

Feb. 27, 2018

**Errata for the 2nd & 3rd Printings of the American
(blue and green front cover) version of
"Understanding Digital Signal Processing, 3/E",**

by Richard Lyons

I beg your pardon for the typographical errors in the book.
It will not take long to make these corrections. I promise.

-Rick Lyons-

Page 47: The text in the first line of page 47 should
be changed from

"... in Figures 2-9(c) and 2-9(d)."

to:

"... in Figures 2-9(a), 2-9(b), and 2-9(e)."

[Found by Walter Schulte (6/6/11)]; [Author Error]

Page 47: In Figure 2-10 the strange 'ñ' characters should
be minus signs.

[Found by Author (9/14/11)]; [Production Error]

Page 56: On the left side of Figure P2-19 the label:

"±1000"

should be changed to:

"-1000".

[Found by Author (9/14/11)]; [Production Error]

Page 96: In the second line of Section 3.10, the text:

"... in Section 3.16, for ..."

should be changed to:

"... in Section 3.13, for ...".

[Found by Anonymous (11/27/11)]; [Author Error]

Page 97: In the sixth line from the bottom of the page, the
value:

"... or -1.45 dB, ..."

should be changed to:

"... or **-1.72** dB, ...".

[Found by Rajeev Krishnamurthi (4/10/12)]; [Author Error]

Page 107: The last term in Equ. (3-37) has a missing minus sign in its exponent. The last term should be:

$$\dots + e^{-jq(K-1)}].$$

[Found by Stan Moore, (3/19/12.)][Production Error]

Page 112: In the second line down from the top of the page, the text:

"... width of the main lobe ... "

should be changed to:

"... first zero-crossing ... "

[Found by Richard Lavery (8/20/14)]; [Author Error]

Page 120: Here's a truly strange error by the typesetting people. Equation (3-51), printed as:

$$\sum_{n=-\infty}^{\infty} x(n)e^{-jon}$$

should be changed to:

$$X(\omega) = \frac{\sin(N\omega/2)}{\sin(\omega/2)}.$$

[Found by Stan Shear (4/3/13)]; [Production Error]

On page 144, in Figure 4-2, the lower right four twiddle factors:

$$W_8^4, W_8^5, W_8^6, W_8^7$$

should be

$$-W_8^0, -W_8^1, -W_8^2, -W_8^3$$

[Found by Saul Iverson, 10/3/17.][Author Error]

Page 187: In the line just above Eq. (5-10), the text:

"... as Eq. (3-59), is ... "

should be changed to:

"... as Eq. (3-**47**), is ... "

[Found by Stan Shear (4/4/13)]; [Author Error]

Page 211: In the third line of the last paragraph the text:

"slope of the $H_\phi(m)$ response ..."

should be:

"negative of the slope of the $H_\phi(m)$ response ..."

[Found by Edward Beadle (7/19/16)]; [Production Error]

Page 227: The third term on the right side of Eq. (5-35)

"... $h(2)e^{-j0\omega}$..."

should be:

"... $h(2)e^{-j2\omega}$...".

[Found by Mark Tachiki (11/28/13)]; [Author Error]

Page 277: The second minus sign in the denominator of Eq. (6-27) should be a plus sign. That equation should be:

$$H(\omega) = \frac{\sum_{k=0}^N b(k) \cdot \cos(k\omega) - j \sum_{k=0}^N b(k) \cdot \sin(k\omega)}{1 - \sum_{k=1}^M a(k) \cdot \cos(k\omega) + j \sum_{k=1}^M a(k) \cdot \sin(k\omega)}$$

[Found by Bert RAM Aerts (8/20/14)]; [Production Error]

Page 278: In the 3rd line from the top, the expression:

" $-\pi \leq \omega \leq +\omega$ "

should be changed to:

" $-\pi \leq \omega \leq +\pi$ "

[Found by Mark Tachiki (12/5/13)]; [Author Error]

Page 278: The last term in Eq. (6-28)

"... $-0.436 \cdot (n-2)$..."

should be changed to:

"... $-0.436 \cdot \mathbf{Y}(n-2)$..."

[Found by Yancen Li (7/13/14)]; [Production Error]

Page 297: In the 7th line up from the bottom of the page, the text printed as:

" $(3!)^2 = 24$ "

should be changed to:

$$(3!)^2 = 36$$

[Found by Bert RAM Aerts (8/30/14)]; [Production Error]

Page 298: In the center Section 2 portion of Figure 6-27, the printed

b'(0)

should be changed to:

b''(0)

[Found by Yancen Li (8/11/14)]; [Author Error]

Page 304: In Figures 6-32(b) and 6-32(c), the 'p' letters in the frequency axes should be the Greek symbol ' π '.

