

Errata: Signals, Systems, and Transforms by Phillips and Parr.

- Page 2 Continuous time signals are incorrectly called analog signals. Analog refers to a signal whose range of values is continuous (continuous amplitude). This distinction is especially relevant in the discrete time portion of the text where the signals considered are analog *discrete time* signals. (Lathi pg. 87)
- Page 2 Discrete time signals are incorrectly called digital signals. Digital refers to a signal whose range of values is discrete (discrete amplitude). This distinction is especially relevant in the discrete time portion of the text where the signals considered are *analog* discrete time signals. (Lathi pg. 87)
- Page 3 Complexity of the model does not lead to the necessity of computer (numerical) solutions. Rather, it is the nonlinearity of the system that leads to this necessity. High order models of linear systems may be solved analytically. However, even simple nonlinear models may require a numerical solution.
- Page 67 The definition given for a linear system is incomplete. In general, a system is linear if: 1) The system satisfies the decomposition property, $y(t) = y_{ZSR}(t) + y_{ZIR}(t)$. 2) The zero state response must obey the principle of superposition with respect to the forcing function. 3) The zero input response must obey the principle of superposition with respect to the initial conditions. (Lathi pg. 80)
- Page 105 The natural response and the zero input response are not the same. In general, the natural response is composed of two components, the natural response of the system to its initial conditions and the natural response of the system to its forcing function. The zero input response of the system is the natural response of the system due only to the system's initial conditions and is independent of the forcing function. (Lathi pg. 80)
- Page 105 The forced response and the zero state response are not the same. The forced response of the system is the component of the system's total response that has the same "form" as the forcing function. The zero state response of the system is the natural and forced response of the system to the forcing function. (Lathi pg. 80)
- Page 114 Example 3.14 gives the steady state response of the system as $y_{ss}(t) = 8H(0) - 5H(-6)e^{-6t} + 3|H(j4)|\cos(4t + 30^\circ + \angle H(j4))$. This is actually the forced response of the system. In steady state ($t \rightarrow \infty$) the exponential decay goes to zero. The correct steady state solution is $y_{ss}(t) = 8H(0) + 3|H(j4)|\cos(4t + 30^\circ + \angle H(j4))$.

- Page 115 In table 3.1, the second line has a typo and should read $Xe^{s_1 t} \rightarrow XH(s_1)e^{s_1 t}; X = |X|e^{j\phi}$.
- Page 206 In equation 5.35 the upper sum limit on the left (time domain) sum is missing. Also, the index is missing in the exponential of the left summand. Equation 5.35 should read
$$\sum_{k=-\infty}^{\infty} C_k e^{jk\omega_0 t} \xleftrightarrow{\mathfrak{F}} 2\pi \sum_{k=-\infty}^{\infty} C_k \delta(\omega - k\omega_0).$$
- Page 213 The transform pair for $\sin(\omega_0 t)$ is missing a minus sign between the impulse functions. It should read $\sin(\omega_0 t) \leftrightarrow \frac{\pi}{j} (\delta(\omega - \omega_0) - \delta(\omega + \omega_0))$.
- Page 213 The third to last transform pair is incorrect. There shouldn't be a $u(t)$ following the time exponential on the left (time) side and the ω in the denominator of the right (frequency) side should be superscripted with 2 rather than subscripted with 2. It should read $e^{-a|t|}, \text{Re}\{a\} > 0 \leftrightarrow \frac{2a}{a^2 + \omega^2}$. (Lathi pg. 257, although he considers the case where a is real)
- Page 213 The transform pair presented in equation 5.35 (last entry on the table) is incorrect in the table as well. It should read
$$\sum_{k=-\infty}^{\infty} C_k e^{jk\omega_0 t} \xleftrightarrow{\mathfrak{F}} 2\pi \sum_{k=-\infty}^{\infty} C_k \delta(\omega - k\omega_0).$$
- Page 258 Table 6.1 lists the first order Chebyshev polynomial as $C_1(v) = 32v$. This contradicts equation 6.9 which gives the correct polynomial as $C_1(v) = v$. (Lathi pg. 514)
- Page 269 The eleventh line of text (just below the equation $y(t) = x(t)\cos(\omega_c t)$) reads "Again using Euler's...". It should read "Again using Euler's...".
- Page 287 In figure P6.16 the triangular spectrum should be labeled $X(\omega)$.
- Page 287 In figure P6.17 the triangular spectrum should be labeled $M(\omega)$.
- Page 413 The definition of memory is incomplete. The autoregressive filter $y[n] = x[n] + y[n-1] + y[n-2]$ is memoryless by the given definition. However, it clearly has memory.
- Page 417 The definition given for a linear system is incomplete. In general, a system is linear if: 1) The system satisfies the decomposition property, $y(t) = y_{\text{ZSR}}(t) + y_{\text{ZIR}}(t)$. 2) The zero state response must obey the principle of superposition with respect to the forcing function. 3) The zero input response

must obey the principle of superposition with respect to the initial conditions. (Lathi pg. 80)

Page 449 The solution to example 10.10 is not in agreement with the solution to example 10.4. The error results by assuming the wrong initial condition. Example 10.10 gives the assumption that the first order system is at rest. It then concludes incorrectly that the initial condition is $y[0] = 0$. The correct initial condition is $y[-1] = 0$. Generally, when an N^{th} order system is “at rest”, $y[-1] = y[-2] = \dots = y[-N] = 0$. (Lathi pg. 574)

Page 450 The natural response and the zero input response are not the same. In general, the natural response is composed of two components, the natural response of the system to its initial conditions and the natural response of the system to its forcing function. The zero input response of the system is the natural response of the system due only to the system’s initial conditions and is independent of the forcing function. (Lathi pg. 80)

Page 450 The forced response and the zero state response are not the same. The forced response of the system is the component of the system’s total response that has the same “form” as the forcing function. The zero state response of the system is the natural and forced response of the system to the forcing function. (Lathi pg. 80)

Reference

Lathi, B. P., *Signal Processing & Linear Systems*, Berkeley Cambridge Press, Carmichael, CA, 1998.