1 Numerical Methods of Statistics – Errata – October 2008

2 Chapter 2

Fix page: 14 line -4

1330_{eight} should be 1770_{eight}

Fix page: 20 line Table 2.1

Z Format for 3.4e+38 should be '7f7fffff' rather than '7fefffff'

Fix page: 20 line 1

display should read V = Z'BF800000' and not Z'C1100000'

Fix page: 20 line -14

change 4 to 3 and 8 to 9 in parenthetical remark to read 3 more than the single's 9

Fix page: 23 line 5

change sign in equation (2.5.1) to read

$$\sum_{i=1}^{n}(x_i - \overline{x})^2 = \sum_{i=2}^{n}(x_i - x)_1)^2 - n(x_1 - \overline{x})^2$$

Fix page: 31 line -7

sign of b should be negative in equation (2.7.7) to read

$$2c/\left[-b + \sqrt{b^2 - 4ac}\right]$$

Fix page: 34 line 4

the fourth digit on Euler's gamma in Exercise 2.12 is wrong

$$H_n = 1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n} = .577215664 + \log(n) + o(n)$$

Fix page: 34 line 25,26

Exercise 2.16 (c), (d) variable should be x

$$(c) f(x) = log(1 + x)$$

$$(d) f(x) = \Phi^{-1}(x)$$

3 Chapter 3

Fix page: 41 line 23

in the third display of code, second line, the variable subtracting should be 'ii' to read i=n+1-ii ! count down from n to 1

Fix page: 42 line -5

entries in $\mathbf{M}^{(2)}$ which are neither 0 nor 1 are $-A_{32}^{(1)}/A_{22}^{(1)}$ and $-A_{42}^{(1)}/A_{22}^{(1)}$ (the numerator subscripts should be 22 and 32 instead of 31 and 41)

Fix page: 47 line -7
superscript of last matrix $\mathbf{L}^{[k]T}$ (not k-1)

Fix page: 48 line -11
in equation (3.5.4), superscript for $\mathbf{D}$ is $[k-1]$, not $[k]$

Fix page: 49 line 13
Example 3.3, change A_{21} to L_{21} in line for $k=2$ for the unknown L_{21}

Fix page: 53 line 14
change $n-1$ to $n-i$ in penultimate binomial coefficient

$$(\mathbf{A}^{-1})_{ij} = B_{ij} = (-1)^{i+j} j \begin{pmatrix} i+j-2 \\ i-1 \end{pmatrix} \begin{pmatrix} i+n-1 \\ i-1 \end{pmatrix} \begin{pmatrix} j+n-1 \\ n-i \end{pmatrix} \begin{pmatrix} n \\ j \end{pmatrix}$$

Fix page: 59 line 16
In Exercise 3.23, Sherman-Morrison-Woodbury formula is incorrect, although correctly given in (5.9.4) on p. 99

$$(\mathbf{A} + \mathbf{u}\mathbf{v}^T)^{-1} = \mathbf{A}^{-1} - \frac{1}{1 + \mathbf{v}^T \mathbf{A}^{-1} \mathbf{u}} \mathbf{A}^{-1} \mathbf{u} \mathbf{v}^T \mathbf{A}^{-1}$$

4 Chapter 4

Fix page: 67 line -9
denominator should be $\mathbf{1}^T \mathbf{A}_n \mathbf{1}$

$$Q = \mathbf{z}^T \mathbf{A}_n^{-1} \mathbf{z} - (\mathbf{1}^T \mathbf{A}_n^{-1} \mathbf{z})^2 / \mathbf{1}^T \mathbf{A}_n^{-1} \mathbf{1}$$

Fix page: 79 line -7
denominator in general case should be (j-d) to read

$$r(j) = (j-1+d) * r(j-1)/(j-d)$$

5 Chapter 5

Fix page: 97 line lots
seven negative signs should be positive

We have $\mathbf{X} = \begin{bmatrix} 1 & 1 \\ 1 & 2 \\ 1 & 3 \\ 1 & 4 \end{bmatrix}$, so use $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$; then

$$\mathbf{U}_{12}\mathbf{X} = \begin{bmatrix} 1/\sqrt{2} & 1/\sqrt{2} & 0 & 0 \\ -1/\sqrt{2} & 1/\sqrt{2} & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 2 \\ 1 & 3 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} \sqrt{2} & 3/\sqrt{2} \\ 0 & +1/\sqrt{2} \\ 1 & 3 \\ 1 & 4 \end{bmatrix}$$

Use $\begin{bmatrix} \sqrt{2} \\ 1 \end{bmatrix}$ to get $\mathbf{U}_{13}$, so

$$\mathbf{U}_{13}\mathbf{U}_{12}\mathbf{X} = \begin{bmatrix} \sqrt{2/3} & 0 & 1/\sqrt{3} & 0 \\ 0 & 1 & 0 & 0 \\ -1/\sqrt{3} & 0 & 1/\sqrt{2/3} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \sqrt{2} & 3/\sqrt{2} \\ 0 & +1/\sqrt{2} \\ 1 & 3 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} \sqrt{3} & 2\sqrt{3} \\ 0 & +1/\sqrt{2} \\ 0 & \sqrt{3/2} \\ 1 & 4 \end{bmatrix};$$

use $\begin{bmatrix} +1/\sqrt{2} \\ \sqrt{3/2} \end{bmatrix}$ to get $\mathbf{U}_{23}$, so

$$\mathbf{U}_{23}\mathbf{U}_{13}\mathbf{U}_{12}\mathbf{X} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & +1/2 & \sqrt{3}/2 & 0 \\ 0 & -\sqrt{3}/2 & +1/2 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \sqrt{3} & 2\sqrt{3} \\ 0 & +1/\sqrt{2} \\ 0 & \sqrt{3/2} \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} \sqrt{3} & 2\sqrt{3} \\ 0 & \sqrt{2} \\ 0 & 0 \\ 1 & 4 \end{bmatrix};$$

