

ERRATA

for *Semiparametric Regression*

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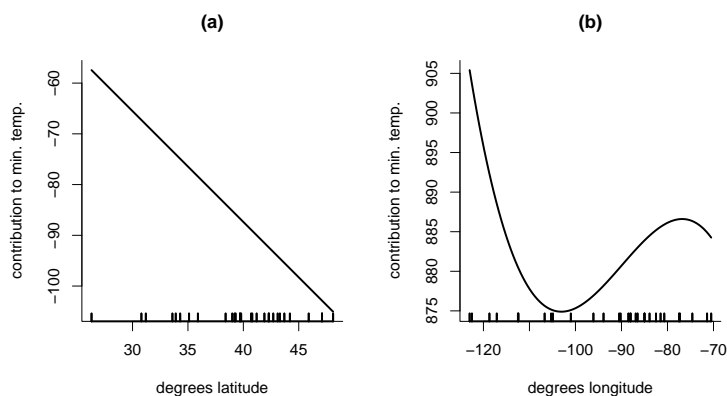
- p.6. In the vertical axis Figure 1.7 the lower “1”, “2” and “3” should have minus signs.
- p.7. In Figure 1.7 UTM represents *Universal Transverse Mercator* coordinates.
- p.9. line –16. “zero-coupon bond sells for \$85” → “zero-coupon bond sells for \$83”.
- p.10. line –15. “Jarrow, Ruppert, and Yu (2001)” → “Jarrow, Ruppert, and Yu (2003)”.
- p.13. line –5. “harvesting.” → “harvesting”.
- p.19. The first line after Figure 19 should be:

$$\widehat{\text{calories}} = 26.2 + 0.202 \text{ sodium} + 49.0 \text{ pork.beef.}$$

and the third and fourth lines should be:

$$\widehat{\text{calories}} = \begin{cases} 75.2 + 0.202 \text{ sodium} & \text{for beef or pork sausages,} \\ 26.2 + 0.202 \text{ sodium} & \text{for poultry sausages.} \end{cases}$$

- p.21. “then” → “than” in 9th line from bottom.
- p.23. line 2. “ $\sigma\sqrt{1 - (i\text{th diagonal entry of } \mathbf{H})} = \sigma\sqrt{1 - H_{ii}}$ ” → “ $\hat{\sigma}\sqrt{1 - (i\text{th diagonal entry of } \mathbf{H})} = \hat{\sigma}\sqrt{1 - H_{ii}}$ ”
- p.23. “line” → “lines” in Figure 2.8 caption.
- p.27. line 1. “ $\sum_{i=1}^{n-k}$ ” → “ $\sum_{i=k+1}^n$ ”.
- p.28. line 6. “ temp_{i-1} ” → “ $\beta_3 \text{temp}_{i-1}$ ”.
- p.35. “smaller” → “the small” in 3rd line above (2.19).
- p.36. line –13. “ $\frac{R_{\text{larger}}^2 - R_{\text{smaller}}^2}{(1 - R_{\text{smaller}}^2)(p_{\text{larger}} - p_{\text{smaller}})/(n - p_{\text{larger}})}$ ” → “ $\frac{R_{\text{larger}}^2 - R_{\text{smaller}}^2}{(1 - R_{\text{larger}}^2)(p_{\text{larger}} - p_{\text{smaller}})/(n - p_{\text{larger}})}$ ”.
- p.37. line 9. “cites” → “cities”.
- pp.38–40. Rug plots are missing from the base of Figures 2.18, 2.19, 2.20 and 2.21. For example, Figure 2.18 should have appeared as:



