

## Errata

We thank Pieter Allaart, University of North Texas, and Ayush Bharadway to hint at the following points.

1. p. 11. In Lemma 1.27 we used a different notation in the lemma than in the proof. This has led to confusions. Lemma and proof are corrected as follows:

### Lemma 1.27 ( $\sigma$ -Algebra generated by the trace of a set system)

Let  $A \subset \Omega$  be nonempty,  $\mathcal{E} \subset \mathcal{P}(\Omega)$ , and  $\mathcal{E}|_A := \{C \cap A : C \in \mathcal{E}\}$ . Then

$$\sigma_A(\mathcal{E}|_A) = \sigma_\Omega(\mathcal{E})|_A. \quad (1)$$

Furthermore, if  $\mathcal{C}$  is a  $\sigma$ -algebra on  $\Omega$  and  $A \in \mathcal{C}$  such that

$$\forall C \in \mathcal{C}: C \neq A \Rightarrow A \cap C = \emptyset, \quad (2)$$

(i. e.,  $A$  does not intersect with any other element of  $\mathcal{C}$ ), then

$$\sigma_\Omega(\mathcal{C} \cup \mathcal{E})|_A = \mathcal{C}|_A. \quad (3)$$

Proof of Lemma 1.27:

We use  $\sigma_\Omega(\mathcal{E})$  to denote the  $\sigma$ -algebra on  $\Omega$  generated by  $\mathcal{E} \subset \mathcal{P}(\Omega)$ . Similarly,  $\sigma_A(\mathcal{D})$  denotes the  $\sigma$ -algebra on  $A$  generated by  $\mathcal{D} \subset \mathcal{P}(A)$ .

(1.15).  $\sigma_\Omega(\mathcal{E})$  is a  $\sigma$ -algebra on  $\Omega$  and  $\mathcal{E} \subset \sigma_\Omega(\mathcal{E})$ , by definition of  $\sigma_\Omega(\mathcal{E})$ . Hence,  $\mathcal{E}|_A \subset \sigma_\Omega(\mathcal{E})|_A$ , and  $\sigma_\Omega(\mathcal{E})|_A$  is a  $\sigma$ -algebra on  $A$  (see Exercise 1-5). Therefore, the definition (1.10) yields

$$\sigma_A(\mathcal{E}|_A) \subset \sigma_\Omega(\mathcal{E})|_A.$$

Furthermore,  $\mathcal{E} \subset \sigma_\Omega(\mathcal{E}|_A \cup \mathcal{E}|_{A^c})$ , which implies

$$\begin{aligned} \sigma_\Omega(\mathcal{E}) &\subset \sigma_\Omega(\mathcal{E}|_A \cup \mathcal{E}|_{A^c}) && \text{[Rem. 1.23]} \\ &\subset \sigma_\Omega(\sigma_A(\mathcal{E}|_A) \cup \sigma_{A^c}(\mathcal{E}|_{A^c})) && \text{[Rem. 1.23]} \\ &= \{C \cup D : C \in \sigma_A(\mathcal{E}|_A), D \in \sigma_{A^c}(\mathcal{E}|_{A^c})\}. && \text{[this set system is a } \sigma\text{-algebra]} \end{aligned}$$

Therefore,

$$\begin{aligned} \sigma_\Omega(\mathcal{E})|_A &\subset \{C \cup D : C \in \sigma_A(\mathcal{E}|_A), D \in \sigma_{A^c}(\mathcal{E}|_{A^c})\}|_A \\ &= \{(C \cup D) \cap A : C \in \sigma_A(\mathcal{E}|_A), D \in \sigma_{A^c}(\mathcal{E}|_{A^c})\} \\ &= \{C \cap A : C \in \sigma_A(\mathcal{E}|_A)\} && [D \subset A^c] \\ &= \sigma_A(\mathcal{E}|_A). && [C \subset A] \end{aligned}$$

Hence, we have shown  $\sigma_A(\mathcal{E}|_A) \subset \sigma_\Omega(\mathcal{E})|_A$  and  $\sigma_\Omega(\mathcal{E})|_A \subset \sigma_A(\mathcal{E}|_A)$ , which is equivalent to  $\sigma_A(\mathcal{E}|_A) = \sigma_\Omega(\mathcal{E})|_A$ .

(1.17).

$$\begin{aligned}
\sigma_{\Omega}(\mathcal{C} \cup \mathcal{E})|_A &= \sigma_A(\mathcal{C} \cup \mathcal{E}|_A) && [(1.15)] \\
&= \sigma_A(\mathcal{C}|_A \cup \mathcal{E}|_A) && [\text{see def. of the trace in Example 1.10}] \\
&= \sigma_A(\mathcal{C}|_A \cup \{\emptyset, A\}) && [(1.16)] \\
&= \sigma_A(\mathcal{C}|_A) && [\{\emptyset, A\} \subset \mathcal{C}|_A] \\
&= \mathcal{C}|_A. && [\text{Exercise 1-5, (1.12)}]
\end{aligned}$$

2. p. 65. Remark 2.67, points a), b), and c): replace  $f(\omega$  by  $f(\omega)$

3. p. 235. Remark 7.26, Equation (7.25):  $\text{Var}[\alpha_0 + \alpha_1 \text{Var}(X)] / \text{Var}(Y)$  should be replaced by  $\text{Var}(\alpha_0 + \alpha_1 X) / \text{Var}(Y)$

4. p. 263. The header of Definition 8.29 should be **Continuous uniform distribution on a set with a finite measure.**

5. Everywhere in the book the word “dice” should be replaced by “die” and “dices” should be replaced by “dice”.

6. p. 254, line 2 of section 8.1.1:  $p_X(x)$  should be replaced by  $p_X(x_i)$ .

7. p. 345, Remark 11.7, line number 5: “Definition (11.11)” should be replaced by “Equation (11.11)”.

8. p. 396, Equation (3.12):  $\beta_1$  should be replaced by  $\lambda_1$ .

9. p. 398, Equation (3.19): The two terms on the right hand side should be switched to

$$P(Y=1|Z=z_i) - P(Y=1|Z=z_0).$$

10. p. 399, Remark 13.19, line number 3: “They quantify the effect of  $x_i$  compared to  $x_0$  on  $Y$ ” should be replaced by “They quantify the effect of  $z_i$  compared to  $z_0$  on  $Y$ ”.

11. p. 423: The subscripts of  $V_1$  and  $V^*_1$  are improperly italicized (twice on line 9, once on line 11, and once on line 17).

12. p. 452, title of Remark 15.6: “ $P$ -uniqueness” is mistyped.

13. p. 459, Equation (15.28):  $g_0(Ann) = .2$  not  $.4$ .

14. p. 459, Equation (15.31): Both values should be preceded by a “minus” sign.

15. p. 459, Equation (15.31):  $g_0(Ann) = .2$  not  $.4$ .

16. p. 459, last displayed equation: The final outcome of the calculation should be  $.05$ , not  $.5$ . (See also first line of p. 460.)

17. p. 479, Example 16.21, line 3. The probability of drawing Joe is not  $.5$ . Instead it is  $.4$  and for Ann it is  $.6$ .

18. p. 527, Corollary 17.62: Replace “If  $Z$  is discrete, then ...” by “If  $Z$  is discrete with finitely many possible values  $z_1, \dots, z_n$ , then ...”.