Fix page: 108 line -3

file name is '**chex57**', not '**chkx57**'

Fix page: 110 line 21

Exercise 5.11: sign is wrong in expression for Si

$$S_i = S_{i-1} + (iy_i - T_i)^2 / [i(i-1)]$$

6 Chapter 6

Fix page: 122 line 23

missing r ...without forming the matrix $\mathbf{A}_k - r\mathbf{I}$;

7 Chapter 7

Fix page: 144 line 8

equation (7.3.9), error in subscript in expression for d_1

$$d_1 = 6(s_2 - z_1')/h_2$$

Fix page: 145 line 8

below equation (7.3.10), replace y with z in condition $|z^{(4)}| \leq M$

Fix page: 149 line 12

correct meaning of *completeness* to read

Completeness of a set of orthonormal functions means that a function orthogonal to every member is a function with zero norm.

Fix page: 166 line 3

Exercise 7.9, correct display to read

$$\hat{F}(y + \log m) = \exp(-e^{-y})$$

Fix page: 166 line 12

Exercise 7.15 should refer to Exercise 7.14

Fix page: 166 line 14

Exercise 7.16 should refer to Exercise 7.14

8 Chapter 8

Fix page: 173 line 1

last two Fibonacci numbers need correcting $F_9 = 55$ and $F_{10} = 89$

Fix page: 173 line -6,-7

errors beginning with 'next step' The next step finds $f(5) < f(6)$, and we finish at $k = 7$, finding $f(7) < f(6)$. The mode is $k = 6$.

Fix page: 185 line 13

delete η . . . the relative change is $[(x + \eta x) - x] / (x) = \eta$.

Fix page: 188 line 18

correct function in Example 8.4 to read

$$f(\mathbf{x} - u\mathbf{d}) = f(\begin{pmatrix} 1 - 4u \\ 2 - 4u \end{pmatrix}) = 2(1 - 4u)^2 + (2 - 4u)^2$$

Fix page: 188 line 19

correct line after display in Example 8.4 to read which has a minimum at $u = 1/3$ (not 2/3)

9 Chapter 9

Fix page: 222 line 1

wrong sign for step in (9.8.5)

$$\beta^{(j+1)} = \beta^{(j)} + (\mathbf{G}^T\mathbf{G})^{-1}\mathbf{G}^T(\mathbf{Y} - \mathbf{g})$$

Fix page: 222 line 19

wrong sign for step in (9.8.6)

$$\beta^{(j+1)} = \beta^{(j)} + (\mathbf{G}^T\mathbf{G} + \lambda_j\mathbf{I}_p)^{-1}\mathbf{G}^T(\mathbf{Y} - \mathbf{g})$$

Fix page: 223 line 15

wrong sign for step in (9.8.7)

$$\beta^{(j+1)} = \beta^{(j)} + (\mathbf{G}^T\mathbf{G} + \mathbf{T}^j + \lambda_j\mathbf{I}_p)^{-1}\mathbf{G}^T(\mathbf{Y} - \mathbf{g})$$

Fix page: 224 line 13

expression for C_4 is missing $\hat{\sigma}^2$

$$\mathbf{C}_4 = \hat{\sigma}^2(\mathbf{G}^T\mathbf{G} + \mathbf{T}(\hat{\beta}))^{-1}\left[\sum_{i=1}^{n}(y_i - g_i(\hat{\beta}))^2\mathbf{G}_{i.}\mathbf{G}_{i.}^T\right](\mathbf{G}^T\mathbf{G} + \mathbf{T}(\hat{\beta}))^{-1}$$

Fix page: 232 line 3

missing 2 in expression variance of $n/S(\hat{\beta})$ in multiple regression is $2\gamma^2/n$ to terms . . .

10 Chapter 10

Fix page: 243 line -9
delete second summation in (10.3.5)

$$M_n(f) = h \sum_{i=1}^{n} f(a + (b-a)\frac{2i-1}{2n})$$

Fix page: 252 line -8 and -7
missing parentheses and extra t_1 to read

$$\ell_n(\mathbf{t}) = n_1 \log[2t_1t_2] + n_2 \log[t_1(2-t_1-2t_2)] + n_3 \log[t_2(2-t_2-2t_1)] + 2n_4 \log[1-t_1-t_2]$$

Fix page: 271 line – last third of page
** Most of these results depend on Y having a multivariate normal distribution, and some of these results are just plain wrong. *** Look for corrections in next edition.

Fix page: 275 line at bottom
Exercise 10.24 – depends of getting correct results on swindles

11 Chapter 11

Fix page: 293 line -14,-11
corrections needed in Algorithm D1 (gchirv) step (3) (b) should read

$$(b) \text{ If } Z < 0 \text{ then } r = r + Z^2/[3(Z+\eta)]$$

step (5) – delete minus sign:

$$\text{If } 2\log U < \log h_\eta(Z) \text{ then } \ldots$$

Fix page: 293 line -5
wrong expression for γ to generate gamma(α, β), call D1 with $\gamma = 2\alpha$

Fix page: 297 line 6
correct expression for $\mathbf{x}$ the vector $\mathbf{x} = (\sqrt{k/Z})\mathbf{y}$, where $\mathbf{y} \ldots$

12 Chapter 12

Fix page: 342 line 8
upper case R

$$T_3(R) = w_0(R)G(0) + 2w_1(R)G(R)exp\{R^2/2\}$$

13 Acknowledgements

I would like to thank Dr. Karen E. Chiswell for her contributions to this list.

J F Monahan, last update 20 October 2008.