, line below (7.6.10)	"Dirichlet" is misspelled
Page 513, line above (7.6.16)	5.4.3 should be 7.5.4
Page 526, line below (7.7.7)	"solely" is misspelled
Page 527, Expression (7.7.15) and Expression (7.7.16)	$\widehat{\theta}$ is missing a subscript n
Page 528, Example 7.7.1, first two lines	$N(0,1)$ should be $N(\theta,1)$ and "Example 7.1.3" should be "Example 7.1.4"
Page 528, second equation in Example 7.7.1	right-hand side should be $n\overline{x}^2$
Page 530, sentence in Example 7.2.2 beginning "The Rao scores test..."	Should read "The Rao scores test of $H:\theta=\theta_0$ against $\theta>\theta_0$..."; also, two instances of θ should be replaced by θ_0 and $\geq u_\alpha$ should be inserted before the period.
Page 531, 11 lines from bottom	"second and third factors" should be "third and fourth factors"
Page 551, Problem 1.7	7.1.2 should be 7.1.3
Page 552, Problem 1.10(ii)	"binomial" should be "Bernoulli"
Page 561, inequality at top of page	set inclusion symbol mistakenly written as ϵ
Page 562, Problem 6.8	"proved" should be "prove"
Page 563, Problem 6.12	Problem is incorrect. It should likely read that $A-B$ is also positive semi-definite
Page 563, Problem 6.12	"Theorem 6.4.7" should be "Theorem 7.6.4"
Page 563, equation in Problem 6.15	mismatched left bracket with right parenthesis
Page 565, Problem 7.9	"interval" is misspelled
Page 576, Expression (A.3.1)	x_n should be X_n
Page 577, top line	$P(X_N=0)$ should be $P(X_n=0)$
Page 577, Expression (A.3.4) and the next 5 lines	All instances of x should be X
Page 577, line below (A.3.8)	"by (A.3.6), the probability of the event (A.3.5)" should be "by (A.3.5), the probability of the event (A.3.4)"
Page 577, last full paragraph	x_1, x_2 should be X_1, X_2
Page 578, first centered formula	$P(T_n-\theta<c)$ is missing the left absolute value sign
Page 609, entry for Bahadur	"411" should be "511"
Page 616, entry for "Bandwidth"	should be included with the B's, not the A's