- p.39. line -9. “ $\widehat{\beta}_{22} \widehat{\beta}_{22}$ ” \rightarrow “ $\widehat{\beta}_{22} \widehat{\beta}_{23}$ ”.
- p.40. line 7. “boundaries of the bar” should be “boundaries of the band”.
- p.40. line -10. “ $y_i - \widehat{\beta}_1 s_i - \widehat{\beta}_{21} t_i - \widehat{\beta}_{22} t_i^2 - \widehat{\beta}_{23} t_i^3$ ” \rightarrow “ $y_i - \widehat{\beta}_0 - \widehat{\beta}_1 s_i - \widehat{\beta}_{21} t_i - \widehat{\beta}_{22} t_i^2 - \widehat{\beta}_{23} t_i^3$ ”.
- p.45. “residual variance” \rightarrow “the residual variance” in the line after the last equation.
- p.46. last line. “Ruppert et al. (1997)” \rightarrow “Ruppert (1997a)”.
- p.49. line 10. “Marquandt” should be “Marquardt”.
- p.50. lines -4, -3. “independent independent” \rightarrow “independent”.
- p.56. line 7. “st. dev. (β_i)” should be “st. dev. ($\widehat{\beta}_i$)”.
- p.56. line 1. “ $y - \widehat{y}_i$ ” \rightarrow “ $y_i - \widehat{y}_i$ ”.
- p.58. lines 1,2. “positions” \rightarrow “position”.
- p.64. line -6. “(or impossible)” \rightarrow “or impossible”.
- p.65. The first expression for \mathbf{D} should have its fifth column deleted.
- p.67. line -14. “There are” \rightarrow “They are”.
- p.69. Equation (3.10). “ $(x - \kappa_k)_+$ ” \rightarrow “ $(x - \kappa_K)_+$ ”.
- p.69. Equation (3.11). “ $\sum_{k=1}^p$ ” \rightarrow “ $\sum_{k=1}^K$ ”.
- p.71. line 3. “into (3.8) allows” \rightarrow “into (3.12) allows”.
- p.73. line -2. “Section 13.2.1” \rightarrow “Section 13.4.5”.
- p.75. line 2. “ $\beta^T \mathbf{D} \beta$ ” \rightarrow “ $\lambda^{2p} \beta^T \mathbf{D} \beta$ ”.
- p.82. lines 8-9. There is a slight abuse of notation here, since p in Section 2.4.6 is the number of predictors *including* the intercept. So e.g. a simple linear regression model has $p = 2$. However, on the previous page (p.81) we use p for the degree of the polynomial part of a penalized spline model; so a linear penalized spline has $p = 1$ in Section 3.13.
- p.90. **Penalized spline with radial basis** The matrix \mathbf{K} should be

$$\mathbf{K} = \begin{bmatrix} \mathbf{0}_{m \times m} & \mathbf{0}_{m \times K} \\ \mathbf{0}_{K \times m} & [|\kappa_k - \kappa_{k'}|^{2m-1}]_{1 \leq k, k' \leq K} \end{bmatrix}$$

where, for example, $\mathbf{0}_{m \times K}$ is the $m \times K$ matrix of zeroes. In addition, to be consistent with Section 13.4.4 and the comment by French, Kammann & Wand (2001) (*Journal of the American Statistical Association*, **96**, 1285–1288) it can be argued that the matrix

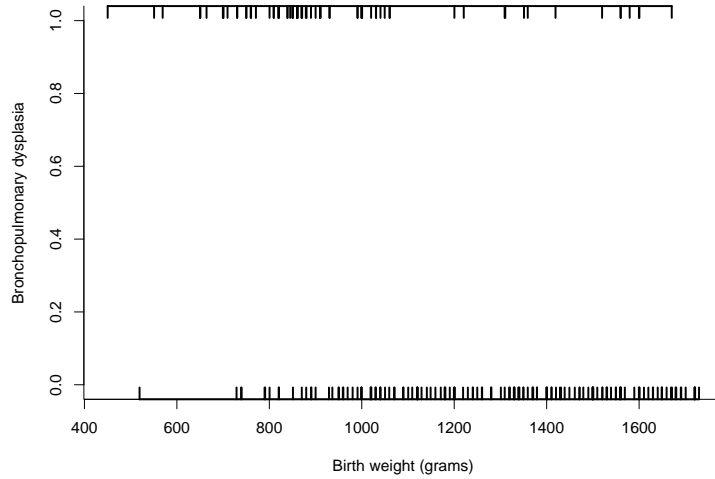
$$[|\kappa_k - \kappa_{k'}|^{2m-1}]_{1 \leq k, k' \leq K}$$

should be replaced by

$$([|\kappa_k - \kappa_{k'}|^{2m-1}]^{1/2})^T_{1 \leq k, k' \leq K} [|\kappa_k - \kappa_{k'}|^{2m-1}]^{1/2}_{1 \leq k, k' \leq K}.$$

- p.94. line -8. “46.5 degrees of freedom.” \rightarrow “46.5 degrees of freedom for the intercepts.”
- p.113. line 9. “in concerned” \rightarrow “is concerned”.
- p.118. Figure 5.5. CV and GCV should be reversed in the legend.

