Corrections to

Introduction to Signals and Systems
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Chapter 2

1. Page 22, Remark 2.1.5(d): Subscript on $x_o(t)$ should be "o" not "0".

2. Page 24, Equation (2.2.3): First limit of integration should carry a negative sign,

$$\int_{-\infty}^{\infty} f(t)\delta(t-t_0)\, dt$$

3. Page 29, Definition 2.3.2: last line should read

$$f(n) = 0, \quad \text{for all} \quad n < n_0 \quad \text{and} \quad n_1 < n.$$

4. Page 32, Problem 2.1.5, should read " .... Remark 2.1.5."

5. Page 32, Problem 2.1.4: Parts (b) and (c) should read

   (b) Show that the following signal is odd

   $$x_e(t) = \frac{x(t) - x(-t)}{2}$$

   (c) Show that

   $$x(t) = x_e(t) + x_o(t)$$

6. Page 34, Problem 2.3.5(ii), should read

   (ii) $\sin\big((2\pi - \Omega_0)n\big) = \sin(\Omega_0 n)$

Chapter 3

1. Page 46, Figure 3.2.2: Caption should read "Roots of a Second-Order Polynomial"

2. Page 52, Problem 3.2.7: Part (b) should read $a(s) = (s - a + jb)(s - a - jb)$

Chapter 4

1. Page 61, Definition 4.2.2: should read " Let $\vec{v} \neq 0$ be a ... "

Chapter 5

1. Page 71, first line of second paragraph: should read " ... voltage and at time $t = 5$ we ... "

2. Page 72, Example 5.1.6: first line of second paragraph should read " ... to the mass by a hammer. Clearly ... "

3. Page 77, Example 5.2.3: ..... Definition 2.2.5

4. Page 101, Problem 5.3.3(viii): The signal in Part (viii) should read

$$x(t) = \sum_{k=-2}^{2} (-1)^k \Lambda(t-2k)$$

5. Page 103, Problem 5.4.3: The second message sequence should read $\tilde{b} = \{b_1 \quad b_2 \quad b_3\} = \{0.1 \quad 0.6 \quad 0.4\}$

Chapter 7

1. Page 139, Equation(7.1.13), should have a (-2) on second line:

$$b_m = \frac{2}{T_0}\int_{T_0} x(t)\sin(m\omega_0 t)\,dt = \frac{2}{T_0}\left[\int_{-\frac{1}{2}}^{\frac{1}{2}} \sin(m\omega_0 t)\,dt - \int_{\frac{1}{2}}^{\frac{3}{2}} 0\,dt\right] \tag{7.1.13}$$

$$= \frac{-2}{T_0 m\omega_0}\left[\cos\left(\frac{m\omega_0}{2}\right) - \cos\left(-\frac{m\omega_0}{2}\right)\right] = 0.$$

2. Page 144, Equation (7.2.5) should read

$$\frac{b_m}{a_m} = -\frac{A_m \sin\theta_m}{A_m \cos\theta_m} = -\tan\theta_m. \tag{7.2.5}$$

3. Page 174, Table 7.6.1, Entry (2,3) should be $X_m = \frac{1}{2}\left(a_m - jb_m\right)$

4. Page 177, Table 7.6.3, 4th row: element symbol to ε

5. Page 179, Problem 7.2.2(vi) include "m ≠ 0"

6. Page 179, Problem 7.2.2(v): should read

(v) $$x(t) = 1 + \sum_{\substack{m=-\infty \\ m\neq 0}}^{\infty} \frac{1}{|m|} e^{j\left(\frac{m\pi}{4}\right)} e^{j2mt}$$

7. Page 180, Problem 7.2.4(ii): Should read "m = 1"

8. Page 180, Problem 7.2.4(iv): Should read "$\cos(m\omega_0 t)$"

9. Page 181, Problem 7.3.1, Figure P7.3.1: Amplitude = 2

10. Page 184, Problem 7.4.3 should read

(a) $$X(\omega) = 2\int_0^{\infty} x(t)\cos(\omega t)\,dt.$$

11. Page 184, Problem 7.4.4 should read

(a) $X(\omega) = -j2\int_0^{\infty} x(t)\sin(\omega t)\,dt.$

12. Page 184, Problem 7.4.5 should read" ... its even and odd parts $x(t) = x_e(t) + x_o(t)$, ... "

13. Page 185, Problem 7.51(ii): Should read $x(t) = \sin(\omega_0 t)$

14. Page 186, Problem 7.5.4: Should read

$$\mathcal{F}\left\{\Pi\left(\frac{t-\frac{\varepsilon}{2}}{\varepsilon}\right)\sin(\tfrac{\pi}{\varepsilon}t)\right\} = \mathcal{F}\left\{\Pi\left(\frac{t}{\varepsilon}\right)\cos(\tfrac{\pi}{\varepsilon}t)\right\}e^{-j\frac{\omega\varepsilon}{2}}.$$

