

Digital Signal Processing: A Computer-Based Approach

3rd Edition

by

Sanjit K. Mitra

Errata List

Chapter 1

1. Page 4, Eq. (1.1): Replace the lower limit of the integral with “ $-\infty$ ”.

Chapter 2

1. Page 49, Example 2.3, line 4: Replace “Example 2.1” with “Example 2.2”.
2. Page 67, Figure 2.23: Replace “Discrete-time sequence” with “Discrete-time system”.
3. Page 73, last line: Replace “Figure 2.28(a)” with “Figure 2.6(a)”.
4. Page 109, Problem 2.20: Replace “Eq. (2.22)” with “Eq. (2.29)”.
5. Page 110, Problem 2.42: Replace “2.63” with “2.66”.
6. Page 114, Problem 2.79: Replace “Eq. (2.80)” with “Eq. (2.90)”.
7. Page 115, Problem M2.1, Parts (a) and (b): Replace “Program 2_1” with “Program 2_2.”

Chapter 3

1. Page 120, line 6 from bottom: Replace “he” with “the”.
2. Page 143, line 10 from top: Replace “ $X(ej\omega)$ ” with “ $X(e^{j\omega})$ ”.
3. Page 161, Problem 3.5: Replace “ $\sin(2\pi t)$ ” with “ $\sin(t)$ ”.
4. Page 161, Problem 3.6(d): Replace “ $X_a\left(\frac{\Omega}{a}\right)$ ” with “ $X_a\left(j\frac{\Omega}{a}\right)$ ”.
5. Page 162, Problem 3.16: Replace “1..” with “1.”.

6. Page 163, Problem 3.21(d): Replace “ $\frac{j\alpha e^{j\omega}}{(1-\alpha e^{j\omega})^2}$ ” with “ $\frac{-\alpha e^{-j\omega}}{(1-\alpha e^{-j\omega})^2}$ ”.
7. Page 164, Problem 3.37: Replace “ $-3 \leq n \leq 7$ ” with “ $-3 \leq n \leq 6$ ”.
8. Page 166, Problem 3.46: Delete “of each” and replace “systems” with “system”.
9. Page 166, Problem 3.48: Replace “systems” with “system”.
10. Page 166, Problem 3.49(a): Replace “with a frequency” with “and a frequency”.
11. Page 167, Problem 3.56: Replace “ $\delta[n] + a\delta[n-1] + b\delta[n-2]$ ” with “ $a\delta[n] + b\delta[n-1] + \delta[n-2]$ ”.
12. Page 167, Problem 3.61(d): Replace “ $H_b(e^{j\omega})$ ” with “ $H_d(e^{j\omega})$ ”.
13. Page 168, Problem 3.74(a): Replace “ $0 \leq n \leq 3$ ” with “ $0 \leq n \leq 4$ ”.

Chapter 4

1. Page 230, Problem 4.29: Replace “1” in the numerator of $H_{HP}(s)$ with “ s^3 ”.

Chapter 5

1. Page 246, Line 2 below Eq. (5.52): Replace “circshift” with “circshift1”.
2. Page 263, line 2 from bottom: Replace “5.30” with “5.31”.
3. Page 266, Eq. (5.122): Replace “ $\{H[k]\} = \{6 \ 1-j \ 0 \ 1+j\}$ ” with “ $\{H[k]\} = \{6 \ 1-j \ 0 \ -1+j\}$ ”.
4. Page 290, Problem 5.12: Replace “ $x_1[n] = \left(x[n] + x\left[\frac{N}{2} + n\right]\right)W_N^n$ ” with “ $x_1[n] = \left(x[n] - x\left[\frac{N}{2} + n\right]\right)W_N^n$ ”.
5. Page 291, Problem 5.15: Replace “ $h[n] = \begin{cases} 0, & 0 \leq n \leq N-1, \\ x[n], & N \leq n \leq 2N-1. \end{cases}$ ” with “ $h[n] = \begin{cases} 0, & 0 \leq n \leq N-1, \\ x[n-N], & N \leq n \leq 2N-1. \end{cases}$ ”.
6. Page 291, Problem 5.16: Replace “and $H[k]$ ” with “ $H[k]$, and $X[k]$ ”.
7. Page 293, Problem 5.34, Part (b): Replace “ $X[6]$ ” with “ $X[5]$ ”.

