

**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-

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**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]

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

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

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**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]

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**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]

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**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]

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**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]

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**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]

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

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

should be changed to:

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

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

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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]

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**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]

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**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]

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**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]

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**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]

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**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]

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**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]

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

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

should be changed to:

" $(3!)^2 = \mathbf{36}$ "

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

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**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]

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

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

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**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]

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**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]

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

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

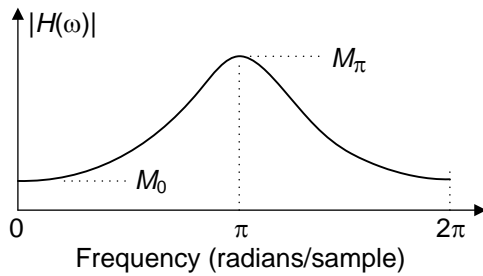
should be changed to:

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

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

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



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

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**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]

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**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]

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**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]

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**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]

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**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]

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**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]

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

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

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

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

**$(-3f_{s,old})$  and  $(3f_{s,old})$**

should be:

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

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

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**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]

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**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]

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

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

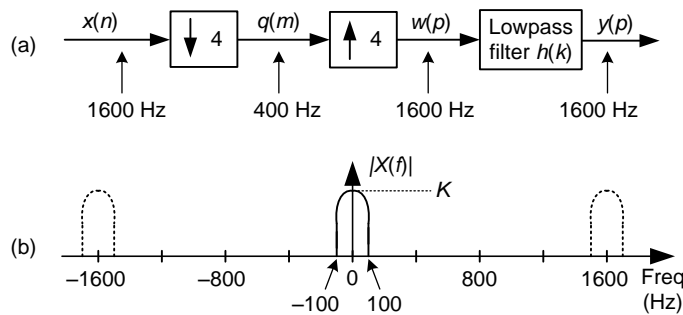
should be changed to:

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

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

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**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]

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**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]

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**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]

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**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]

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**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.

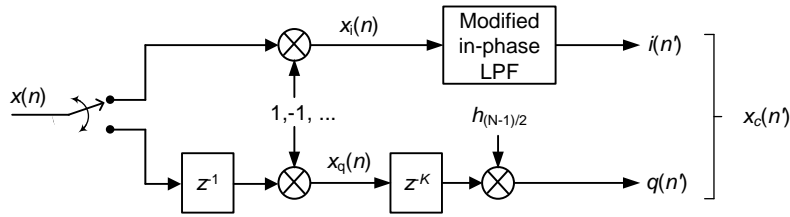
[Found by Jérôme Leclère (10/9/13)]; [Production Error]

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**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:

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

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

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

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

Real multiplies <b>2N</b>	Real additions <b>2(N-1)</b>
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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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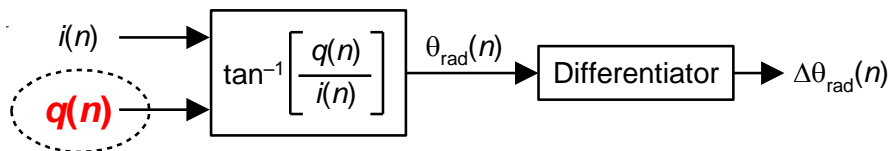
should be changed to:

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

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**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]

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**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]

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**Page 828:** The  $\pi$  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]

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

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

should be:

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

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

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**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]

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**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  $\phi$  making Eq. (A-5) look like:

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

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

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**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]

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**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]

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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-]