Chapter 8

1. Page 236: There is a sign error in equations (8.7.14) and (8.7.16). These equations should read:

$$\frac{2}{T_0}\int_{-\tau_1}^{\tau_1}\cos(\omega_0 t)\cos(\omega_0 t)\,dt = \frac{2\tau_1}{T_0} + \frac{1}{2\pi}\sin(2\omega_0\tau_1). \tag{8.7.14}$$

$$a_1 = \frac{2\tau_1}{T_0} + \frac{1}{2\pi}\sin(2\omega_0\tau_1) - \frac{4}{T_0\omega_0}v_{max}\sin(\omega_0\tau_1), \tag{8.7.16}$$
$$a_m = \frac{2\tau_1}{T_0}\left[\mathrm{Sa}\big((m-1)\omega_0\tau_1\big) + \mathrm{Sa}\big((m+1)\omega_0\tau_1\big)\right] - \frac{4v_{max}}{mT_0\omega_0}\sin(m\omega_0\tau_1).$$

2. Page 248, Problem 8.2.2: The signal $s(t)$ should be defined as $s(t) = \sum_{m=0}^{3} a(m)\tilde{b}(t - mT_b)$.

3. Page 249, Problem 8.3.3: In Part (iii): Write the signal as $x(t) = \sin(\omega_1 t)\Pi(t)$

4. Page 250, Problem 8.4.1: Write the signal as $x(t) = A\sin(\omega_1 t)$

Chapter 9

1. Page 261, Theorem 9.1.7: constrain the ROC to the RHP

2. Page 286, Problem 9.2.1 should read " .. 9.1.2"

3. Page 289, Problem 9.5.1: Second sentence: "Fourier transform" spell

Chapter 10

1. Page 299, Equation (10.1.19): subscript error, "$(s - p_m)$" should read "$(s - p_n)$"

2. Page 342, Problem 10.1.11: Part (c) should read " ... contrast the step response ..."

3. Page 342, Problem 10.1.7: Part (c) should read: " ... current through the capacitor, $i_c(t)$."

4. Page 343, Problem 10.2.1: Problem should read: $\dfrac{Y_1(s)}{X_1(s)} = H_1(s) = \dfrac{100}{s^2 + 6s + 100}$

Part (c) should read: ' ... feedback configuration where $Y_1(s)$ is to be the output signal ...'

5. Page 344, Problem 10.2.4: Part (a) should read

(a) Find the transfer function

$$\frac{Z(s)}{R(s)} = S(s)$$

Part (b): Assume that $H_2(s) = 1$.

6. Page 346, Problem 10.3.2: Part (a) should read: $I(s) = I_r(s) + I_c(s)$ and $V_a(s) = \dfrac{Q_c(s)}{C} = \dfrac{I_c(s)}{sC}$

7. Page 348, Problem 10.3.8: Part (c) should read: "... voltage across the capacitor, $v_c(t)$."

Chapter 11

1. Page 402, Problem 11.5.5: Part (a): The second equation should read

$$m_2\ddot{y}_2(t) = -c_2(\dot{y}_2(t) - \dot{y}_1(t)) - c_3(\dot{y}_2(t) - \dot{y}_3(t)) - k_2(y_2(t) - y_1(t)) - k_3(y_2(t) - y_3(t))$$

Part (b): The first equation should read $\vec{q}(t) = \begin{bmatrix} \vec{y}(t) \\ \dot{\vec{y}}(t) \end{bmatrix}$.

Chapter 12

1. Page 424, Example 12.4.2: The transfer function in (12.4.4) should have a $\dfrac{1}{RC}$ in the numerator. Equations (12.4.5-6) must be modified accordingly.

