

Statistical Shape Analysis

I.L. DRYDEN and K.V. MARDIA
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Introduction

In the following sections a list of errata to the different printings are given. We have tried to give a full list. If you find any more typos then please let us know.

1st printing: April 1998; 2nd printing: June 1999; 3rd printing: April 2002; Print on demand (same as 2nd printing): October, 2004.

Errata that remain after both 2nd and 3rd printings

p25 In formula for area remove $'/D_{12}(X)'$

p28 line-1 'Section 3.12' should be 'Section 3.2'

p35 displayed equations after (2.11) should have: $\|H_1\|^2 = 2/k$

p41 In the 1st displayed equation of Definition 3.2: $-a - ib$ should be $-1_k(a + ib)$

p72 line 8 **and** line after (4.28): $\hat{\theta} = \arg(-\gamma^*z)$ should be $\hat{\theta} = -\arg(\gamma^*z)$

p79 in the formula for ϕ there should be a division line between the upper and lower expressions in the argument of arctan. (somehow it has disappeared)

p79 in the formula for ϕ remove the extra w between w_{22} and w_{23} in the numerator, and remove the last bracket $')'$ in the numerator.

p79 bottom line, u_{2j} : the expression in square brackets is the numerator and should be divided by $(ab)^{1/2}$. Also the division line is missing.

p85 1st equation after Proof:

$$D_{OPA}^2 = \|X_2 - \beta X_1 \Gamma - 1_k \gamma^T\|^2 = \text{trace}(\|X_2\|^2 + \beta^2 \|X_1\|^2 - 2\beta X_2^T X_1 \Gamma) + k \gamma^T \gamma,$$

should be

$$D_{OPA}^2 = \|X_2 - \beta X_1 \Gamma - 1_k \gamma^T\|^2 = \|X_2\|^2 + \beta^2 \|X_1\|^2 - 2\beta \text{trace}(X_2^T X_1 \Gamma) + k \gamma^T \gamma,$$

and four lines below:

$$\text{trace}(\|X_2\|^2 + \beta^2 \|X_1\|^2 - 2\beta \|X_1\| \|X_2\| Z_2^T Z_1 \Gamma)$$

should be

$$\|X_2\|^2 + \beta^2 \|X_1\|^2 - 2\beta \|X_1\| \|X_2\| \text{trace}(Z_2^T Z_1 \Gamma)$$

p111 1st displayed equation $(u_j + v_j)^2$ should be $u_j^2 + v_j^2$

p115 1st displayed equation: $\theta = \arg(-\gamma_{k-1}^* z)$ should be $\theta = -\arg(\gamma_{k-1}^* z)$

p117 2nd displayed equation: $-2\kappa + 2z^* \mu \mu^* z$ should be $-2\kappa + 2\kappa z^* \mu \mu^* z$

p133 In (6.38) the covariance matrix should be multiplied by 2.

p133/134 Change the proof of result 6.11 to: Specifically if we write $X_H = \mu + \epsilon$ where, without loss of generality, we have rescaled X by $\delta_{12} = \{(\mu_2 - \mu_1)^2 + (\nu_2 - \nu_1)^2\}^{1/2}$ and

$$\epsilon = (\epsilon_1, \dots, \epsilon_{k-1}, \eta_1, \dots, \eta_{k-1})^T \sim N_{2k-2}(0, \tau^2 I_{2k-2}),$$

where $\tau = \sigma/\delta_{12}$. The Taylor series expansion is

$$U = \Theta(1 - \sqrt{2}\epsilon_1) - \sqrt{2}\eta_1 \Phi + \sqrt{2}Z + \sum_j \sum_k O(\epsilon_j \epsilon_k),$$

where $Z = (\epsilon_2, \dots, \epsilon_{k-1}, \nu_2, \dots, \nu_{k-1})^T$.

p138 Equation (6.48): each term in the sum should be multiplied by $(\lambda_1/\lambda_2)^j$. i.e. insert this term after the summation sign.

p138 Equation (6.48): the arguments of the generalised Laguerre polynomials should be negative, i.e. insert a minus sign after each { sign.

p155 line 3: s_j^2/λ_j should be $1.0084s_j^2/\lambda_j$

p177 IN the first three displayed equations ‘sup’ should be ‘sup trace’

p192 Replace μ in (9.2) with μ^* .

p192 At end of 1st sentence after (9.2) add: ‘, where $\mu = E[Y] = H \text{vec}_m^{-1}(\mu^*)$.’

