Errata

This is the new errata sheet for both hardbound and softcover editions of the text, as of 10/26/16. Errata that apply only to the hardbound edition are followed by “(H)” and those that apply to both are followed by “(H/S)”.

Chapter 1:

(1) p. 8, Exercise 8: Change “Example 1.5” to “Example 1.3”. (H/S)
(2) p. 10, Definition 1.3 of \( A \cap B \): Change “or” to “and”. (H/S)
(3) p. 12, Figure 1.4: Should have \( a + bi = re^{i\theta} \) and \( a - bi = e^{-i\theta} \). (H/S)
(4) p. 13, line -6: Replace “last” by “fifth”. (H/S)
(5) p. 14, line 2: Replace “\( i(x_1y_2 - x_2y_1) \)” by “\( i(x_1y_2 + x_2y_1) \)”. (H/S)
(6) p. 18, Example 1.14: In the solution replace \( -1 \pm \frac{i\sqrt{2}}{2} \) by \( -\frac{1}{2} \pm \frac{i\sqrt{3}}{2} \). (H/S)

Chapter 2:

(1) p. 68, line 10: Delete “\( A = I \)” from “\( A = I \ldots \)”. (H/S)
(2) p. 68, Exercise 2.2.3(c): Answer should be \[
\begin{bmatrix}
1 & -3 \\
0 & 2 \\
-1 & 3
\end{bmatrix}
\begin{bmatrix}
x \\
y
\end{bmatrix}
= \begin{bmatrix}
-1 \\
0 \\
0
\end{bmatrix}.
\]
(3) p. 69, Exercise 2.2.7(c): Answer should be \[
\begin{bmatrix}
1 & 0 & 1 \\
1 & -3 & 3 \\
0 & -3 & 1
\end{bmatrix}
\begin{bmatrix}
x_1 \\
x_2 \\
x_3
\end{bmatrix}
= \begin{bmatrix}
-x_1 \\
nx_2 \\
-x_3
\end{bmatrix}, \quad \text{(H/S)}
\]
(4) p. 69, Exercise 2.2.11: Answers should be \( A^2 = \begin{bmatrix}
-1 & -8 \\
4 & 7
\end{bmatrix} \), \( BA = \begin{bmatrix}
6 & 8 \\
-9 & 16
\end{bmatrix} \), \( AC = \begin{bmatrix}
-9 & -1 \\
-2 & 9
\end{bmatrix} \). (H/S)
(5) p. 70, Exercise 2.2.18: Replace \( uv + wu \) by \( uv + wu^T \). (H/S)
(6) p. 71, Exercises: Missing Problem 28: “Determine the flop count for multiplication of \( m \times p \) matrix \( A \) by \( p \times n \) matrix \( B \). (See page 48.)” (H)
Chapter 4:

(7) p. 74, line 7: Replace “A = \[
\begin{bmatrix}
\frac{\partial}{\partial x} & 0 \\
0 & f_{\text{frac}, 12}
\end{bmatrix}
\]” by “A = \[
\begin{bmatrix}
\frac{\partial}{\partial x} & 0 \\
0 & \frac{\partial}{\partial y}
\end{bmatrix}
\].” (H/S)

(8) p. 75, Figure 2.2(a), Replace “direction by 1.” to “direction by \( \frac{1}{\sqrt{2}} \).”

(9) p. 112, Exercise 2.5.5(c): Answer should be \( E_2 \left( \frac{1}{\sqrt{2}} \right) E_1 \left( -1 \right) E_{21} \) (i). (H/S)

(10) p. 113, Exercise 2.5.23: Replace “if \( A \) and \( B \) are invertible matrices” by “if \( A \) and \( B \) are matrices.” (H/S)

(11) p. 114, Exercise 2.5.27: Replace “Exercise 26” by “Exercise 17”. (H/S)

(12) p. 117, line 13: Replace “\( A_{ij} = (-1)^{i+j} M(A) \)” by “\( A_{ij} = (-1)^{i+j} M_{ij}(A) \)”.

