

Application Inspired Linear Algebra Errata

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May 17, 2023

This document lists known errors in the first printing of the textbook. This listing includes a page number in bold face type followed by an explanation of the error and the necessary correction.

(11) The grid of numbers at the top of the page should read:

| | | | |
|----|----|----|----|
| 0 | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 |

(47) In the final statement of Example 2.3.12, the vector space should be $(V, +, \cdot)$.

(51) The text in Theorem 2.3.15 should read “Then $0 \cdot x = 0$ for each \dots ”.

(55) The fourth bullet in the proof of Example 2.4.1 should read “And, addition is associative \dots ”.

(57) In Example 2.4.5, “ S ” should be replaced by $\mathcal{C}_0([a, b])$.

(63) In Example 2.4.17, the second illustration should be:

$$\begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array} + \begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array} + \begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array} = \begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array}.$$

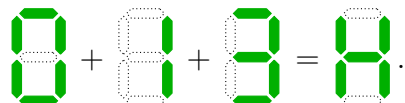
(78) In problem 5(a), “ H ” should be “ \mathcal{J}_{11} ”.

(88) In Example 3.1.6, the second illustration should be:

$$\begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array} + \begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array} + \begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array} = \begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array}.$$

(88) The text on line 3 should read “ \dots linear combination of $\begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array}$, $\begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array}$, and $\begin{array}{|c|} \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline \end{array}$.”

- (104) In two places where “ $x - z$ ” is used in the proof of Theorem 3.1.29, it should read “ $z - x$.”
- (107) In Exercises 13, omit the first occurrence of the word “matrix”.
- (107) In Exercises 14, omit the first occurrence of the word “matrix”.
- (113) In the caption of Figure 3.6, the parenthetical remark should be “(the x_1x_3 -plane)”.
- (118) In Example 3.2.18, the second illustration should be:



- (165) In Example 3.5.6, the coordinate vectors should read “... $[w]_{\mathcal{B}_1}$ and $[w]_{\mathcal{B}_2}$...”.
- (173) In Exercise 10 part (b), the first sentence should read “Consider Dava’s training session distances as vectors in \mathbb{R}^3 .”
- (180) The code output in Section 4.1.4 should read:

```
T =
0.82843    0.50000    0.50000    0.00000
0.00000    0.50000    0.50000    0.82843
0.50000    0.82843    0.00000    0.50000
0.50000    0.00000    0.82843    0.50000
0.00000    0.50000    0.50000    0.82843
0.82843    0.50000    0.50000    0.00000
```

- (202) In Exercise 32, the line segment equation should read: “ $\ell(\lambda) = \dots$ ”.
- (204) In the caption of Figure 4.11, “ $K = T(K)$ ” should read “ $K = T(J)$ ”.
- (219) The text in Definition 4.4.7 should end with “... for every $x \in V$.”
- (225) In Example 4.4.12, the change of basis matrix should include e_1 , e_2 and e_3 , in that order.
- (226) In Theorem 4.4.13, part (b) should read $[\alpha T]_{\tilde{\mathcal{B}}} = \alpha [T]_{\tilde{\mathcal{B}}}$.
- (273) In Example 4.7.54, U and T have been switched in the main body of the example. Also, transformation by U should include a constant of integration, c . It should read as follows.

$$\begin{aligned}
 (T \circ U)(p) &= T(U(p)) \\
 &= T(U(ax + b)) \\
 &= T\left(\frac{a}{2}x^2 + bx + c\right) \\
 &= ax + b \\
 &= p
 \end{aligned}$$

- (321) In Example 5.2.24, the second basis should be $\beta = \{x^2, x, 1\}$.
- (336) The coefficients of the linear dependence relation in Example 6.2.5 should be “ $\alpha_1 = -2$, $\alpha_2 = -1$, and $\alpha_3 = 1$.”
- (338) The final vector in the set S should be $M^3w = \begin{pmatrix} -5 \\ 3 \\ 3 \end{pmatrix}$.
- (341) In the proof of Lemma 6.2.8, the line “ $= M_k(\beta)$ ” should be removed.
- (346) The second eigenspace (for $\lambda_2 = 2$) should have the name \mathcal{E}_{λ_2} .
- (353) In definition 6.2.22, the result should read “ $M = QDQ^{-1}$ ”.
- (371) In Example 6.4.10, the eigenvalue condition should read “ $|\lambda_j| < 1$ for all j ”.
- (376) The Matrix equation presented in Exercise 11 should read

$$y = Ex = \begin{pmatrix} 0.81 & 0.07 & 0.04 & 0.01 \\ 0.08 & 0.64 & 0.01 & 0.08 \\ 0.08 & 0.21 & 0.89 & 0.07 \\ 0.03 & 0.08 & 0.06 & 0.84 \end{pmatrix} \begin{pmatrix} 0.43 \\ 0.08 \\ 0.06 \\ 0.43 \end{pmatrix} \approx \begin{pmatrix} 0.361 \\ 0.121 \\ 0.135 \\ 0.384 \end{pmatrix}.$$

- (376) Question (a) of Exercise 10 should begin “Determine whether or not E is Markov.”
- (376) Question (b) of Exercise 10 should begin “Determine whether or not E^T is Markov.”
- (378) In part (d) of Exercise 12, \mathbb{R}^m should read \mathbb{R}^{m+1} .
- (381) The third condition in Definition 7.1.1 should have u in place of x in all instances.
- (388) The statement of Theorem 7.1.16 should read: “Let $x, y \in \mathbb{R}^n$ and $f : \mathbb{R}^n \times \mathbb{R}^n \rightarrow \mathbb{R}^n$ defined by $f(x, y) = x^T A y$ for some $n \times n$ matrix A . Then f is an inner product on \mathbb{R}^n if and only if A is positive definite.”
- (399) In Exercise 2, the revenue vectors should be labeled b_1, b_2, b_3, b_4 and b_5 , respectively.
- (418) The equation in the first line of text should be “ $\text{proj}_W x = a_1 y + a_2 z$ ”.
- (460) The last two columns of the pseudo-inverse matrix in Example 7.5.21 are out of order. The matrix should be:

$$\frac{1}{12} \begin{pmatrix} 5 & -3 & 3 & -1 & -1 & 3 \\ -1 & 3 & 3 & -1 & 5 & -3 \\ 3 & -1 & -1 & 3 & -3 & 5 \\ -3 & 5 & -1 & 3 & 3 & -1 \end{pmatrix}.$$

(460) The matrix PT in Example 7.5.21 should be

$$PT = \frac{1}{4} \begin{pmatrix} 3 & 1 & 1 & -1 \\ 1 & 3 & -1 & 1 \\ 1 & -1 & 3 & 1 \\ -1 & 1 & 1 & 3 \end{pmatrix}.$$

(460) The vector y following matrix PT in Example 7.5.21 should be

$$y = Tx = \left(7/2 \quad 13/2 \quad 3 \quad 7 \quad 9/2 \quad 11/2\right)^T.$$