8. Page 293, Problem 5.35: Replace “first 6” with “first 7”, “15” with “ $2 + j$ ”, and “ $2 + j$ ” with “15”.
9. Page 293, Problem 5.38: Replace “ $X[7]$ ” with “ $X[8]$ ”.
10. Page 293, Problem 5.41: Replace “ $X[k_4] = -3.4 + j5.9$ ” with “ $X[k_4] = -3.4 - j5.9$ ”.
11. Page 294, Problem 5.43: Replace “ $-2 \ 4$ ” with “ $-2, 4$ ”.
12. Page 294, Problem 5.44: Replace “,” with “,” and “ $e^{j2\pi/3}$ ” with “ $e^{j2\pi n/3}$ ”.
13. Page 294, Problem 5.49: Replace “even” with “real” and replace “odd” with “imaginary”.
14. Page 295, Problem 5.51: Replace “ $M = N = 3$ ” with “ $M = N = 4$ ”.
15. Page 295, Problem 5.54, Part (b): Replace “ $\pi/5$ ” with “ $\pi/4$ ”.
16. Page 295, Problem 5.58, Part (b): Replace “15” with “21”.
17. Page 297, Problem 5.62: Replace “ $[17 \ -17 \ -17 \ 17]$ ” in the third row of the matrix \mathbf{H}_N with “ $[13 \ -13 \ -13 \ 13]$ ” and the fourth row “ $[7 \ -7 \ 7 \ -7]$ ” with “ $[7 \ -17 \ 17 \ -7]$ ”, and replace “ $[1 \ -1 \ -1 \ 17]$ ” in the third row of matrix \mathbf{G}_N with “ $[1 \ -1 \ -1 \ 1]$ ”.

Chapter 6

1. Page 310, Line 11 from bottom: Replace “factor” with “factorize”.
2. Page 344, Eq. (6.108): Replace “ $0.3z + -0.18$ ” with “ $0.3z - 0.18$ ”.
3. Page 345, Problem 6.23: Replace it with the following: “Determine the z -transform of each of the following left-sided sequences:
(a) $x[n] = \alpha^n \mu[-n - 1]$, (b) $y[n] = (n + 1)\alpha^n \mu[-n - 1]$.”
3. Page 349, Problem 6.44: Replace “ $\frac{1 - \alpha z^{-2}}{1 - 2\alpha \cos(\omega_c)z^{-1} + \alpha^2 z^{-2}}$ ” with “ $\frac{1 - z^{-2}}{1 - (1 + \alpha)\cos(\omega_c)z^{-1} + \alpha z^{-2}}$ ”, and replace “ $1/(1 - \alpha)$ ” with “ $2/(1 - \alpha)$ ”.
4. Page 350, Problem 6.52: Replace it with the following: “Let $H(z)$ be the transfer function of a causal, stable LTI discrete-time system. Consider the transfer function

$G(z) = H(z)|_{z=F(z)}$. What are the conditions that need to be satisfied by the transformation $F(z)$ so that remains stable?"

5. Page 350, Problem 6.53: Replace it with the following: "Determine the z -transform $F(z)$ of the Fibonacci sequence $\{f[n]\}$ of Problem 2.70. Evaluate the inverse z -transform of $F(z)$.

6. Page 351, Problem 6.58: Replace " $\tau_g(\omega) = \frac{H(z) + H(z^{-1})}{2} \Big|_{z=e^{j\omega}}$." with

" $\tau_g(\omega) = \frac{T(z) + T(z^{-1})}{2} \Big|_{z=e^{j\omega}}$," and add at the bottom of the equation "where