2. Page 429, Problem 12.1.4: Part (i) should read $\Pi\left(\dfrac{t}{\varepsilon}\right) * \Pi\left(\dfrac{t}{\varepsilon}\right) = \varepsilon\Lambda\left(\dfrac{t}{2\varepsilon}\right)$

3. Page 431, Problem 12.2.2: $h(t)$ is a pulse of width 4.

4. Page 432, Problem 12.2.7: Assume that this signal doesn't repeat.

5. Page 433, Problem 12.3.1: Also assume that $D = 0$ in the state space representation.

Chapter 13

Chapter 14

1. Page 525, Definition 14.7.2: "ω_s" should read "ω_c"

2. Page 549, Problem 14.6.4: Identify 800 Hz as center frequency of passband.

3. Page 548, Problem 14.5.1: should read R_i = 10 kΩ

Chapter 15

1. Page 601, Problem 15.3.4: In Part (g): ".... frequency response function **squared** ... "

2. Page 606, Problem 15.4.7: _The magnitude of the frequency response function has a value of 1.

3. Page 611, Problem 15.4.15: In Part (e): $\omega_n = 10$

Chapter 16

1. Page 647, Last full paragraph: include discussion of **squeeze** command

Chapter 17

1. Page 683, Problem 17.4.1: Parts (iii) and (iv) should read:

(iii) $x(n) = \sin(0.2\pi n)$
(iv) $x(n) = \sin(0.45\pi n)$

Chapter 18

1. Page 715, Table 18.5.4: the first entry should read: $x(n) = 1 \quad \leftrightarrow \quad 2\pi\delta(\Omega)$

Chapter 19

1. Page 727, Figure 19.1.2b: Caption should read "Ideal sampling function $\sigma(t)$"

2. Page 743, Figure 19.4.1 didn't print

3. Page 747, Figure 19.4.4 and 19.4.5 are switched

4. Page 759, Problem 19.3.5: Part (b): Plot only the amplitude spectrum of $x(t)$.

5. Page 761, Problem 19.4.5: Change "β" to "B"

6. Page 762, Problem 19.5.3: The signal should read:
$x(t) = \left[\omega_c e^{-\alpha t} \sin(\omega_c t)\right] u_s(t), \quad \omega_c = 8, \quad \alpha = 0.2.$

Chapter 20

1. Page 803, Problem 20.2.6: The crosscorrelation is: $r_{xy}(n) = x(n) * y(-n)$

Chapter 21

1. Page 833, Figure 21.3.10: In figure, last delay signal should be "$x(n-3)$".

2. Page 841, Definition 21.5.6: Also page 849: Should read "function $A^n, n \geq 0$"

3. Page 847, last sentence: "A direct form II parallel ..."

4. Page 848, Figure 21.6.4 caption: "Direct Form I Parallel ..."

5. Page 857, Problem 21.6.1: In Part (a) use direct form II.

Chapter 22

1. Page 882, (22.5.3), initial condition should be $e^{A(t-t_0)}\vec{q}(t_0)$

2. Page 888, Problem 22.1.2: Problem should read "Show that this system is causal and linear but it is not time invariant."

3. Page 891, Problem 22.4.1: The system representation should read

$$y(n) = \sum_{k=-\infty}^{\infty}\left[(0.5)^{n-k}\sin\left(0.003(n-k)\right)\right]u_S(n-k)x(k).$$

4. Page 892, Problem 22.4.4, Part (i): Correct indexing on coefficients of numerator.

Chapter 23

1. Page 947, Problem 23.2.1: The signal should be: $x(t) = \sin(2.2\pi t)$

2. Page 947, Problem 23.2.2: The transfer function should read $\frac{Y(z)}{X(z)} = H(z) = \frac{0.15z^2}{z^2 - 1.5z + 0.65}$.

3. Page 950, Problem 23.3.9: Add "The center frequency of the passband is 3 kHz."

4. Page 951, Problem 23.4.3: Should read " given in (23.4.8)."

5. Page 952, Problem 23.5.3: Part (a) should read: "Find the frequency response function of this filter."

6. Page 955, Problem 23.6.2: The sampling frequency should be " f_S = 30 Hz. "

7. Page 956, Problem 23.6.4: The signal should be: $x(t) = \mathrm{Sa}(5t)\cos(15t)$