- p.119. line 1. “(3.32)” → “(3.33)”.
- p.119. line -9. “deflates $\hat{\sigma}_\varepsilon^2$ ” be replaced by “deflates RSS” .
- p.119. line -4. “numericalally” → “numerically”.
- p.123. Figure 5.8. Add the following sentence to the end of the caption: “The data correspond to the 50th percentile of the respective RMSE distributions.”
- p.125. line 12.. “Figure 15.3 shows that” → “Figure 15.3 shows the”.
- p.129. In the caption for Figure 5.14 the following sentence should be removed: “The number of knots is coded: 1 = 5 knots, . . . , 6 = 120 knots.”
- p.130. In the caption for Figure 5.15 the following sentence should be removed: “The number of knots is coded: 1 = 5 knots, . . . , 6 = 120 knots.”
- p.137. line -2. “ $N(0, \sigma^2)$ ” → “ $N(0, \sigma_\varepsilon^2)$ ”.
- p.138. line 7. “Chapter 5” → “Section 5.2”.
- p.139. lines 9–13. The last part of the sentence “Also, if . . . fitted curve.” is incorrect. Remove “where . . . corresponds to the fitted curve” and finish the sentence at the displayed equation on line 10.
- p.139. line -10. “ $\mathbf{X}_x\{\mathbf{E}(\tilde{\boldsymbol{\beta}}|\mathbf{u}) - \tilde{\boldsymbol{\beta}}\} + \mathbf{Z}_x\{\mathbf{E}(\tilde{\mathbf{u}}|\mathbf{u}) - \mathbf{u}\}$ ” → “ $\mathbf{X}_x\{\mathbf{E}(\tilde{\boldsymbol{\beta}}|\mathbf{u}) - \boldsymbol{\beta}\} + \mathbf{Z}_x\{\mathbf{E}(\tilde{\mathbf{u}}|\mathbf{u}) - \mathbf{u}\}$ ”
- p.140. Both occurrences of “ $\hat{\sigma}_\varepsilon$ ” in (6.14) should be removed.
- p.140. “ $\mathbf{C}(\mathbf{C}^T\mathbf{C} + \frac{\sigma_\varepsilon^2}{\sigma_u^2}\mathbf{D})\mathbf{C}^T$ ” → “ $\mathbf{C}(\mathbf{C}^T\mathbf{C} + \frac{\sigma_\varepsilon^2}{\sigma_u^2}\mathbf{D})^{-1}\mathbf{C}^T$ ” in 4th line from the bottom.
- p.151. line -2. “of first” → “of the first”.
- p.153. line 2. “see” → “seen”.
- p.156. line -12. “have same” → “have the same”.
- p.162. line -5. “dashed lines” → “lines”.
- p.163. line 14. “ κ_K ” → “ κ_k ”.
- p.164. line -9. “can be fit” → “can be fitted”.
- p.165. line -3. “is” → “are”.
- p.179. line -5. “the the” → “to the”.
- p.183. line -12. $df_{\text{fit, smaller}} - df_{\text{fit, larger}} \rightarrow df_{\text{res, smaller}} - df_{\text{res, larger}}$.
- p.190. In Table 9.1 the numerical summaries for **hispanic** and **white** should be interchanged.
- p.190. In Figure 9.4 the labels at the base of the plot, **Hispanic** and **White**, should be interchanged.
- p.195. The data are missing from Figure 10.1. The plot that should have appeared is:



- p.196. line –97. “...implement with MCMC than is the logistic.” → “...implement with MCMC than is the logistic (Albert and Chib, 1993).” The reference for this additional paper is:

Albert, J.H. and Chib, S. (1993). Bayesian analysis of binary and polychotomous response data. *Journal of the American Statistical Association*, **88**, 669–679.

