

ERRATA

Fundamentals of Matrix Computations, Second Edition

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This list does not include minor spelling and grammatical errors that the reader can easily diagnose. I have tried to restrict the list mainly to mathematical typos and other items that could cause confusion.

p. 6 In Exercise 1.1.10, the code should read as follows:

```
b = zeros(n, 1);
for j = 1:n
    for i = 1:n
        b(i) = b(i) + A(i, j)*x(j);
    end
end
```

p. 42 On the last line of (1.4.28), the \tilde{R} should be \hat{R} .

p. 64 In Example 1.6.2, the Bucky Ball has 90 edges, not 30.

p. 71 On lines 3 and 5, the equation $\hat{A}x = b$ should be $\hat{A}x = \hat{b}$.

p. 72 In both arrays on this page, the entry $a_{n2}^{(2)}$ should be $a_{n2}^{(1)}$.

p. 89 In the expression for $A^{(1)}$, the entry $a_{n2}^{(2)}$ should be $a_{n2}^{(1)}$.

p. 113 The first line of the proof of Theorem 2.1.7 should read as follows: It suffices to show that $\|x + y\|_2^2 \leq (\|x\|_2 + \|y\|_2)^2$.

p. 134 On line 2, change “nonsingular” to “singular.”

p. 143 The equation $\text{fl}(x/y) = (x/y)(1+\epsilon)$ at mid page should be $\text{fl}(\hat{x}/\hat{y}) = (x/y)(1+\epsilon)$.

p. 147 In at least five places on this page, especially in Exercise 2.5.6, the symbol r should be \hat{r} . Aside from that, the equation $\hat{r} = b - Ax$ in Exercise 2.5.6 should read $\hat{r} = b - A\hat{x}$.

p. 152 On line 1, $.833 \times 10^1$ should be $.833 \times 10^{-1}$.

p. 159 In Theorem 2.7.2, the matrix G is $n \times n$.

pp. 168–169 In the MATLAB code in Exercise 2.7.25, the lower-case a should be an upper-case A in two places.

- p. 196** On the third line of the proof of Theorem 3.2.30, the equation $\gamma = 1/\|u\|_2^2$ should be $\gamma = 2/\|u\|_2^2$.
- p. 198** In Exercise 3.2.33, show further that $1 \leq \|u\|_2 \leq 2$.
- p. 210** In Exercise 3.2.68, the scalar γ in the definition of the reflector Q_i should have a subscript: $Q_i = I - \gamma_i u_i u_i^T$.
- p. 216** In part (a) of Exercise 3.3.10, in the MATLAB code, change `eye(m)` to `eye(n)`.
- p. 229** The third line of algorithm (3.4.23) should be $\tilde{r}_{ik} \leftarrow \langle v_k^{(i-1)}, \tilde{q}_i \rangle$.
- p. 246** In part (b) of Exercise 3.5.26, assume that the matrices A and B have full rank.
- p. 262** On the bottom half of the page, the definition of right and left singular vectors is backward. The columns of U are *left* singular vectors, and the columns of V are *right* singular vectors.
- p. 265** In part (c) of Exercise 4.1.17, in the equation $\sigma_1 = \|Au_1\|_2$, change the u_1 to a v_1 . Earlier in the same line, I wish I'd used the symbol v instead of u in the max.
- p. 267** In the second line after the second diagram, change A to A^{-1} .

- p. 276** In an equation in the middle of page, insert the vector $\begin{bmatrix} \hat{y} \\ z \end{bmatrix}$ in the appropriate place to get

$$c - \Sigma y = \begin{bmatrix} \hat{c} \\ d \end{bmatrix} - \begin{bmatrix} \hat{\Sigma} & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} \hat{y} \\ z \end{bmatrix} = \begin{bmatrix} \hat{c} - \hat{\Sigma} \hat{y} \\ d \end{bmatrix}.$$

Also, in the immediately preceding line, change \hat{r} to \hat{y} .

- p. 315** Just after (5.3.3), change $|\lambda_2/\lambda_1| \rightarrow 0$ to $|\lambda_2/\lambda_1|^j \rightarrow 0$.
- p. 342** At the end of Exercise 5.4.27, change $\|B\|_2$ to $\|\delta B\|_2$ to get "... since $\|\delta B\|_2$ is (asymptotically) proportional ..."
- p. 361** In the third line after displayed matrix A_m , insert the word *if*: "More precisely, if $|\lambda_i| > |\lambda_{i+1}| \dots$ "
- p. 369** In Exercise 5.6.25, R_1 is incorrect. It should be

$$R_1 = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}.$$

- p. 371** In part (b) of Exercise 5.6.27, in the formula for t , the radical in the denominator should be $\sqrt{1 + \hat{t}^2}$. (The \hat{t} should be squared.)

- p. 415** In the third line of the proof of Theorem 6.1.3, change $\text{span}\{x_1, \dots, x_k\} \in \mathcal{S}$ to $\text{span}\{x_1, \dots, x_k\} = \mathcal{S}$.
- p. 416** At the end of the fifth line of the proof of Theorem 6.1.6, change \mathbb{F}^n to \mathbb{F} .
- p. 423** On the third line from the bottom, change $\mathbb{F}^{n \times n}$ to \mathbb{F}^n .
- p. 476** Two lines before (6.6.1) change $\|\delta A_2\|/\|A\|_2 = \epsilon$ to $\|\delta A\|_2/\|A\|_2 = \epsilon$.
- p. 482** On the bottom line and five lines above, change $\tilde{l}_j = l_j \delta_{j-1}/\delta_j$ to $\tilde{l}_j = l_j \delta_j/\delta_{j+1}$.
- p. 531** In Example 7.2.3, the iterates are incorrect and should be replaced by

$$x^{(10)} = \begin{bmatrix} 3.902 \\ 2.899 \\ 1.914 \\ 0.935 \end{bmatrix}, \quad x^{(20)} = \begin{bmatrix} 3.9965 \\ 2.9965 \\ 1.9970 \\ 0.9977 \end{bmatrix}, \quad x^{(30)} = \begin{bmatrix} 3.99988 \\ 2.99987 \\ 1.99989 \\ 0.99992 \end{bmatrix},$$

and the statement “ $x^{(50)}$ agrees with . . .” should be replaced by “ $x^{(80)}$ agrees with . . .”

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