$$T(z) = z \frac{dH(z)/dz}{H(z)}."$$

Chapter 7

- Page 367, line 3 from top: Replace the second " $H_1(z)$ " with " $H_2(z)$ ".
- Page 418, Problem 7.49: Replace it with "If $H(z)$ is a bandpass filter with passband edges at ω_{p1} and ω_{p2} , and stopband edges at ω_{s1} and ω_{s2} , with $\omega_{s1} < \omega_{p1} < \omega_{p2} < \omega_{s2}$, what type of filter is $H(-z)$? Determine the locations of the bandedges of $H(-z)$ in terms of the bandedges of $H(z)$."
- Page 418, Problem 7.53: Replace " $-j0.3$ " with " $-j$ ".
- Page 421, Problem 7.79: Replace " $0.5 - 0.4z^{-1} + 0.8z^{-2} + 0.8z^{-3} - 0.4z^{-4} + 0.5z^{-5}$," with " $-0.1 + 0.5z^{-1} + 0.05z^{-2} + 0.05z^{-3} + 0.5z^{-4} - 0.1z^{-5}$ ".
- Page 423, Problem 7.89, Part (b): Replace " $0.2(1 - z^{-2})$ " with " $0.1(1 - z^{-2})$ ".
- Page 423, Problem 7.90, Part (b): Replace " $4.5 + 6z^{-1} + 6z^{-2} + 4.5z^{-3}$," with " $3 + 7.5z^{-1} + 7.5z^{-2} + 3z^{-3}$ ".
- Page 425, Problem M7.5: Replace " $1 - 0.2742z^{-2} + z^{-3}$ " with " $1 - 0.2742z^{-1} + z^{-2}$ ".
- Page 425, Problem M7.7: Replace "(7.64)" with "(7.71)".
- Page 425, Problem M7.8: Replace "(7.67)" with "(7.74)".

Chapter 8

1. Page 483, Problem 8.35: Replace “realizes” with “is” and replace “transfer” with “filter”.
2. Page 484, Problem 8.37: Replace “multipliers” with “delays”.
3. Page 484, Problem 8.39: Replace “3H” with “3B”, and “multipliers” with “delays”.
4. Page 485, Problem 8.48, Part (c): Replace “0.3885” with “0.5414”, and “0.2543” with “0.0757”.
5. Page 485, Problem 8.48, Part (d): Replace “0.3646” with “0.4547”, and “0.147” with “-0.2859”.

6. Page 488, Problem M8.7: Replace

$$\text{“}G(z) = \frac{0.3288(1 + 0.8917z^{-1} + 1.6721z^{-2} + 1.6721z^{-3} + 0.8917z^{-4} + z^{-5})\text{” with}$$
$$\text{“}G(z) = \frac{0.2801(1 - 0.6006z^{-1} + 1.0338z^{-2} + 1.0338z^{-3} - 0.6006z^{-4} + z^{-5})\text{”}.$$

7. Page 488, Problem M8.8: Replace

$$\text{“}G(z) = \frac{0.2879(1 + 0.1318z^{-1} + 1.1861z^{-2} - 1.1861z^{-3} - 0.1318z^{-4} - z^{-5})\text{” with}$$
$$\text{“}G(z) = \frac{0.2876(1 + 0.1318z^{-1} + 1.1861z^{-2} - 1.1861z^{-3} - 0.1318z^{-4} - z^{-5})\text{”}.$$

Chapter 9

1. Page 517, Problem 9.8: Replace it with “Using Eq. (9.58), develop the expression for the causal digital transfer function $G(z)$ obtained from the causal analog transfer function $H(s) = \frac{A}{s+\alpha}$ via the impulse invariance method.

2. Page 520, Eq. (9.60): Replace it with “ $G_{LP}(z) = \frac{0.1944(1 + 0.9802z^{-1} + z^{-2})}{1 - 0.7016z^{-1} + 0.281z^{-2}}$ ”.

Chapter 10

1. Page 550, Eq. (10.87a): Replace it with “ $\delta_P^{(F)} = \sqrt{1 + \frac{\delta_P}{1 + \delta_S}} - 1$ ”.

Chapter 11

1. Page 596, Eq. (11.9): Replace the second row of \mathbf{T} with “ $-1 \ 1 \ \delta \ 0 \ 0 \ 0$ ”.

Chapter 12

1. Page 734, Figure P12.8: Replace “0.7” with “0.12”.

Chapter 15

1. Page 915, Figure 15.19: The down-sampling factor of the down-sampler should be M .