- p.197. “distribution” → “distributions” two lines above (10.6).
- p.199. line –8. “ $\log\left(\frac{y}{\eta}\right)$ ” → “ $\log\left(\frac{y}{\phi}\right)$ ”.
- p.199. line –6. “ $\log\left(\frac{y}{\eta}\right)$ ” → “ $\log\left(\frac{y}{\phi}\right)$ ”.
- p.201. line 1. “ $\mathbf{W}_{2,\hat{\beta}}^{-1}$ ” → “ $\mathbf{W}_{2,\hat{\beta}}$ ”.
- pp. 201,202. Section 10.7. f should be replaced by μ throughout this section.
- p.202. line –2. The displayed expression should be

$$-\sum_{i=1}^n \log \left\{ V(\mathbf{x}_i^T \boldsymbol{\beta}^{(t)}, \boldsymbol{\theta}) \right\} - \sum_{i=1}^n \frac{\{y_i - \mu(\mathbf{x}_i^T \boldsymbol{\beta}^{(t)})\}^2}{V(\mathbf{x}_i^T \boldsymbol{\beta}^{(t)}, \boldsymbol{\theta})}.$$

- p.204. line 14. Remove “(see e.g. the web site multilevel.ioe.ac.uk for various links)”.
- p.205. “Newton-Raphson” → “Newton-Raphson method” in the last line.
- p.206. “an only” → “only an” in first line of Section 10.8.4.
- p.211. “ $(\hat{\beta})_i$ ” → “ $(\hat{\beta}_i)$ ” in the last line.
- p.212. line 14. “ $\mathbf{W}_{\boldsymbol{\beta}} = \text{diag}\{H'(\mathbf{X}\boldsymbol{\beta})\}$ ” → “ $\mathbf{W}_{\boldsymbol{\beta}} = \text{diag}\{\mu'(\mathbf{X}\boldsymbol{\beta})\}$ ”.
- p.212. line 21. “number of parameters in model” → “number of parameters in the model”.
- p.214. Caption to Figure 11.1: “plusses” → “short vertical bars”.
- p.215. line 17. “enter the the additive” → “enter the additive”.
- p.216. line 1. “ $\hat{\mathbf{f}} = (b')^{-1}(\hat{\boldsymbol{\eta}})$ ” → “ $\hat{\mathbf{f}} = b'(\hat{\boldsymbol{\eta}})$ ”.
- p.217. Caption to Figure 11.2: “plusses” → “short vertical bars”.
- p.218. line 8. “by equation (8.5)” to “by equation (8.5) with $\sigma_{\varepsilon}^2 = \phi = 1$ ”.

- p.219. Section 11.4. \mathbf{X} should be replaced by \mathbf{C} throughout this section.
- p.219. In equations (11.7), (11.8) and (11.9): “ $\frac{1}{2}\mathbf{\Lambda}$ ” \rightarrow “ $\mathbf{\Lambda}$ ”.
- p.219. line 6. “by equation (8.5)” to “by equation (8.5) with $\sigma_\varepsilon^2 = \phi = 1$ ”.
- p.219. line 7. “As before, let” \rightarrow “Let”.
- p.219. line –9. “ $\mathbf{W} = \text{diag}\{\mu'(\mathbf{x}_i^T \hat{\boldsymbol{\beta}} + z_i^T \hat{\mathbf{u}})\}$ ” \rightarrow “ $\mathbf{W} = \text{diag}\{\mu'(\mathbf{X} \hat{\boldsymbol{\beta}} + \mathbf{Z} \hat{\mathbf{u}})\}$ ”.
- p.220. line 12. “of the model for” \rightarrow “of the model, respectively, for”.
- p.224. line –15. The displayed equation should read:

$$(x_i, y_i, z_i) = (\text{density}_i, \log.\text{yield}_i, \text{location}_i).$$

