Corrections to *Probability and Statistics* (Fourth Edition)

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Preface

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Chapter 2

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- p. 60, line 2: A_nB should be $A_n \cap B$. (5/19/2015)

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Chapter 3

Section 3.1

- p. 96, lines 13 and 15: 0.65253 should be 0.6253, and 0.34747 should be 0.3747. (5/19/2015)
- p. 97, line 12: 0.65252 should be 0.6253. (5/19/2015)

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- p. 117, problem 15: "c.d.f. or X" should read "c.d.f. of X". (5/19/15)

Section 3.4

- p. 126, line −2: $\bigcup_{n=-0}^{\infty}$ should be $\bigcup_{n=0}^{\infty}$. (5/19/15)
- p. 128, displayed equation in Example 3.4.15, after the three equal signs: $xy/29,204$ should be $(x-4)(y-1)/29,204$; $x/196$ should be $(x-4)/196$; and $y/149$ should be $(y-1)/149$. (6/9/14)

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- p. 134, displayed equations in Example 3.5.6: $x/196$ should be $(x-4)/196$; and $y/149$ should be $(y-1)/149$. (6/9/14)
- p. 137, last paragraph of Example 3.5.8: $f(1,2)$ should be $f(0,2)$ (two places), $f_1(1)$ should be $f_1(0)$ (two places), and $f_2(1)$ should be $f_2(2)$ (two places). (5/19/15)
- p.140, line 20: "of x of y" should read "of x and of y". (5/19/15)

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- p. 143, Table 3.8 caption: "Y given X" should read "X given Y." (5/20/15)
- p. 143, line −4: "Brand 1 also" should read "Brand 2 also". (5/20/15)

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- p. 160, line −2: $|4.6)$ should be $|4,6)$ (5/20/15)
- p. 161, line 1: 10,360 should be 103,680. (5/20/15)
- p. 164, line −9: "required" is misspelled. (5/20/15)

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- p. 178, first displayed equation, $-ye^{-2y}$ should be $-2ye^{-2y}$. (1/21/13)

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- p. 213, line 4: $\int_0^\infty$ should be $\int_1^\infty$. (5/19/15)

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- p. 218, Theorem 4.4.2, line 2: "constant b" should read "constant b" (5/20/15)
- p. 220, Definition 4.2.1, the inequality in the displayed formula should be "$\leq$". (7/3/12)

Section 4.3

- p. 228, Proof of Theorem 4.3.2, line -2: "the so too" should read "then so too". (5/20/15)
- p. 229, legend of Figure 4.6: third row should read "- - - p.d.f. of $-x$". (5/20/15)

Section 4.4

- p. 239, Proof of Theorem 4.4.6, line 1: "Proof L et" should read "**Proof** Let". (5/20/15)

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Section 4.6

- p. 252, Example 4.6.5, line 3: $1/(2\pi)$ should be $1/\pi$. (5/19/15)

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Chapter 5

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- p. 279, Example 5.2.1, lines $-3, -2$: "Y_1, whose mean is 1.81" should read "$10Y_1$ whose mean is 18.1," and $10 + 1.81 + 19.82 = 31.63$ should be $10 + 18.1 + 19.82 = 47.92$." (5/19/15)

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- p. 316, Example 5.7.1, line 1: "Suppose" is misspelled. (5/20/15)
- p. 318, Equation (5.7.10): "$\exp(\beta x)$" should read "$\exp(-\beta x)$". (6/4/12)
- p. 319, Example 5.7.4, line 6: The formula for $g_2(z|x_1, \ldots, x_n)$ is missing a factor z^n. (6/4/12)

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- p. 351, Example 6.2.2, line -1: "0.2" should be "0.02". (5/20/15)

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- p. 367, Equation (6.3.14): denominator of left-hand-side should be $\left(\sum_{i=1}^{n} p_i(1-p_i)\right)^{3/2}$. (5/20/15)

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- p. 389, in equation (7.2.8) and the next displayed equation, immediately after each equal sign, insert the factor $(20,000)^4/3!$. This factor divides out of the calculations in (7.2.9) so it is not needed there. Also, the last line of (7.2.9) is missing a factor of θ^{n+3}. (5/19/15)
- p. 389, line 4 of last paragraph of text: "This prior has the same standard deviation as the original prior, but" should read "This prior has a standard deviation 10 times that of the original prior, and" (5/19/15)

Section 7.3

- p. 401, last displayed equation: "0.1154)" should read "0.1154" (11/15/10)
- p. 401, last displayed equaiton: "(1.12)" should read "(0.4116)" (11/15/10)