p196 At the end of (9.9): $\cos 2\rho\}$, should be $\cos 2\rho)$,

p196 In the first line of the proof of Result 9.3: ‘(3.4)’ should be ‘(9.6)’

p206 line after displayed matrix Γ : change ‘is symmetric positive definite’ to ‘is non-singular’

p233 line 21: should be Green and Sibson (1978)

p237 Equation (10.22) on the right-hand-side of a as well as w , one needs to post-multiply by \check{y}

p288 paragraph 3 line 2. Replace ‘1998’ with ‘2001’

p318 line-12: (x_2, y_2) should be $(x_2, -y_2)$

p322 Replace lines -1,-2 with

Bookstein, F.L. and Mardia, K.V.(2001). EM-type algorithms for missing morphometric data. Proceedings Intl.Conf. on Recent Developments in Statistics and Probability and their Applications. IISA 2000-2001 INDIA ,pp66-68.

p325 last line: should be Green and Sibson (1978)

p330 pages for Mardia and Dryden (1989b) should be 271–282 (not 71–282).

Errata corrected on 2nd printing but have reappeared on 3rd printing

p6 In the caption line 3-4 change:

‘permuted to give the same shape as A, B, C and D; triangle E can be reflected to have the same shape as A, B, C and D;’

to

‘permuted to give the same shape as A, B, C; triangle E can be reflected to have the same shape as D;’

p9 line 8: add in ‘non-i.i.d.’ before ‘distribution theory’

p11 Figure 8 caption: renumber the landmarks. Change the numbering to the following:

The face region is taken to be comprised of landmarks 7: *nasion* (n), 4: *basion* (ba), 5: *staphylion* (st), 1: *prosthion* (pr) and 6: *nariale* (na). The braincase region is taken to be comprised of landmarks 7, 4 and 8: *bregma* (b), 2: *lambda* (l) and 3: *opisthion* (o).

p13 Fig 10 caption: ‘13 is the extreme bottom right’ should be ‘13 is the extreme top left’

p24 line - 8 ‘interpreted as $2k$ times’ should be ‘interpreted as $(2k)^{-1}$ times’

p40 line 8: change (β, θ, a, b) to $(\hat{\beta}, \hat{\theta}, \hat{a}, \hat{b})$

p50 Figures 36 and 37 captions: ‘+3 standard deviations’ should be ‘6 standard deviations’.

p51 line 7 ‘at +3 standard’ should be ‘at 6 standard’

p51 second pair of displayed vectors: change to

$$\begin{aligned} & (0.11 - 0.11i, -0.11 - 0.12i, -0.04, -0.01 + 0.22i, 0.04 - 0.01i, 0.01 + 0.01i)^T, \\ & (0.05 + 0.03i, 0.04 + 0.01i, -0.01, -0.06 + 0.01i, 0.03 - 0.02i, -0.06 - 0.03i)^T. \end{aligned}$$

p51 line -10 ‘At the same time landmarks 2 and 3 move’ should be ‘At the same time landmarks 3 and 5 move’

p64 line 4 ‘minimization is again carried’ should be ‘minimization is carried’

p72 line 11 (Definition): ‘partial tangent coordinates’ should be ‘partial Procrustes tangent coordinates’

p86 line 5, equ. (5.9), displayed equ. after (5.9), equ. (5.10), displayed equ. after (5.10) and the line afterwards: Δ should be Λ .

p87 line 7: Δ should be Λ

p96 Equation (5.26) change to

$$\text{vec}(X_I) = \text{block diag}(H^T, H^T)\{v(c, j) + \gamma\}$$

p106 Second displayed equation should be changed to

$$\text{vec}(\hat{\mu}) + c\lambda_j^{1/2}\gamma_j$$

p110 line -6: change $\phi_j = (\theta_j - \theta_k) \bmod 2\pi$ to $\phi_j = (\theta_j - \theta_{k-1}) \bmod 2\pi$

p130 line -7 'is a $(2k - 2) \times (2k - 2)$ block diagonal matrix' should be 'is a $(2k - 2) \times 2k$ block diagonal matrix'

p131 line 4 'transformation from X to' should be 'transformation from X_H to'

p132 2nd and 3rd displayed equations: $\sin^2 \rho$ should be $\cos^2 \rho$. (three times altogether)

p132 1st displayed equation should be the r th moment, i.e. change $E[\{\chi_2^2(\lambda)\}]$ to $E[\{\chi_2^2(\lambda)\}^r]$

p146 line -13 change 43.124 to 43.269 in two places on this line.

