# 1 Corrections 01 February 2008

# 2 Chapter 1 corrections

**Fix page: 2 line 9**
l.c. $n$ should be u.c. $N$ so that $\mathbf{X}$ is $N \times 2$, $\mathbf{b}$ is $2 \times 1$, and $\mathbf{e}$ is $N \times 1$.

**Fix page: 2 line 15**
replace $b_1$ and $b_2$ with $\beta_1$ and $\beta_2$, to read

$$y_i = \beta_0 + \beta_1 n_i + e_i.$$

**Fix page: 6 line 3**
upper limit of inner double sum is $b_i$ where $N = \sum_{i=1}^{a} \sum_{j=1}^{b_i} n_{ij}$.

**Fix page: 9 line 5**
missing square brackets

$$\begin{aligned} y_t &= \beta_0 + \beta_1 t + e_t \\ &= \beta_0 + \beta_1 t + \eta + \rho e_{t-1} + a_t \\ &= \beta_0 + \beta_1 t + \eta + \rho \left[ y_{t-1} - \beta_0 - \beta_1 (t-1) \right] + a_t \\ &= \left[ \beta_0 (1-\rho) + \eta + \beta_1 \right] + \beta_1 (1-\rho) t + \rho y_{t-1} + a_t \end{aligned} \tag{1}$$

**Fix page: 10 line -8**
replace $b_1$ and $b_2$ with $\beta_0$ and $\beta_1$, to read where $p_i = \beta_0 + \beta_1 x_i$.

**Fix page: 10 line -6**
replace $b_1$ and $b_2$ with $\beta_0$ and $\beta_1$, to read where $\lambda_i = \beta_0 + \beta_1 x_i$.

# 3 Chapter 2 corrections

**Fix page: 14 line 5**
missing $\mathbf{b}$ in display

$$\mathbf{X}^T\mathbf{X}\mathbf{b} = \begin{bmatrix} na & n & n & ... & n \\ n & n & 0 & ... & 0 \\ n & 0 & n & ... & 0 \\ ... & ... & ... & & ... \\ n & 0 & 0 & ... & n \end{bmatrix} \begin{bmatrix} \mu \\ \alpha_1 \\ \alpha_2 \\ ... \\ \alpha_a \end{bmatrix} \text{ and } \mathbf{X}^T\mathbf{y} = \begin{bmatrix} y_{..} \\ y_{1.} \\ y_{2.} \\ ... \\ y_{a.} \end{bmatrix}$$

**Fix page: 14 line -11**
missing transpose (superscript) and also $\mathbf{w}^T\mathbf{X}^T\mathbf{X}\mathbf{w} = \|\mathbf{X}\mathbf{w}\|^2 = 0$,

**Fix page: 15 line 19**
delete 'a'

**Corollary 1** $\mathbf{X}\hat{\mathbf{b}}$ *is invariant to the choice of solutions* $\hat{\mathbf{b}}$ *to the normal equations (??).*

**Fix page: 15 line -9**
missing $\mathbf{X}^T$ in display

$$\mathbf{X}^T\hat{\mathbf{e}} = \mathbf{X}^T(\mathbf{y} - \mathbf{X}\hat{\mathbf{b}}) = \mathbf{0}$$

**Fix page: 25 line 5**

fix normal equations This minimization problem has led to the normal equations $\mathbf{X}^T\mathbf{X}\mathbf{b} = \mathbf{X}^T\mathbf{y}$.

# 4 Chapter 3 corrections

**Fix page: 33 line 15**

missing ) (right parenthesis) all solutions to the normal equations are given by $\hat{\mathbf{b}}(\mathbf{z}) = (\mathbf{X}^T\mathbf{X})^g\mathbf{X}^T\mathbf{y} + (\mathbf{I} - (\mathbf{X}^T\mathbf{X})^g\mathbf{X}^T\mathbf{X})\mathbf{z}$.

**Fix page: 35 line 1**

missing hat $\hat{\mathbf{b}}_1 = \begin{bmatrix} 0 \\ \overline{y}_{1.} \\ \overline{y}_{2.} \\ \overline{y}_{3.} \end{bmatrix}$

**Fix page: 36 line -5**

$\mathbf{X}^T$ should be $\mathbf{X}\mathbf{b}$

$$\mathbf{X}\mathbf{b} = \begin{bmatrix} \mathbf{1}_b & \mathbf{1}_b & \mathbf{0} & \dots & \mathbf{0} & \mathbf{I}_b \\ \mathbf{1}_b & \mathbf{0} & \mathbf{1}_b & \dots & \mathbf{0} & \mathbf{I}_b \\ \dots & \dots & \dots & \dots & & \\ \mathbf{1}_b & \mathbf{0} & \mathbf{0} & \dots & \mathbf{0} & \mathbf{I}_b \\ \mathbf{1}_b & \mathbf{0} & \mathbf{0} & \dots & \mathbf{1}_b & \mathbf{I}_b \end{bmatrix} \begin{bmatrix} \mu \\ \alpha_1 \\ \alpha_2 \\ \dots \\ \alpha_a \\ \beta_1 \\ \beta_2 \\ \dots \\ \beta_b \end{bmatrix}.$$