(13) p. 125, line 9: Switch the variables \( x_1 \) and \( x_2 \) in the solution. (H/S)

(14) p. 137, line 2: Replace second row \(-8, -2\) of \( B \otimes A \) by \(-8, 4\). (H/S)

(15) p. 138, line 1: Replace “\( IAX + (-I)XB \)” by “\( AXI + (-I)XB \)”.

(16) p. 143, Exercise 2.7.6: Vectors should be listed as “\( \mathbf{x}^{(0)} \), \( \mathbf{x}^{(1)} \), and \( \mathbf{x}^{(2)} \).”

Chapter 3:

(1) p. 150, line 3: Change “\( n((1 - 2i)) \)” to “\( n(1 - 2i) \)”.

(2) p. 158, line 20: Change “\( T(f(x)) \)” to “\( T(f(x)) \)”.

(3) p. 180, Exercise 3.3.4: Change “\( \mathbb{R}^3 \)” to “\( \mathbb{R}^3 \)”.

(4) p. 182, Exercise 3.3.17: Answer should be \( \begin{bmatrix} \frac{1}{3} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{3} \end{bmatrix} \). (H/S)

(5) p. 182, Exercise 3.3.18: Replace \( \pi/4 \) by \( \pi/6 \). (H/S)

(6) p. 198, Exercise 3.5.22: Statement should be “Show that a set of vectors \( v_1, v_2, \ldots, v_n \) in the vector space \( V \) is a basis if and only if it has no redundant vectors and \( \dim V \leq n \).” (H/S)

Chapter 4:

(1) p. 219, line 1: Change “\( = -6 - 3 + 3 = -6 + 3 + 9 = \)” to “\( = -6 - 3 + 9 = \)”.

(2) p. 219, line 11: Change “\( (u \cdot v) w - (u \cdot w) v - (u \cdot v) w \)” to “\( (u \cdot w) v - (u \cdot v) w \)”.

(3) p. 219, Exercise 4.1.3(a): Answer should be \( \frac{\sqrt{15}}{2} \).

(4) p. 221, lines 19 and 22: Change “\( \|u\| \)” and “\( \|v\| \)” to “\( \|u\|^2 \)” and “\( \|v\|^2 \)”.

(5) p. 226, line 8: Change “\( \dim \mathbf{a}^\perp = n \)” to “\( \dim \mathbf{a}^\perp = n - 1 \)”.

(6) p. 227, line 9: Sentence should be “It can be shown that if \( A \) is known, the errors in \( b \) are normally distributed, and the least squares solution unique, then it is an unbiased estimator of the true solution in the statistical sense.”

(7) p. 230, line 9: Change “\( \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix} \)” to “\( \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix} \).

(8) p. 231, Exercise 4.2.3(b): Vectors should be \( (3, 0, 4) \), \( (2, 2, 1) \). (H/S)

(9) p. 231, Exercise 4.2.5: Answers should be (a) \( |u \cdot v| = 1 \leq \|u\| \|v\| = \sqrt{15} \)
(b) \( |u \cdot v| = 19 \leq \|u\| \|v\| = 2\sqrt{15} \)
(c) \( |u \cdot v| = 26 \leq \|u\| \|v\| = 26 \).

(10) p. 231, Exercise 4.2.7(b): Replace \( (1, 1, 1) \) by \( (0, 1, 1) \). (H/S)

(11) p. 239, Figure 4.4: Vector marked “\( H_\mathbf{w} \)” should be “\( H_\mathbf{w} \)”.