p146 line -9 change ' τ in H_1 ' to ' τ in H_0 '

p170 line -5 'landmarks 7 and 4' (not 1 and 2)

p170 line -2 'landmarks 7, 4, 5, 1 and 6' (not 1,2,3,4 and 5)

p170 line -1 'landmarks 7, 4, 8, 2 and 3' (not 1,2,6,7 and 8)

p171 line -9 'landmarks 7, 4, 5, 1 and 6' (not 1,2,3,4 and 5)

p171 line -7 'landmarks 7, 4, 8, 2 and 3' (not 1,2,6,7 and 8)

p171 Figure 77 has actually been registered on landmarks prosthion (1) and lambda (2). A plot of the data registered on landmarks nasion (7) and basion (4) would fit in with the text. Replace with new figure 77

p172 Figure 78 has actually been registered on landmarks prosthion (1) and lambda (2). A plot of the data registered on landmarks nasion (7) and basion (4) would fit in with the text. Replace with new figure 78

p171 Equation (7.17) N_{2p-4} should be N_{2k-4}

p198 line 7 'size-and-shape' should be 'size and shape'

p207 equ (10.11) middle equation the far right hand side the second occurrence of $(\Gamma^{21})^T$ should be $(\Gamma^{12})^T$.

p264 equ. (11.7) the term

$$g(\theta_{\text{old}}|\theta_{\text{new}}|x) \text{ should be } g(\theta_{\text{old}}|\theta_{\text{new}})$$

p278 line 19 'probabilities distributions' should be 'probability distributions'

p281 line -11: $\frac{1}{n}$ missing from average squared Euclidean distance matrix, i.e. we should change $(W)_{h_1, h_2} = \sum_{i=1}^n d_i^2(h_1, h_2)$ to $(W)_{h_1, h_2} = \frac{1}{n} \sum_{i=1}^n d_i^2(h_1, h_2)$

p309 line -8: 'this chapter' should be 'Chapter 11'

Index p340 'Goodall's SFS test' should be 'Goodall's F test'

Index p340 gorilla skulls data 317-318 (not 314-315)

Index p340 handwritten character recognition data 318-320 (not 316)

Index p342 mouse vertebrae data 313-316 (not 312-314)

Index p345 schizophrenia study data 320 (not 316)

Errata remaining on 2nd printing but corrected on 3rd printing

p67 line -2 change ‘full squared full’ to ‘squared full’

p96 Subsection heading of 5.5.1: Change

‘Two dimensional data’ to ‘Tangent space PCA’

p96 Equation (5.26) change

block $\text{diag}(H^T, H^T)$ to block $\text{diag}(H^T, \dots, H^T)$

p113 in bottom displayed equation: $\int_{S_{k-1}}$ should be $\int_{S_{k-2}}$

p114 in top displayed equation: $\int_{S_{k-1}}$ should be $\int_{S_{k-2}}$

p118 line 3: 0.496 should be 0.495

p118 line 5: $\hat{\kappa} = 100$ should be $\hat{\kappa} = 419.2$

p143 Two lines before result 6.16

$\Sigma = \tau^2 L \Omega_0 L^T$ should be $\Sigma = 2\tau^2 L \Omega_0 L^T$

p143 in Equation (6.59)

$\tau^2 F L \Omega_0 L^T F^T$ should be $2\tau^2 F L \Omega_0 L^T F^T$

p144 In Equation (6.60)

$\tau^2 L \Omega_0 L^T$ should be $2\tau^2 L \Omega_0 L^T$

p144 Change displayed equation before section 6.7.4 to

$$2\tau^2 F F^T = 2\tau^2 \{I_{2k-4} + \Theta \Theta^T + \Phi \Phi^T\},$$

p166 The first displayed formula needs a horizontal line between the numerator and the denominator (It somehow disappeared on printing).

p167 bottom formula on page for $\hat{\sigma}^2$: replace $nk m$ with 1, i.e, it should be

$$\hat{\sigma}^2 = \frac{1}{(n-1)M} \sum_{i=1}^n \text{vec}(X_i^P - \bar{X})^T \text{vec}(X_i^P - \bar{X}).$$

p183 change ‘cos r ’ to ‘cos d^* ’ in right-most part of equation (8.6)

p183 two lines after equation (8.6): change ‘ r ’ to ‘ d^* ’

p227 Caption to Fig 104 ‘pdot’ should be ‘plot’

p239 line -14: Change $\sigma_{1/2}(h) = \|h\|$ to $\sigma_{1/2}(h) = -\|h\|$

p282 line before equation (12.3) $\sigma^2 I_2$ should be $\frac{\sigma^2}{2} I_2$

p282 Equation (12.3): twice on RHS one should just have σ^2 instead of $2\sigma^2$, i.e. $2\sigma^2 \chi_2^2(\delta_{rs}^2/2\sigma^2)$ should be $\sigma^2 \chi_2^2(\delta_{rs}^2/\sigma^2)$

p288 line 15,16 change Bookstein and Mardia (1998) to Bookstein and Mardia (2001)

p305 line 16 'more more equilateral' should be 'more equilateral'

p318 line -2: Change $(x_1, y_1), \dots, (x_k, y_k)$ to $(x_1, -y_1), \dots, (x_k, -y_k)$

p334 Small (1982) reference: change 'Philosophical' to 'Philosophical'