- p.226. Section 12.2.1. “ L ” should be replaced by “2” throughout Section 12.2.1 since this section only deals with binary-by-continuous interactions. General L is covered in Section 12.3.3.
- p.228. Figure 12.3. In the legend the symbols and years should line up with each other.
- p.229. line 13. “recordings (respectively) and” \rightarrow “recordings, respectively, and”.
- p.232. Equation (12.13). “ $\beta_{4j} \log(i+1)$ ” \rightarrow “ $\beta_{5j} \log(i+1)$ ”.
- p.232. lines –15, –14. “relative to deviance” \rightarrow “relative to the deviance” and “a overdispersion” \rightarrow “an overdispersion”.
- p.234. “is part of” \rightarrow “are part of” in margin note near bottom.
- p.246. last line. “the t -density with $\nu + \frac{1}{2}$ degrees of freedom” \rightarrow “a t -density with 2ν degrees of freedom”.
- p.251. “ $\text{Cov}(\mathbf{Z}_R \mathbf{u}) = \mathbf{Z}_R$ ” \rightarrow “ $\text{Cov}(\mathbf{Z}_R \mathbf{u}) = \sigma_u^2 \mathbf{Z}_R$ ”
- p.254. “using the design matrices $\mathbf{X} = [1 \mathbf{x}_i^T]_{1 \leq i \leq n}$ ” \rightarrow “taking \mathbf{X} to have columns spanning the space of all d -dimensional polynomials in the components of the \mathbf{x}_i with degree less than m ”
- p.255. line –9. “Nychka and Saltzman 1998” \rightarrow “Johnson, Moore and Ylvisaker 1990; Nychka and Saltzman 1998”. The reference for this additional paper is:
Johnson, M.E., Moore, L.M. and Ylvisaker, D. (1990). Minimax and maximin distance designs. *Journal of Statistical Planning and Inference*, **26**, 131–148.
- p.257. line 9. “ $\mathbf{x}_1, \dots, \mathbf{x}^n$ ” \rightarrow “ $\mathbf{x}_1, \dots, \mathbf{x}_n$ ”.
- p.269. 5th line of Section 15.2. “(published 2002)” \rightarrow “(2002)”.
- p.270. line 5. “In practice, σ^2 is” \rightarrow “In practice, σ_v^2 is”.
- p.270. Equation (15.3). “ $-(n/2) \log(\sigma_v^2)$ ” \rightarrow “ $-(n/2) \log(\sigma_x^2)$ ”.
- p.272. Step (3) of the algorithm. “ $(\hat{\sigma}_\varepsilon^2 / \sigma_u^2)$ ” \rightarrow “ $(\sigma_\varepsilon^2 / \sigma_u^2)$ ”.
- p.272. Step (4) of the algorithm.

$$“\hat{\mathbf{P}} = m^{-1} \sum_{j=1}^m \mathbf{X}_{ji}^\top \mathbf{X}_{ji}” \quad \rightarrow \quad “\hat{\mathbf{P}} = m^{-1} \sum_{j=1}^m \begin{bmatrix} \mathbf{X}_{ji}^\top \mathbf{X}_{ji} & \mathbf{X}_{ji}^\top \mathbf{Z}_{ji} \\ \mathbf{Z}_{ji}^\top \mathbf{X}_{ji} & \mathbf{Z}_{ji}^\top \mathbf{Z}_{ji} + (\sigma_\varepsilon^2 / \sigma_u^2) \mathbf{I}_K \end{bmatrix}”$$

- p.272. Step (5)(a) of the algorithm. $\begin{bmatrix} \boldsymbol{\beta}^{(k+1)} \\ \mathbf{b} \end{bmatrix} \rightarrow \begin{bmatrix} \boldsymbol{\beta}^{(k+1)} \\ \mathbf{u} \end{bmatrix}$.

