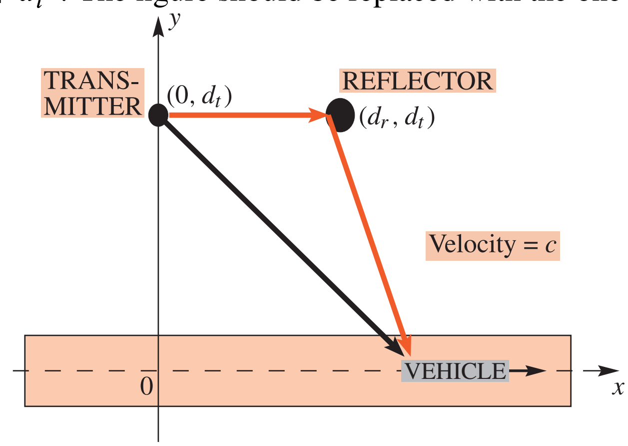
SP First ERRATA. These are mostly typos, but there are a few crucial mistakes in formulas. Underline is not used in the book, so I've used it to denote changes.
JHMcClellan, February 13, 2010

1. page 10*, Figure 2-4, last line of text in figure: $\Longrightarrow \underline{x} = r\cos(\theta)$

2. page 13*, righthand column, last line of text, change 3 to 2,
   ... negative slope of $-\frac{2}{3}$ for $\frac{1}{2} < t \le \underline{2.}$ Now ...

3. page 34*, Figure 2-21, The diagram of the original figure does not correspond to the equations given in the problem. The general formula for the distance off the reflector, d_2, is $d_2 = d_r + \sqrt{(x-d_r)^2 + d_t^2}$. The figure should be replaced with the one below:



4. page 41, (bottom left), The CDROM citation should read:
   LAB: *#3 AM and FM Sinusoidal Signals*

5. page 44*, 2nd line, left hand column, change the sentence to read:
   Since $T_0 = 1/f_0$ is the smallest possible period, it is also the fundamental period.

6. page 49, equation (3.25) ***Orthogonality Property***

7. page 53, (2nd line of equations for a_k),
   denominator should be: $\underline{-j(2\pi/T_0)k}$, so we would have

$$= \left(\frac{1}{T_0}\right) \frac{e^{-j(2\pi/T_0)k(\frac{1}{2}T_0)} - e^{-j(2\pi/T_0)k(0)}}{-j(2\pi/T_0)k}$$

8. page 56, 2nd line of equation(3.37),
   exponent in exponential needs changing, should be: $\underline{e^{-j(2\pi/T_0)kt}}$. The entire line should read:

$$+\frac{1}{T_0}\int_{\frac{1}{2}T_0}^{T_0} (2(T_0-t)/T_0)e^{-j(2\pi/T_0)kt}\,dt$$

9. page 63, righthand column, line 18, (insert a space) ...signals, such as a Touch-Tone phone.

10. page 78, righthand column, 7 lines below equation (4.12) should read:
...arbitrary, but the ideal D-to-C converter always selects...

11. page 83, The CDROM citation should read:
LAB: *#3 Chirp Synthesis from Chapter 3*

12. page 91, The CDROM citation should read:
DEMO: *Reconstruction Movies*

13. page 111, The CDROM citation should read: **LAB:** *#6 Digital Images: A/D and D/A*

14. page 123*, The convolution table has a notation problem. $h_1[n]$ and $h_2[n]$ are swapped and we should have written $h_2[k]h_1[n-k]$. Also, in the equation above the table, we should write: $y[n] = h_2[n] * h_1[n]$.

n	$n<0$	0	1	2	3	4	5	6	$n>6$
$h_1[n]$	0	1	1	1	1	0	0	0	0
$h_2[n]$	0	0	1	1	1				
$h_2[0]h_1[n]$	0	0	0	0	**0**	0	0	0	0
$h_2[1]h_1[n-1]$	0	0	1	1	**1**	1	0	0	0
$h_2[2]h_1[n-2]$	0	0	0	1	**1**	1	1	0	0
$h_2[3]h_1[n-3]$	0	0	0	0	**1**	1	1	1	0
$h[n]$	0	0	1	2	**3**	3	2	1	0

15. page 126, The CDROM citation should read:
LAB: *#7 Sampling, Convolution, and FIR Filtering*

16. page 132, 3rd line of Example 6-2, Missing $-\pi/3$ which should be colored.
... and $\angle H(e^{j\pi/3}) = -\pi/3.$

17. page 133, righthand column, 2nd line, algebraic steps in (6.6) show that $y[n]$ can finally be expressed as a cosine signal.