[Found by Author (7/11/16)]; [Production Error]

Page 317: In the eleventh line below Eq. (6-104)

"... 6-21(b). Knowing that ..."

should be changed to:

"... 6-22(c). Knowing that ..."

[Found by Yancen Li (7/14/14)]; [Author Error]

Page 324: In the third line from the bottom of the page, the text

"...in the form of Eq. (6-43)."

should be changed to:

"...in the form of Eq. (6-60)."

[Found by Yancen Li (8/11/14)]; [Author Error]

Page 329: In the fourth line from the top of the page, the text

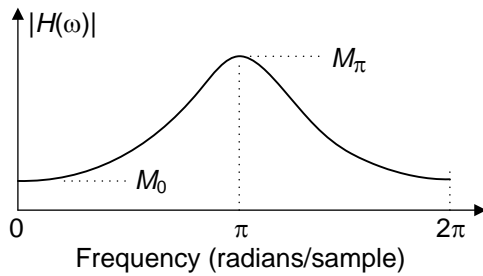
"...design filter in Figure 6-28(a)... "

should be changed to:

"...design filter in Figure 6-36(a)... "

[Found by Yancen Li (8/11/14)]; [Author Error]

Page 345: The right side of Figure P6-26 should look like the following:



[Found by Kip Haggerty (11/22/14)]; [Production Error]

Page 366: The denominators in Eq. (7-10) printed as:

$$h_{\text{SL1}}(k) = \frac{-1}{6}, \frac{8}{6}, 0, \frac{-8}{6}, \frac{1}{6} \quad (7-10)$$

should be changed to:

$$h_{\text{SL1}}(k) = \frac{-1}{12}, \frac{8}{12}, 0, \frac{-8}{12}, \frac{1}{12} \quad (7-10)$$

[Found by Author (4/20/14)]; [Author Error]

Page 366: The denominators in Eq. (7-11) printed as:

$$h_{\text{SL2}}(k) = \frac{-22}{126}, \frac{67}{126}, \frac{58}{126}, 0, \frac{-58}{126}, \frac{-67}{126}, \frac{22}{126} \quad (7-11)$$

should be changed to:

$$h_{\text{SL2}}(k) = \frac{-22}{252}, \frac{67}{252}, \frac{58}{252}, 0, \frac{-58}{252}, \frac{-67}{252}, \frac{22}{252} \quad (7-11)$$

[Found by Joseph Galante (4/15/14)]; [Author Error]

Page 384: In the sixth line of the paragraph following Eq. (7-31'), the figure callout:

"... in Figure 7-34(b). "

should be changed to:

"... in Figure 7-16(b). "

[Found by Jérôme Leclère (10/9/13)]; [Author Error]

Page 463: In the 3rd line up from the bottom of the page, the text:

"... and use Eq. (2-13) with $m_{\text{odd}} = 5$ to set ..."

should be changed to:

"... and use Eq. (2-11) with $k = 3$ to set ..."

[Found by Jiwoo Kim, (2/5/12)]; [Author Error]

Page 467: In Problem 8.9, the minus sign in the denominator should be a plus sign. The following is correct.

$$\tan(\alpha) = \frac{e^{j\alpha} - e^{-j\alpha}}{j(e^{j\alpha} + e^{-j\alpha})}.$$

[Found by Lee Fugal, (1/5/13)]; [Author Error]

Page 510: In the 12th line, the text:

"... band B_v , the ..."

should be changed to:

"... band B' , the ...".

[Found by Jiwoo Kim, (1/12/12)]; [Author Error]

Page 512: Eq. (10-3) contains two inappropriate small 'a' characters. The printed Eq. (5-3) should be changed to:

$$N \approx \frac{\textit{Atten}}{22(f_{\text{stop}} - f_{\text{pass}})} = \frac{60}{22(2.2/400 - 1.8/400)} \approx 2727$$

[Found by Author, (6/16/11)]; [Production Error]

Page 515: In **Figure 10-5(c)** the **frequency axis labels marked**

$(-3f_{s,\text{old}}$ and $(3f_{s,\text{old}}$

should be:

$(-3f_{s,\text{new}}$ and $(3f_{s,\text{new}}$).

[Found by Author, (2/25/17)]; [Author Error]

Page 556: On the left side of Figure 10-35 all instances of

"±"

characters should be changed to:

"-", minus signs.