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- p. 419, line 7: $(2, 1.5.2.1)$ should be $(3, 1.5, 2.1)$. (5/19/15)

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- p. 431, line 9: "right-hand" should read "left-hand". (5/19/15)

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- p. 536, next line after (9.1.8) "Example 6.5.15" should read "Example 7.5.7" (11/15/10)
- p. 549 Exercise 11: "δ_c" should read "δ" at the ends of parts b and c. (11/15/10)

Section 9.2

- two lines before Theorem 9.2.2, "Nayman" should be "Neyman". (8/16/12)

- Name of Theorem 9.2.2, "Nayman" should be "Neyman". (8/16/12)
- p. 553, line -10,"Nayman" should be "Neyman". (8/16/12)
- p. 554, line -2,"Nayman" should be "Neyman". (8/16/12)
- p. 556, line 13,"Nayman" should be "Neyman". (8/16/12)
- p. 556, line 23,"Nayman" should be "Neyman". (8/16/12)
- p. 557, line 6,"Nayman" should be "Neyman". (8/16/12)

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- p. 562, second line of the proof of Theorem 9.3.1,"Nayman" should be "Neyman". (8/16/12)

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- p. 591, Example 9.6.4, line 2: "$\psi =$" should read "$|\psi| =$". (11/15/10)

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Section 9.8

- p. 612, 2 and 4 lines after (9.8.16): In both places, "$T_{n-1}^{-1}(1-\alpha_0)$" should read "$-T_{n-1}^{-1}(1-\alpha_0)$" (11/15/10)

Section 9.9

- p. 617, line -6,"Nayman" should be "Neyman". (8/16/12)

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- p. 682, first line of "Ties" secttion: "signed ranks test" should read "ranks test". (11/15/10)

- p. 683, Eq. (10.8.6): The correct formula is

$$\begin{aligned}\mathrm{Var}(S) = mn\big(&\Pr(X_1 \geq Y_1) - (m+n-1)\Pr(X_1 \geq Y_1)^2 \\ &+(n-1)\Pr(X_1 \geq Y_1, X_1 \geq Y_2) + (m-1)\Pr(X_1 \geq Y_1, X_2 \geq Y_1)\big).\end{aligned}$$

  (11/15/10)

- p. 685, Exercise 15: There are a few errors in the statement of the problem. The corrected exercise is given here:

  15. Consider again the conditions of Exercise 1. This time, let $D_i = X_i - Y_i$. Wilcoxon (1945) developed the following test of the hypotheses (10.8.7). Order the absolute values $|D_1|, \ldots, |D_n|$ from smallest to largest, and assign ranks from 1 to n to the values. Then S_W is set equal to the sum of all the ranks of those $|D_i|$ such that $D_i > 0$. If the distribution of D_i is symmetric around 0, then the mean and variance of S_W are

$$E(S_W) = \frac{n(n+1)}{4}, \tag{10.8.8}$$

$$\mathrm{Var}(S_W) = \frac{n(n+1)(2n+1)}{24}. \tag{10.8.9}$$

  The test rejects H_0 if $S_W \geq c$, where c is chosen to make the test have level of significance α_0. This test is called the *Wilcoxon signed ranks test*. If n is large, a normal distribution approximation allows us to use $c = E(S_W) + \Phi^{-1}(1-\alpha_0)\mathrm{Var}(S_W)^{1/2}$.

  a. Let $W_i = 1$ if the $|D_j|$ that gets rank i has $D_j > 0$ and $W_i = 0$ if not. Show that $S_W = \sum_{i=1}^{n} iW_i$.

  b. Prove that $E(S_W)$ is as stated in Eq. (10.8.8) under the assumption that the distribution of D_i is symmetric around 0. *Hint:* You may wish to use Eq. (4.7.13).

  c. Prove that $\mathrm{Var}(S_W)$ is as stated in Eq. (10.8.9) under the assumption that the distribution of D_i is symmetric around 0. *Hint:* You may wish to use Eq. (4.7.14).