18. page 153, righthand column, middle, $dsty$ in the middle of the equation should be deleted.

$$
\begin{aligned}
&H(e^{j2\pi(250)/1000}) \\
&\quad = \frac{\sin(\pi(250)(11)/1000)}{\sin(\pi(250)/1000)} e^{-j2\pi(250)(5)/1000} \\
&\quad = 0.0909e^{-j\pi/2}
\end{aligned}
$$

19. page 156, (bottom right), The CDROM citation should read:
LAB: *#9 Encoding and Decoding Touch-Tones*

20. page 174, Exercise 7.6, equation for $w[n]$ should have minus sign instead of plus:
$w[n] = x[n] - x[n-1]$

21. page 176, The CDROM citation should read:
DEMO: *Three Domains - FIR*

22. page 181, first paragraph of Section 7-7 should read:
Now we can exploit our new knowledge to design filters with desirable characteristics. In this section, we will look at a special class of bandpass filters (BPFs) that are all close relatives of the running-sum filter.

23. page 192, Figure P-7.6(b), output (above the arrow on the far right) should be $w[n]$, not $y[n]$.

24. page 195, in Problem **P-7.17**, part (a). The exponent has two extra parentheses that should be deleted; the exponent should be:

$$H(e^{j\hat{\omega}}) = [2b_0 \sin(2\hat{\omega}) + 2b_1 \sin(\hat{\omega})]e^{j\pi/2 - j\hat{\omega}2}$$

25. page 219*, Example 8-11 (caption), **Example 8-11: Long Division**

26. page 241*, in Problems **P-8.13** and **P-8.14**, $\mathcal{S}_6$ is wrong. The upper limit on the summation needs to be 3, not 2; otherwise, no match is possible.

$$\mathcal{S}_6: \quad y[n] = \sum_{k=0}^{3} x[n-k]$$

27. page 242, Problem **P-8.17**, ...five possible impulse responses (J–N).

28. page 250*, Figure 9-5 (caption), Scaled unit-impulse signal is symbolized...

29. page 264, Figure 9-13(a), Label on y-axis contains a "gamma," should be: $x(\tau)$

30. page 264, Figure 9-13(b), Label on y-axis appears to have a light gray vertical bar after the equals sign. This is only visible in the PDF file. Should be: $g(\tau) = x(-\tau)$

31. page 295, The CDROM citation should read:
LAB: *#13 Numerical Evaluation of Fourier Series*

32. page 296, line 1 beneath Fig. 10-6 should read:
which we can rewrite as $y(t) =$...

33. page 302, The CDROM citation should read:
LAB: *#15 Fourier Series (Ch. 12)*

34. page 312*, The following derivation should be written on two lines instead of three; otherwise, the equals sign is ambiguous.

$$|X(j\omega)| = \left| \int_{-\infty}^{\infty} x(t)e^{-j\omega t}\,dt \right|$$
$$\leq \int_{-\infty}^{\infty} \left| x(t)e^{-j\omega t} \right| dt = \int_{-\infty}^{\infty} |x(t)|\,dt$$

35. page 319*, line 8, righthand column, (insert comma)
necessary condition, for having a Fourier transform.

36. page 326, line 11, righthand column,
...we showed in (10.3)...

37. page 329*, equation in righthand column is missing T^2,

$$y(t) = x(t) * h(t) = \frac{1}{2\pi} \int_{-\infty}^{\infty} \underline{T^2} \left(\frac{\sin(\omega T/2)}{(\omega T/2)} \right)^2 e^{j\omega t} d\omega$$

or T could be removed from the denominator and it could be written as:

$$y(t) = x(t) * h(t) = \frac{1}{2\pi} \int_{-\infty}^{\infty} \left(\frac{\sin(\omega T/2)}{\underline{(\omega/2)}} \right)^2 e^{j\omega t} d\omega$$

38. page 349*, Figure P-12.4(b), input signal to first block should be $\underline{x(t)}$, instead of $x[n]$

39. page 351, line 1, righthand column,
remove the words "filtersFrequency selective" so that it reads:
... *frequency selective* filters. In this section,...

40. page 354*, Figure 12-9, 2nd line of caption, (subscript not italic)
...to give the output signal $\underline{y_{\text{lp}}(t)}$.