[Found by Author, (9/14/11)]; [Production Error]

Page 557: On the left side of Figure 10-36 all instances of

"±" characters should be changed to "-", minus signs.

[Found by Author, (9/14/11)]; [Production Error]

Page 574: In the next to the last line before Figure P10-11, the complex-valued expression:

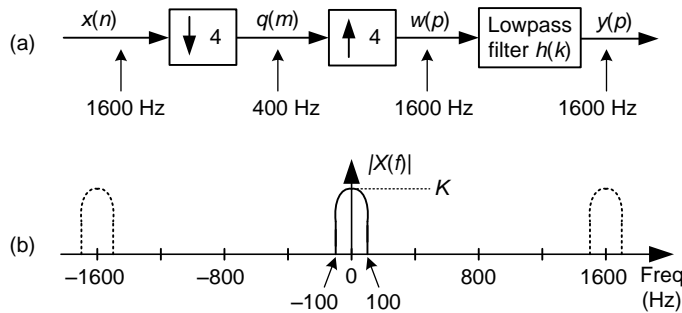
$$e^{-j2n/4}$$

should be changed to:

$$e^{-j2\pi n/4}$$

[Found by Renato Lopes, (10/29/13)]; [Author Error]

Page 578: For some reason the wrong figure was printed for Figure P10-17. The correct Figure P10-17 is:



[Found by Prof. Renato da Rocha Lopes (9/17/13)]; [Production Error]

Page 614: Eq. (11-36) has a missing π character. That equation should be:

$$\alpha = \cos(2\pi f_c/f_s) - 1 + \sqrt{\cos^2(2\pi f_c/f_s) - 4 \cos(2\pi f_c/f_s) + 3} \quad (11-36)$$

[Found by Zachary Blackwell (2/27/18)]; [Typesetting Software Error]

Page 604: In the second line of Eq. (11-20'), the 2nd term in parenthesis:

$$(-0.9239 + j0.3827)$$

should be changed to:

$$(-0.9239 - j0.3827)$$

[Found by Jérôme Leclère (10/9/13)]; [Author Error]

Page 648: On the 2nd and 3rd lines down from the top, the references to Eqs. (D-11) and (D-12) should be changed to Eqs. (D-28) and (D-29).

[Found by Prof. Kip Haggerty (1/1/16)]; [Author Error]

Page 673: In Figure 13-2(b) and 13-2(d), the vertical axes should be labeled ' $\phi(m)$ ' and ' $\phi_{1,-1}(m)$ ' respectively.

[Found by Jiwoo Kim (2/18/12)]; [production Error]

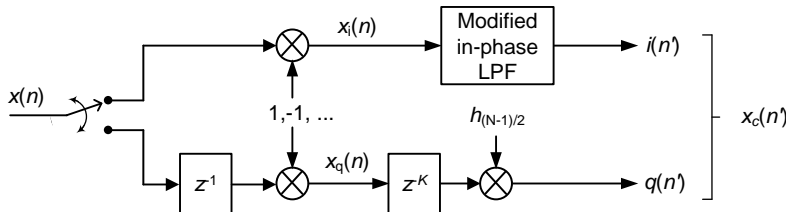
Page 675: In Figures 13-4(b) and 13-4(c), the hyphens, "-", near the vertical axes' $\phi_I(m)$ and $\phi_Q(m)$ labels should be ignored.

[Found by Jérôme Leclère (10/9/13)]; [Production Error]

Page 678: in the fifth line down, delete the text:

"...followed by another K delay..."

In Figure 13-6(c) the final z^{-K} delay block should be deleted making that figure become:



[Found by Brian Frantz, 8/8/17.] [Author Error]

Page 682: In the second part of Equation (13-7), printed as:

$$|V| = \begin{cases} \text{Max} + \text{Min}/8, & \text{if } \text{Min} < 3\text{Max}/8 \\ 27\text{Max}/32 + 19\text{Min}/16, & \text{if } \text{Min} \geq 3\text{Max}/8 \end{cases} \quad (13-7)$$

the "19" should be changed to a "9", making the equation look like:

$$|V| = \begin{cases} \text{Max} + \text{Min}/8, & \text{if } \text{Min} < 3\text{Max}/8 \\ 27\text{Max}/32 + 9\text{Min}/16, & \text{if } \text{Min} \geq 3\text{Max}/8 \end{cases} \quad (13-7)$$

[Found by Author (4/2/11)]; [Author Error]