  (11/15/10)

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Chapter 11

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- p. 703, 3rd displayed equation: "0.382" should read "-0.382" (11/15/10)
- p. 704, Example 11.2.5, line 3: "-81.049" should read "-81.06" (11/15/10)

Section 11.3

- p. 708, first line after (11.3.2): "$\sum_{j=1} a_{1j}a_{2j}$" should read "$\sum_{j=1}^{n} a_{1j}a_{2j}$". (11/15/10)
- p. 715, line 1: "$H_0 : \beta_1 \geq 0$" should read "$H_0 : \beta_1 \leq 0$" and "$H_1 : \beta_1 < 0$" should read "$H_1 : \beta_1 > 0$". (8/9/13)
- p. 722, Eq. (11.3.30), end of first line: "$\beta^*_{\beta_1}$" should read "β^*_1". (11/15/10)
- p. 728, Exercise 22: The problem should have asked for the regression of logarithm of 1980 price on the logarithm of 1970 price. It can be solved either as stated here or as stated in the text, but the regression on logarithm of 1970 price makes more sense. (11/15/10)

Section 11.4

- p. 731, end of first displayed equation: "$-\dfrac{n\overline{x}_n s_x^2}{\tau \sum_{i=1}^{n} x_i^2}$" should read "$-\dfrac{\tau n\overline{x}_n s_x^2}{\sum_{i=1}^{n} x_i^2}$". (11/15/10)
- p. 731, two lines after (11.4.6): "$-\tau^2/2$" should read "$-\tau/2$". (11/15/10)
- p. 732, first line after (11.4.7): "15" should read "14". (11/15/03)
- p. 734, Example 11.4.4, line 6: "7.191" should read "7.181". (11/15/10)

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- p. 741, Example 11.5.3, end of first displayed equation: "144.1" should read "172.3". (11/15/10)
- p. 743, first line after the end of Theorem 11.5.3: "$j = 1, \ldots, n$" should read "$j = 0, \ldots, p-1$". (11/15/10)
- p. 749, first displayed equation: "$z_{i0}\beta_0 - \cdots - z_{ip-1}\beta_{p-1}$" should read "$z_{i0}\hat{\beta}_0 - \cdots - z_{ip-1}\hat{\beta}_{p-1}$". (11/15/10)
- p. 752, second line of "Summary" section: "$z_{i0}\hat{\beta}_0 + \cdots + z_{ip-1}\hat{\beta}_{p-1}$" should read "$z_{i0}\beta_0 + \cdots + z_{ip-1}\beta_{p-1}$". (11/15/10)
- p. 752, Exercise 2, line 2: "S^2 has the χ^2" should be "S^2/σ^2 has the χ^2". (11/15/10)

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- p. 758, line 5: "Eq. (11.6.8) has the" should read "Eq. (11.6.8), when divided by σ^2, has the". (11/15/10)
- p. 761, Exercise 2, displayed equation: Both places where σ^2 appears in a denominator should be σ. (11/15/10)
- p. 763, Exercise 14(a): "$\sum_{i=1}^{p} \alpha_i$" should be "$\sum_{i=1}^{p} n_i \alpha_i$" (11/15/10)

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Chapter 12

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- p. 794, Example 12.2.5, line −3: "$E(X^2) \geq E(X)$" should read "$E(X^2) \geq E(X)^2$". (6/1/12)

Section 12.3

- p. 805, Example 12.3.2, first row of last displayed equation: "$f\left(\exp[(y_1^2 + y_2^2)/2], \right.$" should read "$f\left(\exp[-(y_1^2 + y_2^2)/2], \right.$". (11/15/10)
- p. 812, Example 12.3.10, last line: "is" should read "if". (11/15/10)

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- p. 832–834, the numerical part of Example 12.5.6 suffered from an error in the input data. The correct analysis changes the conclusions stated in the text. Corrected text can be found by following the link to more extensive corrections at the top of the web page.
- p. 838, Exercise 12, line 5: "variance γ_0" should read "precision γ_0" (11/15/10)
- p. 838, Exercise 13(a): The "1/2" exponent should be "−1/2" in the displayed formula. (11/15/10)
- p. 838–839, Exercise 14: Add the text "The prior hyperparameters are $\alpha_0 = 0.5$, $\mu_0 = 0$, $\lambda_0 = 1$, and $\beta_0 = 0.5$." (11/15/10)
- p. 839, Exercise 15 part a line 2: Delete the text "if $X_{n+i} \leq c$, then" (11/15/10)

- p. 839, Exercise 15 part b line 2: Delete the text "if $X_{n+i} \geq c$, then" (11/15/10)

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Tables

References

Answers to Exercises

Section 1.8

- Exercise 21: The answer should be "$\binom{364+k}{k}$". (6/4/12)

Section 2.3

- Exercise 15: The answer should be "0.356". (5/21/15)

Section 3.3

- Exercise 7: The bottom branch should read "1 for $x > 8$". (6/5/12)

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- Continuous uniform distribution: The mgf should be "$\frac{\exp(tb)-\exp(ta)}{t\ (b-a)}$". Also, the limits for the density should be "$a \leq x \leq b$". (5/2/17)