41. page 355, The CDROM citation should read:
LAB: *#14 Design with Fourier Series*

42. page 364, Figure 12-20, misspelled word inside the first block: Half-Wave Rectifier

43. page 368*, equation (12.40), second line is missing n; it should be:

$$= x(t) \sum_{n=-\infty}^{\infty} \delta(t - \underline{n} T_s)$$

44. page 369*, Example **12-5**, first equation is missing a k inside the δ function:

$$P(j\omega) = \sum_{k=-\infty}^{\infty} \left(\frac{2\pi}{T_s} \right) \delta(\omega - \underline{k}\omega_s)$$

45. page 379, Figure 12-35(d), the rightmost label $2\pi\gamma$ contains an extraneous γ; should be $\underline{2\pi}$

46. page 381*, Problem **P-12.2** has ω_{co1} and ω_{co2} switched, because the natural assumption is that ω_{co1} is the lower passband cutoff frequency, while ω_{co2} is the upper one. Thus, the natural assumption is that $\omega_{co1} < \omega_{co2}$. To correct this equation (12.76) should be changed to:

$$h_{\text{bp}}(t) = \frac{\sin(\underline{\omega_{co2}} t)}{\pi t} - \frac{\sin(\underline{\omega_{co1}} t)}{\pi t}$$

47. page 383*, Problem **P-12.7** part (c), change minus sign to plus sign:

$$w(t) = \frac{1}{2}x_1(t)[1 \underline{+} \cos(2\omega_c t)] \ldots$$

48. page 383, Figure P-12.8, inside block (bad spacing)
LTI System

49. page 384, Figure P-12.9, inside block (bad spacing)
LTI System

50. page 385, Figure P-12.11(a), change summation index to k in the definition of $p(t)$:

$$p(t) = \sum_{\underline{k}=-\infty}^{\infty} a_k e^{jk\omega_p t}$$

51. page 386, Problem **P-12.13**, change π to π/T_s in the definition of $H_r(j\omega)$:

$$H_r(j\omega) = \begin{cases} T_s & |\omega| \leq \pi/T_s \\ 0 & |\omega| > \underline{\pi/T_s} \end{cases}$$

52. page 387, Figure P-12.15(b), change 4 to 1 in the definition of the passband of $H(e^{j\hat{\omega}})$.

53. page 392, before equation (13.8), lefthand column, (insert space)
......equation (12.61) on p. 376, that the DTFT of...

54. page 410, top, lefthand column, section title should be:
13-8.2 Spectrograms in MATLAB

55. page 413*, Figure 13-20, Label on x-axis should be (sec) not (msec):
Time (sec)

56. page 414*, Figure 13-22, Label on x-axis should be (sec) not (msec):
Time (sec)

57. page 414*, Figure 13-23, Label on x-axis should be (sec) not (msec):
Time (sec)

58. page 438*, Figure A-13 (caption),
For the vectors shown, $|z_1| > 1$ and $|z_3| < 1$.

59. page 449, lefthand column, line 16, in MATLAB code for for `function foo`:
Missing a comment sign (`%`) sign before the `x = input vector` statement.
`%        x = input vector`

60. page 460, top line, lefthand column,
Use the built-in MATLAB editor, or an external one...

Optional:

1. page 26, The suggested change in wording was not made:
   Change **LAB:** *#2, Adding Sinusoids and Complex Amplitudes*
   to **LAB:** *#2 Introduction to Complex Exponentials*.
   Note: this change was made correctly on page 31.

2. page 46, The CDROM citation should read:
   DEMO: *Spectrograms: Simple Sounds: Square Wave*

3. page 68, Problem **P-3.15** (b), top of the right hand column.
   It would make a better problem to define $y(t)$ as $2x(t - T_0/4)$ because then the shifted square wave has its jumps at $t = 0$ and $t = T_0/2$ like the example worked out in Section 3-6.1.

4. page 381, in Problems **P-12.2** and **P-12.3** it should be stated that $\omega_{co1} < \omega_{co2}$.

5. page 416, The CDROM citation should read:
   DEMO: *Ch 3, Spectrograms*

CD-ROM Errata:

1. Exercise 2.2, p. 14 in the text: "Derive the equations for the shifted signal $x_2(t) = s(t + 1)$." seems to point to a similar but different shifted triangular-signal on the SPFirst CD and also on the website. Fig. 2-8(c) in the book shows the correct signal for $s(t + 1)$, but the answer to Exercise 2.2, on CD and website, points to a .pdf file showing a different signal (base of 3-units instead of 2) with different slopes ($m = 1$ and $m = -1/2$ instead of $m = 2$ and $m = -2/3$) and having a different final equation when solving for $s(t + 1)$.

2. Exercise 3.8 solution is wrong because the $k = 3$ term was evaluated incorrectly. The last two lines should be:

$$x_N(t) = \frac{1}{2} - \frac{2}{\pi} e^{j50\pi t} - \frac{2}{\pi} e^{-j50\pi t} - \frac{2}{3^2\pi} e^{j150\pi t} - \frac{2}{3^2\pi} e^{-j150\pi t}$$

$$= \frac{1}{2} - \frac{4}{\pi} \cos(50\pi t) - \frac{4}{9\pi} \cos(150\pi t)$$

3. Exercise 7.6 solution was not consistent with the printed version (1st and 2nd printing) of the text. However, the error is with the text, so the solution is not changed.