Page 683: On the left side of the third line up from the bottom of Table 13-2, in the expression:

$$27\text{Max}/32 + 19\text{Min}/16$$

the "19" should be changed to a "9", making the expression look like:

$$27\text{Max}/32 + 9\text{Min}/16$$

[Found by Author (4/2/11)]; [Author Error]

Page 741: In the first line of Table 13-4, the two values:

Real multiplies	Real additions
4N	2N

should be changed to:

Real multiplies	Real additions
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[Found by Pavel Rajmic (3/5/14)]; [Author Error]

Page 748: In the first line of Table 13-5, the four values:

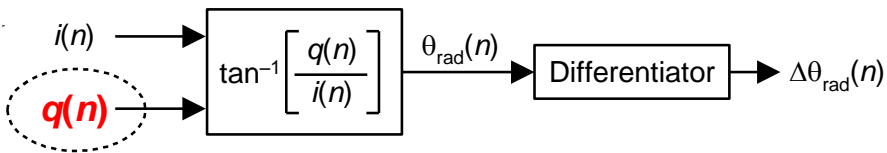
Real multiplies 4N	Real additions 2N	Real multiplies 4N	Real additions 2N
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should be changed to:

Real multiplies 2N	Real additions 2(N-1)	Real multiplies 2N	Real additions 2(N-1)
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[Found by Author (3/5/14)]; [Author Error]

Page 759: In Figure 13-60, the the two inputs to the arctangent operation should be:



[Found by Kendall Castor-Perry (8/10/12)]; [Production Error]

Page 805: In the third line of the first paragraph the text:

"... in Figure 13-92(c),"

should be changed to:

"... in Figure 13-**91**(c),"

[Found by Les Mills (5/3/11)]; [Author Error]

Page 828: The π symbols in the exponents of both sides of Eqs. (13-170) and (13-170') are missing. The equations should be:

$$e^{-j2\pi(m+N/2)/N} = -e^{-j2\pi m/N} \quad (13-170)$$

and

$$e^{-j2\pi(m+N/4)/N} = -je^{-j2\pi m/N} \quad (13-170')$$

[Found by Jérôme Leclère (10/9/13)]; [Production Error]

Page 830: In the fifth line of the first paragraph the text:

"... k(0" k"N-1) ..."

should be:

"... $k(0 \leq k \leq N-1)$..."

[Found by Edward Beadle (7/19/16)]; [Production Error]

Page 840: In the first paragraph following Figure 13-121, that starts with "Ah, but there's ...", there are three instances of the expression:

$$e^{-j2\pi m/N}$$

Those expressions should have the letter "n" inserted in the exponent, making all three expressions read as:

$$e^{-j2\pi nm/N}$$

[Found by Author, 7/9/12.][Author Error]

Page 849: The left side of Equ. (A-5) looks like the following:

$$-r = \frac{\pi\phi_d}{180}.$$

The minus sign should be a Greek ϕ making Eq. (A-5) look like:

$$\phi_r = \frac{\pi\phi_d}{180}.$$

[Found by Stan Moore, 3/19/12.][Production Error]

Page 854: The cube root bar on the right side of Eq. (A-27) should not extend over the angle argument. The right side of Eq. (A-27) should look as follows:

$$\dots = \sqrt[3]{125} e^{j(75^\circ + n360^\circ)/3} \quad (\text{A-27})$$

[Found by Turki Almadhi & John W. Obrien (12/14/11)]; [Production Error]

Page 875: Two corrections: On the left side of the second line of Eq. (D-12), the term:

"... $-\cos(\omega t)$]" ...

should be changed to:

"... $-\cos(2\omega t)$]" ...

On the right side of the second line of Eq. (D-12), the term:

"... $-\frac{1}{2}(\sin(\omega t))$..."

should be changed to:

$$"... -\frac{1}{4}(\sin(2\omega t))..."$$

[Found by Julian Vrbancich, 10/23/12; [Author Error]

Dear Reader, if you find any additional errors, no matter how trivial, please notify me at: **R.Lyons@ieee.org**
I'd sure appreciate hearing from you and I promise I'll reply to your E-mail.

A suggestion: This errata is complete on the day you first received it. However, I have learned over the years that because of the way books are produced, as time goes by additional typographical errors will be detected. So what this means is that 6-12 months from now you might want to send me an E-mail requesting the errata **FOR YOUR PARTICULAR PRINTING NUMBER** of the book so you can check for any recently-detected "typos."

Thanks,
[-Rick Lyons-]

