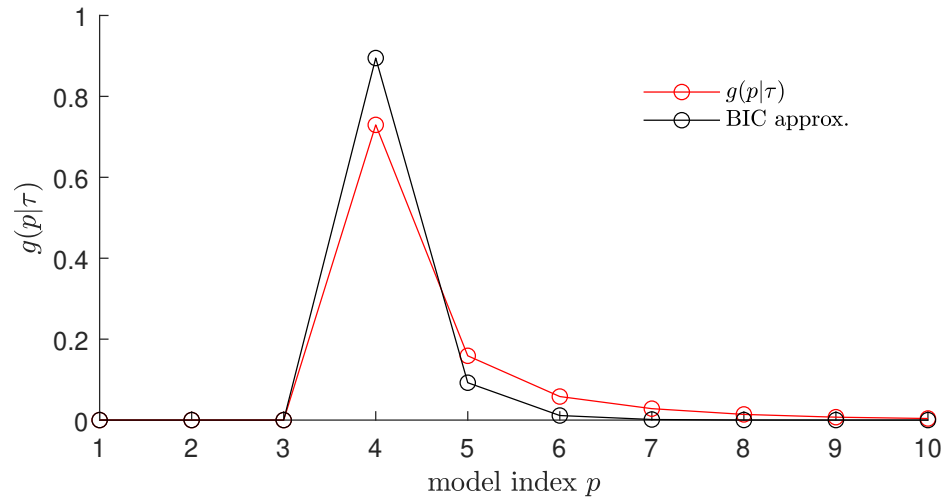


Data Science and Machine Learning: Mathematical and Statistical Methods

Errata

(Last Update 6th September 2021)

1. Page 33, definition of the Hilbert matrix: $\mathbf{H}_p = \int_0^1 [1, u, \dots, u^{p-1}]^\top [1, u, \dots, u^{p-1}] du$.
2. Page 37, line 3 from the top: replace $\mathbb{E}Y_i$ with $\mathbb{E}_{\mathbf{x}}Y_i$.
3. Page 38, lines 3,4 in second paragraph: replace $\ell_{\mathcal{T}_{-k}}$ symbol with ℓ_{C_k} .
4. Page 38, first line in displayed equation: replace $\ell_{\mathcal{T}_{-k}}$ symbol with $\ell_{C_k}(g_{\mathcal{T}_{-k}})$.
5. Page 57, Figure 2.16. There was a mistake in the drawing of the BIC approximation. The actual BIC approximation matches the posterior density quite well:



6. Page 72, Line -2: ... in terms of the probability ... (remove repeated “the”).
7. Page 74, Lines 6 and 10 of `accrejgamma.py`: The parameter `lam` should be replaced with 4 for the proposal pdf `g`.
8. Page 74, Line -3. ... from state x_{t-1} to state x_t ...
9. Page 78, Algorithm 3.27 input: Replace $q(\mathbf{x}, \mathbf{y})$ with $q(\mathbf{y} | \mathbf{x})$.
10. Page 85, Line 7: 0.025 and 0.975 quantiles
11. Page 100, Line -8: $(1 - \alpha)\nu$ should be $(1 - \alpha)\nu$.
12. Page 108, Lines 5 and 11: $\mathbb{E}S(\lambda)$ should be $S(\lambda)$.
13. Page 110, Line -2: ... bits that *do not* match ...
14. Page 111, Caption of Figure 3.15: ... that *do not* match ...
15. Page 111, Line 4 under Figure 3.15: “maximize” should be “minimize”

16. Page 112, Lines 1-2: “Note that ...”. Should be deleted.
17. Page 112, Line 3: 200 should be 100.
18. Page 112, Line 8: “maximizer” should be “minimizer”
19. Page 112, Line 12: “maximum” should be “minimum”
20. Page 156, Line -5: u_ℓ^\top should be \mathbf{u}_ℓ^\top .
21. Page 160, Exercise 5: $\mathbf{F}(\boldsymbol{\theta})$ should be $\mathbf{F}(\boldsymbol{\theta})/n$.
22. Page 162: Line 12: $\boldsymbol{\Sigma}^{1/2}\mathbf{x}$ should be $\boldsymbol{\Sigma}^{-1/2}\mathbf{x}$.
23. Page 162: Lines 17 and 20: $\boldsymbol{\Sigma}^{1/2}(\mathbf{x}_i - \boldsymbol{\mu})$ should be $\boldsymbol{\Sigma}^{-1/2}(\mathbf{x}_i - \boldsymbol{\mu})$.
24. Page 178: fourth line below Table 5.1: replace “qualitative” with “quantitative”.
25. Page 179, fourth line in Example 5.5: replace “row-wise” with “column-wise” and the vector \mathbf{y} with $\mathbf{y} = [9.2988, 8.2111, 9.0688, 8.2552, 9.4978, \dots, 8.9485]^\top$.
26. Page 181, formula for R_{adjusted}^2 at the bottom: replace $n - p - 1$ in the formula with $n - p$.
27. Page 184, formula for F_i should have the norms squared:

$$F_i = \frac{\|\mathbf{Y}^{(i)} - \mathbf{Y}^{(i-1)}\|^2/p_i}{\|\mathbf{Y} - \mathbf{Y}^{(d)}\|^2/(n - p)} .$$
28. Page 211, Exercise 12 (b): \mathbf{P}_{ii} should be $(1 - \mathbf{P}_{ii})$; that is 1 minus the i -th leverage.
29. Page 219, Line -2: ... only β_1 is regularized.
30. Page 221, Line 8: ... one obtains the so-called ...
31. Page 235, Line 7: $\int_0^1 (g''(x))^2 dx$ instead of $\int_0^1 (g'')^2 dx$.
32. Page 247, Algorithm 6.8.1, Line 1: \mathbb{R}^p should be \mathbb{R}^n .
33. Page 248, Algorithm 6.8.2, Line 1: Set $\mathbf{B} \leftarrow (n\gamma\mathbf{I}_p)^{-1}$.
34. Page 264, Line 8: Replace $g_X(\mathbf{x})$ with $g_X(\mathbf{x}|\boldsymbol{\theta})$
35. Page 273, 3rd line under Figure 7.9: The results are summarized in Table 7.6.
36. Page 290, first line under Algorithm 8.2.1: change R_{v_T} and R_{v_F} to \mathcal{R}_{v_T} and \mathcal{R}_{v_F} .
37. Page 291, line 2: $g^v(\mathbf{x})$ should be $g^w(\mathbf{x})$.
38. Page 313, formula (8.21): g_0 should be $g_0(\mathbf{x})$.
39. Page 329, line 12 from below: change y_{i-k} to y_{i-k+1} .

40. Page 331, last displayed equation:

$$\frac{\partial C}{\partial \mathbf{b}_l} = \frac{\partial z_l}{\partial \mathbf{b}_l} \frac{\partial C}{\partial z_l} = \delta_l, \quad l = 1, \dots, L.$$

41. Page 333, line 4 of Example 9.4: “inputs y ” should be “inputs \mathbf{x} ”.

42. Page 335, Algorithm 9.4.2, Line 2: ... using $\frac{\partial C}{\partial \mathbf{g}} = 1$...

43. Page 340, second displayed line:

$$[p_0, p_1, p_2, p_3] = [1, 20, 20, 1].$$

44. Page 341, Line 3: Remove the line $S = \text{RELU}$.

45. Page 351, Exercise 7(b): In the displayed formula, \mathbf{B} should be replaced with \mathbf{B}^{-1} .

46. Page 362, First sentence in paragraph above Theorem A.4: ... the matrix \mathbf{P} projects any vector in \mathcal{V} onto itself.

47. Page 362, Sentence above Theorem A.4: ... where \mathbf{U} is not ...

48. Page 380, third line from below: change b_{i-k} to b_{i-k+1} .

49. Page 394, line 5: ... can be computed with the aid ... (missing “the”)

50. Page 404, last two lines: replace H with \mathbf{H} .

51. Page 414, Section B.3.4: Replace ℓ with ℓ_τ .

52. Page 433, displayed equation in the proof of Theorem C.4: replace $|\mathbf{J}_{\mathbf{g}^{-1}}(\mathbf{z})|$ with $|\det(\mathbf{J}_{\mathbf{g}^{-1}}(\mathbf{z}))|$.

53. Page 439, line 4: is equal to $\Gamma(\alpha)\lambda^{-\alpha}$ times ...

54. Page 442, 4th line from the bottom: $x \geq c$ should be $x > c$.

55. Page 445, halfway on the page: $|e^{ix} - 1| = \left| \int_0^x i e^{i\theta} d\theta \right| \leq \left| \int_0^x |i e^{i\theta}| d\theta \right| = |x|$.

56. Page 446, displayed equation below (C.37): $O(t/n)$ should be $o(t/n)$, and in the next displayed equation, $o(1)$ should be $o(1/n)$.

57. Page 448, line 2: $O(t^3/n^{3/2})$ should be $o(t^2/n)$.

58. Page 450, first displayed equation after (C.39): The Σ in the denominator should be Σ_n .

59. Page 451: Delete “ln” after “An application ... yields”

60. Page 451, line starting with “asymptotically negligible”: Replace n with $-n$ in the exponent.

61. Page 456, Sentence under (C.47): Similar to the one-dimensional case ($d = 1$), replacing the factor $1/n$ with $1/(n - 1)$ gives an unbiased estimator, called the *sample covariance matrix*.
62. Page 457, last line of Example C.13: $g'(\theta)$ should be $l'(\theta)$.
63. Page 511, line 13 from above: ‘expectation of’.