Errata for the <u>10th Printing</u> of
"Understanding Digital Signal Processing, 2/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 7: In the third line below Eq. (1-7), the text:

   "... indicate that $X_{sum}(n)$ has a frequency ..."

The uppercase "X" should be lowercase "x" as:

   "... indicate that $x_{sum}(n)$ has a frequency ..."

[Found by Angela Livingstone, 3/30/08; [Production Error]

Page 37: The "f_s" labels, within the arrows, at the very
bottom of Figure 2-13 should be "$f_s/2$".

[Found by Author [6/20/06].][Author Error]

Page 38: In the fifth line up from the bottom of the page,
the text:

   "... where m_{odd} is an odd integer[14]."

should be changed to:

   "... where m_{odd} is an odd integer greater than one[14]."

[Found by Jim Murphy [9/14/05] & Justin Reeves [6/20/06].][Author Error]

Page 40: In the 2nd line below Eq. (2-14), the text:

   "$m = 2$ provide an optimum ..."

should be changed to:

   "$m_{even} = 2$ provide an optimum ..."

[Found by Justin Reeves, 6/20/06.][Author Error]

Page 42: In the middle of Table 2-2, on the right side,
the text:

   "m_{odd} is any positive odd integer ..."

should be changed to:

   "m_{odd} is an odd integer greater than one ..."

[Found by Justin Reeves, 6/20/06.][Author Error]

Page 48: The incorrect letter "v" in the third line of Eq. (3-4d)
      should be replaced with a "$\cdot$" multiplication symbol.

Page 62: The second part of equation (3-18') printed as:

$$x(n) = \frac{1}{\sqrt{N}} \sum_{n=0}^{N-1} X''(m) e^{j2\pi nm/N} \qquad (3\text{-}18')$$

should have the lower limit of the summation changed to "m"
instead of "n", as:

$$x(n) = \frac{1}{\sqrt{N}} \sum_{\boldsymbol{m}=0}^{N-1} X''(m) e^{j2\pi nm/N} \qquad (3\text{-}18')$$

Page 77: For **both** Eq. (3-29) and Eq. (3-30), the "-1" characters
should be deleted from the denominator of the cosine arguments.
The cosine argument, in both equations, should be:

    "...$\cos(2\pi n/N)$,"

Page 93: The last term in Equ. 3-37 has a missing minus sign in
its exponent. The last term should be:

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

On page 134, in Figure 4-2, the lower right four twiddle factors:

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

should be

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

Page 143: In Figure 4-10, in the middle stage there is
the number 4 on the 1st and 2nd (counting down from the top)
southeast-pointing arrows. Those 4s should not be there.
The 4s should be on the 3rd and 4th southeast-pointing arrows
of the middle stage as shown below.

x(0)   X(0)
x(1)   X(1)
x(2)   X(2)
x(3)   X(3)
x(4)   X(4)
x(5)   X(5)
x(6)   X(6)
x(7)   X(7)
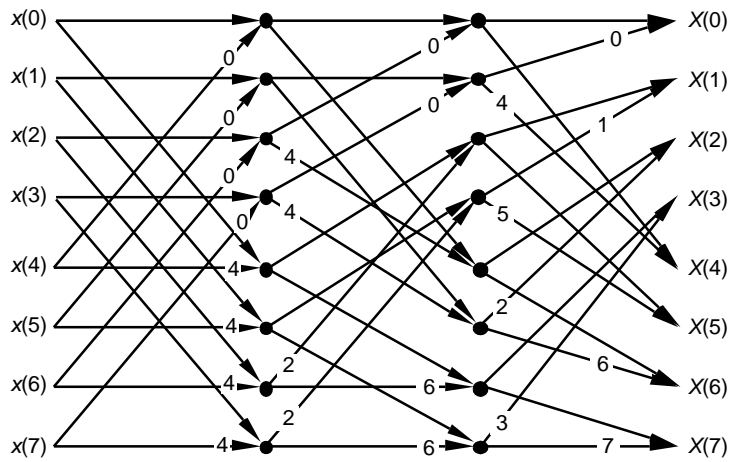
[Found by Antoine Trux, 1/2/07.][Author Error]

Page 244: The normalized-frequency labeling (radians/sample) on the frequency axis of Figures 6-24(b) and 6-24(c) should be changed as:

      -2π changed to -4π
      $-\pi$ changed to -2π
       π changed to 2π
     2π changed to 4π

[Found by Author, 10/17/08.][Author Error]

Page 257:   In the eleventh line below Eq. (6-87)

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

should be changed to:

      "... Figure 6-**22**(b). Knowing that ..."

