

**Known Errors in the 4th Edition of Intermediate Physics for Medicine
and Biology, by Russell Hobbie and Brad Roth**

Last revised September 30, 2014

Page 1: In the first sentence of Sec. 1.1, "than span" should be "that span".
Corrected 9-30-14. Found when preparing the 5th edition.

Page 11: "where is θ the angle" should be "where θ is the angle".
Corrected 9-30-14. Found when preparing the 5th edition.

Page 19: "by the gas [Fig. 1.28(b)]" should be "by the gas [Fig. 1.30(b)]".
Corrected 9-30-14. Found when preparing the 5th edition.

Page 21: In the last line of Sec. 1.17, " 87×10^6 " should be " 87×10^{-6} ".
Corrected 5-13-13.

Page 22: "on the both fraction" should be "on both the fraction". Corrected
9-30-14. Found when preparing the 5th edition.

Page 27: In Chapter 1 Problem 25, "cartilage in anisotropic" should be
"cartilage is anisotropic" [*corrected in the second printing*]

Page 29: In the Chapter 1 citation to the paper by Elliott et al. (2002), Dr.
Daria Narmoneva's name is misspelled. "Normoneva" should be
"Narmoneva". Our apologies to Dr. Narmoneva. Corrected 12-20-
11.

Page 32: In Chapter 2, just below Table 2.1, the equation " $y_1=y_0(1+0.5)$ "
should be " $y_1=y_0(1+0.05)$ ". This error found by Ronald Roth.
[*corrected in the second printing*]

Page 32: In Table 2.3, “ $b = 0.5$ ” should be “ $b = 0.05$ ”. Corrected 9-30-14.
Found when preparing the 5th edition.

Page 33: In the first paragraph of Sec. 2.2, “\$4.65” should be “\$4.51”.
Corrected 9-30-14. Found when preparing the 5th edition.

Page 46: In Problem 41, “52-64” should be “62-64”. Corrected 9-30-14.
Found when preparing the 5th edition.

Page 55: “as we did in Eq. 3.1” should be “as we did in Fig. 3.1”. Corrected
9-30-14. Found when preparing the 5th edition.

Page 56: In footnote 7, “then $\Omega(U)$ is actually” should be “then $\Omega(U) dU$ is
actually”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 67: Following “This can be rearranged as (letting $C_A = [A]$, etc.”, the
close parenthesis is cut off on the top, making it look like a comma.
It should be “)”. Corrected 9-30-14. Found when preparing the 5th
edition.

Page 78: In Problem 58, “Thereby relate G to the chemical potential”
should be “Thereby relate Φ to the chemical potential”. Corrected
9-30-14. Found when preparing the 5th edition.

Page 78: In Problem 61, “90 mV” should be “-90 mV”. Corrected 9-30-14.
Found when preparing the 5th edition.

Page 88: In the second row (“Mass”) of Table 4.3, “C” should be “ρ”, the mass per unit volume or density. Corrected 9-30-14. Found when preparing the 5th edition.

Page 93: In Chapter 4, the equation after Eq. 4.38b is missing a minus sign. It should be $\frac{dC}{dr} = -\frac{i}{4\pi Dr^2}$. This error found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 100: In Figure 4.22, the vertical axis label is incorrect. Replace $\frac{C(x)}{C(0)}$ by $\frac{C(x)}{C_0}$. This error was found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 101: Just before Eq. 4.77, “Comparing this with Eq. 4.70” should be “Comparing this with Eq. 4.71”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 105: In Problem 24d, the time derivative should be written as a partial derivative. Corrected 9-30-14. Found when preparing the 5th edition.

Page 105: In Chapter 4, Problem 25, “two plane substances” would be better if written “two plane membranes”. This change was suggested by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 116: In footnote 7, “Likavek” should be “Likavec”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 133: In the Basser et al. (1998) reference, “Schneidermann” should be “Schneiderman”. Our apologies to Dr. Schneiderman. Corrected 9-30-14. Found when preparing the 5th edition.

Page 133: In the Bean (1972) reference, “Essenman” should be “Eisenman”. Our apologies to Dr. Eisenman. Corrected 9-30-14. Found when preparing the 5th edition.

Page 133: In the Steinmuller (1998) citation, “15” should be “25”. 11-18-12

Page 133: In the White and Likavek (1992) reference, “Likavek” should be “Likavec”. Our apologies to Dr. Likavec. Corrected 9-30-14. Found when preparing the 5th edition.