# 5 Chapter 4 corrections

**Fix page: 67 line 16**

missing transpose Here this means $\lambda \in \mathcal{C}(\mathbf{U}^T) = \mathcal{C}(\mathbf{X}^T\mathbf{R}^T) = \mathcal{C}(\mathbf{X}^T)$

# 6 Chapter 5 corrections

**Fix page: 87 line -1**

replace $n_i$ and subscript $N_i$ with $p_i$ and $U_i \sim \chi^2_{p_i}(\phi_i)$, where $p_i = 1$

**Fix page: 93 line -5**

missing transpose in (2,1) element of matrix

$$\begin{bmatrix} \mathbf{B}\mathbf{X} \\ \mathbf{Q}_1^T\mathbf{X} \end{bmatrix} = \begin{bmatrix} \mathbf{B} \\ \mathbf{Q}_1^T \end{bmatrix} \mathbf{X} \sim N_{q+s}(\begin{bmatrix} \mathbf{B}\mu \\ \mathbf{Q}_1^T\mu \end{bmatrix}, \begin{bmatrix} \mathbf{B}\mathbf{V}\mathbf{B}^T & \mathbf{B}\mathbf{V}\mathbf{Q}_1 \\ \mathbf{Q}_1^T\mathbf{V}\mathbf{B}^T & \mathbf{Q}_1^T\mathbf{V}\mathbf{Q}_1 \end{bmatrix}).$$

**Fix page: 98 line -3**

insert 'noncentral' and so the mean and variance of a noncentral chi-square variate are $p + 2\phi$ and $2p + 8\phi$, respectively.

# 7 Chapter 6 corrections

**Fix page: 112 line -7**
subscript should be $N - r$ not $k$ Reject if $t > c_\alpha$ provides a level $\alpha$ test for $\alpha = Pr(T > c_\alpha | T \sim t_{N-r})$.

**Fix page: 140 line 8**
reference to (6.16) should be (6.17)

# 8 Chapter 7 corrections

# 9 Chapter 8 corrections

# 10 Chapter 9 corrections

# 11 Appendix A corrections

**Fix page: 200 line -12**
change 'a' to 'all' Viewed another way, the set of all linear combinations of a set

**Fix page: 202 line 17**
change $\mathbf{b}^{(j)}$ to $\mathbf{c}^{(j)}$ there exists a vector $\mathbf{c}^{(j)}$ such that $\mathbf{A}_{\cdot j} = \mathbf{B}\mathbf{c}^{(j)}$.

**Fix page: 204 line 14**
change 'are' to 'be' Let $\mathcal{S}$ and $\mathcal{T}$ be orthogonal complements

**Fix page: 204 line -6**
$\mathbf{x}$ should be $\mathbf{s}$ The Pythagorean Theorem applies to the decomposition in (**??**), since if $\mathbf{x} = \mathbf{s} + \mathbf{t}$

**Fix page: 206 line 4**
change $q$ to $m$ and the right hand side $(m \times 1)$ vector $\mathbf{c}$

**Fix page: 208 line 14**
insert 'Result' and following Result A.10, we find

**Fix page: 209 line 14**
subscript of $\mathbf{I}$ should be $n$ not $q$

$$\tilde{\mathbf{x}} = \mathbf{G}\mathbf{c} + [\tilde{\mathbf{x}} - \mathbf{G}\mathbf{c}] = \mathbf{G}\mathbf{c} + [\tilde{\mathbf{x}} - \mathbf{G}\mathbf{A}\tilde{\mathbf{x}}] = \mathbf{G}\mathbf{c} + [\mathbf{I}_n - \mathbf{G}\mathbf{A}]\,\tilde{\mathbf{x}}$$

**Fix page: 209 line 16**
superscript should be $n$ not $q$ First, by varying $\mathbf{z}$ over $R^n$,

**Fix page: 214 line 3**
reference equation (A.10), not (A.6)

**Fix page: 215 line 16**
subscript 2 Solving for $q_1$, we have $q_1 = -(1/2)q_2$;

**Fix page: 217 line 10**
replace 'eigenvalues' with 'eigenvectors' So we have three eigenvalues, $\lambda_1 = 15$, $\lambda_2 = 8$, $\lambda_3 = 6$, and to get their eigenvectors,

**Fix page: 224 line 4**
reverse $\mathbf{U}$ and $\mathbf{V}$ in display

$$\mathbf{A}^{+} = \mathbf{V} \begin{bmatrix} \mathbf{\Lambda}^{-1} & \mathbf{0} \\ \mathbf{0} & \mathbf{0} \end{bmatrix} \mathbf{U}^{T}$$