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

Page 264: In the 6th line of the first full paragraph, the text:

      "...squeezed in toward zero Hz."

should be:

      "...squeezed in toward **$f_s/2$** Hz."

[Found by VV (vanamali), 3/12/09.] [Author Error]

Page 264: In the next to the last line of the first full paragraph there's a missing "|" vertical bar character indicating "magnitude".   The text:

      "...in $|H_d(f_d)-$..."

should be:

      "...in $|H_d(f_d)|-$..."

[Found by Author, 7/14/05.] [Author Error]

Page 267: There is a missing "x(n)" factor in Equation (6-114), the first part of that equation should be:

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        y(n)  =   0.20482712·x(n) + 0.40965424·x(n-1) + ...
```

[Found by Kendall Castor-Perry, 5/3/09.] [Author Error]

Page 286: The feedback coefficient of the resonator in Figure
7-3, printed as:

$$e^{j\Box r}$$

it should be changed to:

$$e^{j\omega r}$$

[Found by Author, 7/14/09.] [Production Error]

Page 345: On the right side of Figure 8-8 the term $e^{j2\pi f_o t}$ should
be divided by two, making it

$$e^{j2\pi f_o t}/2.$$

[Found by John Littig, 9/24/07.] [Author Error]

Page 353: In the sentence just before Eq. (8-17), the described
notion of orthogonality of $i(n)$ and $q(n)$ is only conditionally
true. Because this orthogonality topic was not described in
sufficient detail, I suggest you strike out both the sentence just
before Eq. (8-17) as well as Eq. (8-17) itself.

[Found by Ken Walsh, 5/9/06.] [Author Error]

Page 389: In the seventh line of the second paragraph, the
text is printed as:

        "The lower the attenuation, the ...".

Please change the word "lower" to "greater" so that
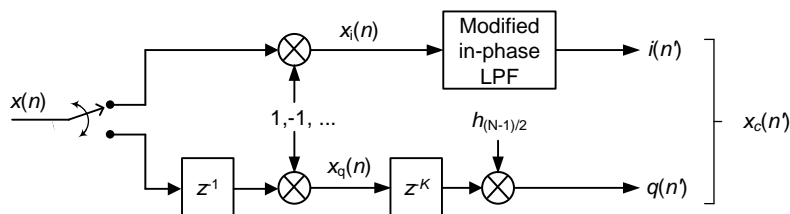the text reads:

        "The **greater** the attenuation, the ...".

[Found by Mark Kolber, 1/29/08.][Author Error]

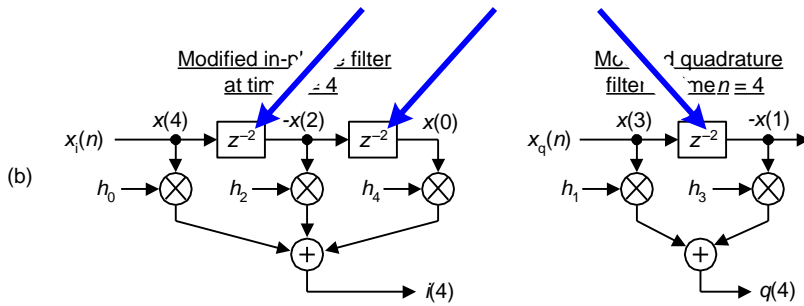**Page 478:** in the fifth line down, delete the text:

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

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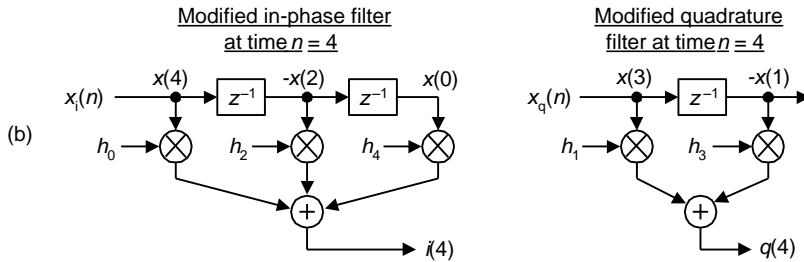making that figure look as follows:

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

Page 479: In Figure 13-6(b) the superscripted "-2" characters shown by the large arrows below:

Should be changed from "-2" to "-1" making Figure 13-6(b) become:

[Found by Damon Bradley, 10/1/09.][Author Error]

Page 484: Equation (13-10) has suffered a series of "foul-ups" in different Printings of the book. Eq. (13-10) should be:

$$W(m) = \sum_{n=0}^{N-1} \alpha e^{-j2\pi nm/N} - \frac{\beta}{2} \cdot \sum_{n=0}^{N-1} e^{j2\pi n/N} e^{-j2\pi nm/N} - \frac{\beta}{2} \cdot \sum_{n=0}^{N-1} e^{-j2\pi n/N} e^{-j2\pi nm/N}$$