(12) p. 241, Exercise 4.3.9(c): Answer should be \( \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \). (H/S)
Chapter 5:

(13) p. 244, Theorem 4.11: The correct statement should be “If \( U_B \overset{S}{\rightarrow} V_C \) \( \rightarrow \) \( \rightarrow \) \( W_D \), then \([T \circ S]_{B,D} = [T]_{C,D}[S]_{B,C} \).” Accordingly, the subscripts should be changed in the proof, i.e., second line of proof should have “\([T \circ S]_{B,D} [u]_B = [(T \circ S)(u)]_B = [T(v)]_D \), fourth line should have “\([T \circ S]_{B,D} [u]_B = [(T \circ S)(u)]_D = [T(S(u))]_D \), sixth line should have “\([S]_{B,C} [u]_B \), seventh line should have “\([T \circ S]_{B,D} [u]_B = [T]_{C,D} [S]_{B,C} [u]_B \), and eighth should have “\( e_j = [u]_B \).” (H/S)

(1) p. 256, line 6: Replace “its” by “it’s”. (H/S)
(2) p. 258, line 7: Replace \( \mathcal{E}_{1+i}(A) \) by \( \mathcal{E}_{1-i}(A) \). (H/S)
(3) p. 262, Problem 5.1.15: Replace “ane” by “and”. (H/S)
(4) p. 265, line -8: Delete \( Ax = \) at start of displayed equation. (H/S)
(5) p. 267, line -5: “\( \sin (\pi A) = \)” should be “\( \sin (\frac{\pi}{A}) = \)” . (H/S)
(6) p. 270, Exercise 5.2.5: Replace “if \( p(A) = 0 \)” by “if \( q(A) = 0 \)” . (H/S)
(7) p. 270, Exercise 5.2.5: Answer should be “True in every case. (a) and (c) satisfy \( q(A) = 0 \) and are diagonalizable, (b) and (d) are not diagonalizable and \( q(A) \neq 0 \).” (H/S)
(8) p. 275, line 12: Replace “10A” by “A”. (H/S)
(9) p. 280, Exercise 5.3.1(d): Answer should be “no dominant eigenvalue”. (H/S)
(10) p. 280, Exercise 5.3.5(d): Answer should be that ergodic theorem does not apply to it. (H)
(11) p. 280, Exercise 5.3.7: Answer should be “\( \text{diag} \{ A, B \} \), where possibilities for \( A \) are \( \{ J_1(2), J_1(1) \} \), \( J_2(2) \) and possibilities for \( B \) are \( \{ J_1(3), J_1(3), J_1(3) \}, \text{diag} \{ J_1(3), J_2(3) \}, \text{diag} \{ J_3(3) \} \} \).” (H/S)
(12) p. 281, Exercise 5.3.11: “three state” should be “three stage”. (H)
(13) p. 281, Exercise 5.3.12: The last sentence should read: “Compare the growth rate to a constant interest rate that closely matches the model.” (H)
(14) p. 282, Problem 5.3.16: “choice of \( a, b \in \mathbb{R} \)” should be “choice of \( a, b \in \mathbb{R} \) with \( b \neq 0 \).” (H/S)
(15) p. 282, Problem 5.3.17: Promote Problem 17 and following up one number. Problem 17 is “Show that 1 is an eigenvalue for all stochastic matrices.” (H)
(16) p. 284, line -9,-10: Replace “\( \mathbf{v}_2^* \)” by “\( \mathbf{v}_2^* \)”. (H/S)
(17) p. 286, Exercise 5.4.2(c): Blank (3,3)th entry of matrix should be 0. (H/S)
(18) p. 287, Exercise 5.4.9: Replace “\( B = \text{P diag} \{ 1, \sqrt{2}, 4 \} \text{P}^T \)” by “\( B = \text{P diag} \{ 1, \sqrt{2}, 2 \} \text{P}^T \)”. (H/S)
(19) p. 288, proof of Theorem 5.14: Delete the repetition of the line beginning “Compute an eigenvalue ...”. Also, since “Exercise 5” did not appear in the final edition, prove that \( H_x \mathbf{w} = \mathbf{e}_1 \) with \( \mathbf{v} = \mathbf{w} - \mathbf{e}_1 \), as follows: Check that \( \mathbf{v}^* (\mathbf{w} + \mathbf{e}_1) = 0 \), since \( \mathbf{w} \cdot \mathbf{e}_1 = \mathbf{e}_1 \cdot \mathbf{w} \), since both dot products are real. Hence \( H_x (\mathbf{w} + \mathbf{e}_1) = \mathbf{w} + \mathbf{e}_1 \). Then use the facts that \( H_x \mathbf{v} = -\mathbf{v} \) and \( \mathbf{w} = \frac{1}{2} (\mathbf{v} + (\mathbf{w} + \mathbf{e}_1)) \) to deduce that \( H_x \mathbf{w} = \mathbf{e}_1 \). (H/S)
(20) p. 292, line 9: replace “right singular values” by “right singular vectors”. (H/S)
Chapter 6:

(1) p. 310, line 11: Replace “\[ \frac{1}{n} \int_{e^{-n}} \]” by “\[ \frac{1}{n} e^{-n} \]”. (H/S)

(2) p. 311, Exercise 6.1.3(a): Answer for infinity norm should be \( \frac{1}{3}(1, -3, -1) \). (H/S)

(3) p. 314, line 7: Replace “\( \int_{0}^{b} f(x)^2 \, dx \)” by “\( \int_{a}^{b} f(x)^2 \, dx \)”. (H/S)

(4) p. 318, line -11: Replace “\( u(x)^{1/2} \)” with “\( u(x)^{1/2} \)”. (H/S)

(5) p. 320, line 3: Replace “Another useful corollary” by “Another useful corollary to Theorem 6.3”. (H/S)

(6) p. 320, Exercise 6.2.1: Answer for (a) should have \( \|u, v\| = 46, \|u\| \approx \sqrt{97}, \|v\| = \sqrt{40} \) and (b) should have \( \|v\| = \frac{1}{\sqrt{v}} \) and \( \frac{1}{s} = 0.2 \leq \frac{1}{\sqrt{v}} \). (H/S)

(7) p. 320, Exercise 6.2.3(b): Answers should be \( \frac{2}{5}x^3, \frac{2}{5^2}x^2 \). (H/S)

(8) p. 331, Exercise 6.3.5(a): Answer for \( \|v\| \) should be \( \frac{1}{5}(23, -5, 14) \). (H)

(9) p. 331, Exercise 6.3.9: Replace \( w_1 = (-1, -1, 1) \) by “\( w_1 = (-1, 1, -1) \)” (H)

(10) p. 341, Exercise 6.4.8: Change “page 335” to “page 336”. (H/S)

(11) p. 343, Theorem 6.15: Swap “\( \|A\|_1 \)” of (1) with “\( \|A\|_\infty \)” of (2). (H/S)

(12) p. 345, line -10: Replace “\( A^{-1}(I + \bar{A}^{-1}\delta A)\delta x \)” by “\( A^{-1}(I + A\delta A)\delta x \)”.

(13) p. 347, Exercise 6.5.1(c): Answer should be \( 2\sqrt{17}, 10, 10 \). (H/S)

(14) p. 347, Exercise 3: Change “\( \delta b = 0.05b \)” to “\( \delta b = 0.5b \)” (H/S)

(15) p. 347, Exercise 6.5.3: Answer should be “Calculate \( c = \|A^{-1}\delta A\| = 0.05, \|I_3\| = 0.05 < 1, \|\delta A\|_A = 0.05, \|\delta b\|_b = 0.5, \text{cond}(A) \approx 6.7807 \). Hence, \( \frac{\|\delta x\|_x}{\|\delta x\|_x} \approx 0.42857 < \frac{\text{cond}(A)}{1-c} \frac{\|\delta A\|_A}{\|\delta b\|_b} \approx 1.7844 \).” (H/S)

(16) p. 347, Problem 6.5.7: Statement should be “\( \|A\|_1 = \max_{1 \leq j \leq m} \{\sum_{i=1}^{n} |a_{ij}|\} \)” (H/S)

(17) p. 354, Exercise 6.6.1: Answer for \( \text{cond}(A) \|\delta b\|_\infty / \|b\|_\infty \) should be 2.5873. (H/S)