- p.277. 7th line. “The Bayes” → “Bayes”.
- p.279. Equation (16.2) should read

$$P\{\boldsymbol{\theta} \in \mathcal{S}(\mathcal{D})|\boldsymbol{\theta}\} = 1 - \alpha \quad \text{for all } \boldsymbol{\theta}.$$

and equation (16.3) should read

$$P\{\boldsymbol{\theta} \in \mathcal{S}(\mathcal{D})|\mathcal{D}\} = 1 - \alpha \quad \text{for all } \mathcal{D}.$$

- p.279. line 6. “parameter parameter” → “parameter”.
- p.283. Vertical axis label of Figure 16.1(d).
“Variance ratio 1” → “Variance ratio – 1”.
- p.283. 1st line after Figure 16.1. “are used” → “is used”.
- p.285. line 5. “but all four autocorrelations” → “but the absolute value of all four autocorrelations”.
- p.286. Vertical axis label of Figure 16.3(d).
“Variance ratio 1” → “Variance ratio – 1”.
- p.290. line 1. “Chib and Greenberg 1995” → “Albert and Chib 1993; Chib and Greenberg 1995”.
- p.296. line 12. “with β_{p+k} having” → “with u_k having”.
- p.296. line 14. “ $\sigma_\varepsilon^2 \text{diag}(0, \dots, 0, \lambda_1, \dots, \lambda_K)$.” → “ $\sigma_\varepsilon^{-2} \text{diag}(0, \dots, 0, \lambda_1, \dots, \lambda_K)$.”.
- p.297. line –3. “and and” → “and”.
- p.298. line –3. “is defined” → “is as defined”.
- p.299. line 7 of Section 17.5.2. “increase” → “increases”.
- p.302. line –17. “compare posterior” → “compare the posterior”.
- p.303. Figure 17.5 caption. “Monte Carlo variance” → “the Monte Carlo variance”.
- p.303. Figure 17.6 caption. “Monte Carlo variance” → “the Monte Carlo variance”.
- p.305. line 12. “ $\sum_{i=1}^n \{y_i - f(x_i; v)\}^2 + \sum_{j=1}^d \lambda_j^2(\kappa_{k,j}) u_{k,j}^2$ ”
→ “ $\sum_{i=1}^n \{y_i - f(x_i; v)\}^2 + \sum_{j=1}^d \sum_{k=1}^{K_j} \lambda_j^2(\kappa_{k,j}) u_{k,j}^2$ ”.
- p.308. Section 18.2. “carciogenicity” → “carcinogenicity”.
- p.308. line –4. “sound” → “Sound”.
- p.314. line –5. “fit tensor” → “fit a tensor”.
- p.316. line –5. “correlation function” → “autocorrelation function”.
- p.320. line –12. “basis model” → “basic model”.
- p.324. line 9. “of the methods” → “the methods”.
- p.328. Section A.2.6. “semipositive definite” → “positive semidefinite”.
- p.330. line 11. “ $\partial f(\boldsymbol{x}) \partial x_i$ ” → “ $\partial f(\boldsymbol{x}) / \partial x_i$ ”.
- p.339 Equation (B.2). “x <- \$radiation” → “x <- air\$radiation”.
- p.345. In the chunk of Matlab code near the bottom of the page the line of code
if smooth_spline_penalty == 1 ;
should be added after

```
D = diag(id) ;
```

- p.384. Immediately after "MASE, 128" should appear a new line with "Matérn family, 246".
- p.351. Section B.1.2.2. "general ridge regression" → "generalized ridge regression".
- p.355. In the S-PLUS code near the center of the page, the following lines of code should be added immediately after the line that reads `K.3 <- length(knots.3)`:

```
Z.1 <- outer(x1,knots.1,"-")
Z.1 <- Z.1*(Z.1>0)
Z.2 <- outer(x2,knots.2,"-")
Z.2 <- Z.2*(Z.2>0)
Z.3 <- outer(x3,knots.3,"-")
Z.3 <- Z.3*(Z.3>0)
Z <- cbind(Z.1,Z.2,Z.3)
```

- p.365. The full reference for the paper by French and Wand is:

French, J.L. and Wand, M.P. (2004). Generalized additive models for cancer mapping with incomplete covariates. *Biostatistics*, **5**, 177–191.

- p.370. Parise et al. (2001). The paper is in *JRSS-C, Applied Statistics*. The order of the authors is Parise, Wand, Ruppert and Ryan.

Acknowledgements

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