$$= \alpha \sum_{n=0}^{N-1} e^{-j2\pi nm/N} - \frac{\beta}{2} \cdot \sum_{n=0}^{N-1} e^{j2\pi n(m-1)/N} - \frac{\beta}{2} \cdot \sum_{n=0}^{N-1} e^{-j2\pi n(m+1)/N}. \qquad (13\text{--}10)$$

[Found by Author, 3/22/04.][Author Error]

Page 518: For more accurate results, the "12/M" factor at the beginning of Eq. (13-70) should be changed to sqrt(12/M). Thus Eq. (13-70) should be:

$$y_{desired}(n) = \sqrt{\frac{12}{M}} \cdot \sigma' \cdot \left[\left(\sum_{k=1}^{M} x_k(n) \right) - \frac{M}{2} \right] + \mu'. \qquad (13\text{-}70)$$
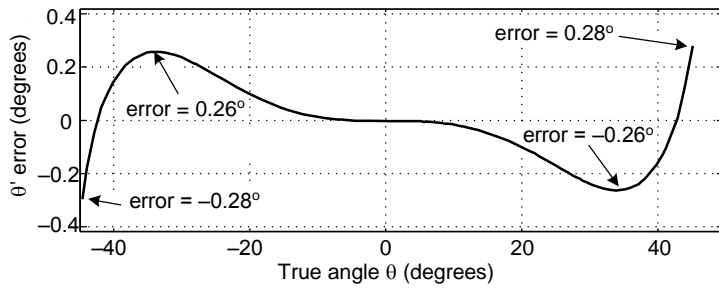
[Found by Bharat Pathak, 7/13/07.][Author Error]

Page 548: 4th line below Eq. (13-107), change the text:

"... 0.26^o using ..."

to

"... $0.2\mathbf{8}^o$ using ...".

For preciseness, you might note on Figure 13-59 that the error is -0.28^o at True $\theta = -45^o$, and the error is $+0.28^o$ at True $\theta = +45^o$, as shown in the following figure.

[Found by Chris Zarowski, 4/27/06.][Author Error]

Page 549: 4th line below Eq. (13-109'), change the text:

"... error is 0.26° for ..."

to

"...error is $0.2\mathbf{8}^{\circ}$ for ...".

[Found by Chris Zarowski, 4/27/06.][Author Error]

Page 560: In Figure 13-70(b), on the right side in the
"Section 3, r = 1" part of the figure, there should be three
stages of delay lines instead of only two stages as shown
in the figure. That "Section 3, r = 1" part of the figure should
look like the following:
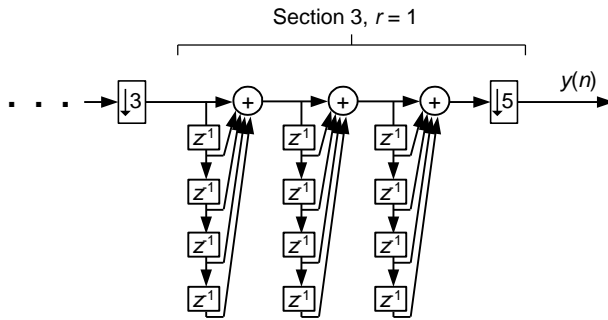
[Found by Mike Totham, 8/31/07.][Author Error]

Page 561: Equation (13-123) has a missing 1/N scale factor in
front of the summation. That equation should be:

$$M(q) = \frac{1}{N} \sum_{k=qN}^{(q+1)N-1} x(n) \qquad\qquad (13\text{-}123)$$

[Found by Author, 8/24/08.][Production Error]

Page 569: In the right $X_{\text{int}}(m)$ column of Table 13-8, the *underline*
character associated with row $m = 9$ should be a zero "0" value
as follows:

m	$X_{\text{int}}(m)$
...	...
9	0
...	...

[Found by Author, 3/21/09.][Production Error]

Page 607: Two corrections: In the second line of Eq. (D-7), the
term:

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

should be:

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

In the third line of Eq. (D-7), the term:

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

should be:

"... $-\dfrac{1}{4}\big(\sin(\mathbf{2}\omega t)\big)...$"

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

Page 610: The final ratio at the end of Eq. (D-12) **MAY** be printed as:

$$\frac{(b-a)^2}{12}.$$

Make sure the numerator looks like (with a PLUS sign):

$$\frac{(b+a)^2}{12}.$$

[Found by Author, 1/15/05.][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.

Thanks,
[-Rick Lyons-]