Errata for the 4th & 5th 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 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:

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

should be changed to:

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

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

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^{-j\omega} ..."

should be:

"... $h(2)e^{-j^2\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:

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

[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)

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

has a missing 'y'. It should be changed to:

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

[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 Author (7/11/16)]; [Production Error]
Page 345: The right side of Figure P6-26 should look like the following:

![Diagram]

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

\[ h_{SL1}(k) = \frac{-1}{6}, \frac{8}{6}, 0, \frac{-8}{6}, \frac{1}{6} \] (7-10)

should be changed to:

\[ h_{SL1}(k) = \frac{-1}{12}, \frac{8}{12}, 0, \frac{-8}{12}, \frac{1}{12} \] (7-10)

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

\[ h_{SL2}(k) = \frac{-22}{126}, \frac{67}{126}, \frac{58}{126}, 0, \frac{-58}{126}, \frac{-67}{126}, \frac{22}{126} \] (7-11)

should be changed to:

\[ h_{SL2}(k) = \frac{-22}{252}, \frac{67}{252}, \frac{58}{252}, 0, \frac{-58}{252}, \frac{-67}{252}, \frac{22}{252} \] (7-11)

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)."

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

\[ \tan(\alpha) = \frac{e^{j\alpha} - e^{-j\alpha}}{j(e^{j\alpha} + e^{-j\alpha})}. \]
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 \((3f_s,\text{new})\).

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

\(e^{-j2n/4}\)

has a missing \(\pi\) symbol. It should be changed to:

\(e^{-j2\pi n/4}\)

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

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

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

should be changed to:

\((-0.9239 - j0.3827)\)
\[ \alpha = \cos(2\pi f_c f_s) - 1 + \sqrt{\cos^2(2\pi f_c f_s) - 4\cos(2\pi f_c f_s) + 3} \]  

(11-36)

[Found by Zachary Blackwell (2/27/18)]; [Typesetting Software 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 675: In Figures 13-4(b) and 13-4(c), the hyphens, "-", near the top of the vertical axes' \( \phi_1(m) \) and \( \phi_0(m) \) labels should be deleted.

[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:

![Modified in-phase LPF Diagram]

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

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

<table>
<thead>
<tr>
<th>Real multiplies</th>
<th>Real additions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4N</td>
<td>2N</td>
</tr>
</tbody>
</table>

should be changed to:

<table>
<thead>
<tr>
<th>Real multiplies</th>
<th>Real additions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2N</td>
<td>2(N-1)</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Real multiplies</th>
<th>Real additions</th>
<th>Real multiplies</th>
<th>Real additions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4N</td>
<td>2N</td>
<td>4N</td>
<td>2N</td>
</tr>
</tbody>
</table>

should be changed to:

<table>
<thead>
<tr>
<th>Real multiplies</th>
<th>Real additions</th>
<th>Real multiplies</th>
<th>Real additions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2N</td>
<td>2(N-1)</td>
<td>2N</td>
<td>2(N-1)</td>
</tr>
</tbody>
</table>
Page 759: In Figure 13-60, the two inputs to the arctangent operation should be:

\[ \frac{q(n)}{i(n)} \]

\[ \theta_{\text{rad}}(n) \]

\[ \Delta \theta_{\text{rad}}(n) \]

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

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

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

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

should be:

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

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:

\[ ... = \sqrt[3]{125} e^{j(75^0 + n360^0)/3} \quad (A-27) \]

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.

Thanks,
[-Rick Lyons-]