Page 137: “It crosses the synaptic cleft (about 50 nm) and enters the next cell” should be “It crosses the synaptic cleft (about 50 nm) and activates or inhibits the next cell”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 158: “Dennis et al. (1994)” should be “Demir et al. (1994)”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 159: “must to change” should be “must accumulate to change”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 160: In the bottom panel of Fig. 6.41, the units on the vertical axis should be “(S m⁻²)”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 163: In Chapter 6, “about 10% of its final value” would be better if written “about 10% of its maximum value”. This change was suggested by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 175: In Chapter 6, Problem 66, " $a+b$ " would be better as " $d=a+b$ ".
Also, "Determine the value of b " would be better as "Determine the value of a ". Finally, " $b=\gamma a$ " would be better as " $a=\gamma d$ ". This change was suggested by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 175: In the Hodgkin and Rushton (1946) reference, "W. A." should be "W. A. H.". Our apologies to Dr. Rushton. Corrected 9-30-14.
Found when preparing the 5th edition.

Page 175: In the Dennis et al (1994) reference, "Dennis" should be "Demir". Our apologies to Dr. Demir. Corrected 9-30-14. Found when preparing the 5th edition.

Page 175: In the Wilders et al. (1991) reference, "van Ginnekin" should be "van Ginneken". Our apologies to Dr. van Ginneken. Corrected 9-30-14. Found when preparing the 5th edition.

Page 199: In Problem 30 of Chapter 7, part (a), in the equation for v_i , the " x " in the argument of the sine function should be a " z ".

Page 199: In Problem 31 of Chapter 7, "and 7.44b by σ_{ex} " should be "and 7.44b by σ_{ox} ".

Page 202: In the Ungar et al. (1986) reference, "unidirectionally" should be "unidirectionally". Corrected 9-30-14. Found when preparing the 5th edition.

Page 202: In the Watanabe and Grundfest (1961) reference, "commisural" should be "commissural". Corrected 9-30-14. Found when preparing the 5th edition.

Page 209: In the second line of Equation 8.13, the factor in brackets should be $\left[-xv_i(x)\Big|_{x_1}^{x_2} + \int_{x_1}^{x_2} v_i(x)dx\right]$. This error found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 211: At the bottom of the right column, "8-10" should be "80-100". Corrected 9-30-14. Found when preparing the 5th edition.

Page 225: In the Thomas et al. (1993) reference, "M. Freake" should be "S. M. Freake". Our apologies to Dr. Freake. Corrected 9-30-14. Found when preparing the 5th edition.

Page 225: In the Trontelj et al. (1994) reference, "Jabinsek" should be "Jazbinsek". Our apologies to Dr. Jazbinsek. Corrected 9-30-14. Found when preparing the 5th edition.

Page 235: Eq. 9.44 is missing a minus sign. It should be $\lambda = -\frac{L}{u} = -\frac{k_B TL}{zev}$. This error found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 244: Delete "[Moulder (Web)]". Unfortunately, this excellent website no longer exists. *[corrected in the second printing]*

Page 245: In section 9.10.4, replace "(Web, question 20A)" by ", the author of a website about power lines and cancer that unfortunately no longer exists,". Also, in sections 9.10.5 and 9.19.6, delete "(Web)". Finally, in footnote 7, delete "[Moulder (Web) Q. 27F]". *[corrected in the second printing]*

Page 246: Eq. 9.69 is missing a minus sign on the right-hand-side. It should

be $\frac{dE_1}{dt} + \frac{\sigma}{\kappa\epsilon_0} E_1 = -\frac{\omega}{\kappa} E_0 \sin\omega t$. This implies that Eqs. 9.70 also need a

minus sign: $A = -\frac{\omega\tau_t}{\kappa(1 + \omega^2\tau_t^2)} E_0 \approx -\frac{\omega\epsilon_0}{\sigma} E_0$ and

$B = -\omega\tau_t A = \frac{(\omega\tau_t)^2}{\kappa(1 + \omega^2\tau_t^2)} E_0 \approx 0$. These errors found by Gabriela

Castellano, UNICAMP, Brazil, 1-27-11.

Page 248: In the third line of the right column, " $\beta=0.009a^3$ " should be replaced by " $\beta=0.009(8\pi)a^3=0.23a^3$ ". This error found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 248: In the right column, three lines after Eq. 9.77, " $B_0 = 5 \times 10^{-5} \text{ T}$ " should be replaced by " $B_0 = 2 \times 10^{-5} \text{ T}$ ". This error found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 253: In Chapter 9, Problem 33, "50 mT" should be "50 μT ". This error found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 254: In the Kirschvink et al. (1992a) reference, the volume number "889" should be "89". Corrected 9-30-14. Found when preparing the 5th edition.

Page 254: In the Leuchtag and Swihart (1977) reference, "C. J. Swihart" should be "J. C. Swihart". Our apologies to Dr. Swihart. Corrected 9-30-14. Found when preparing the 5th edition.

Page 254: Delete "Moulder, J. E. (Web). Power Lines and Cancer: Frequently Asked Questions, www.mcw.edu/gcrc/cop/powerlines-cancer-FAQ/toc.html".
[corrected in the second printing]

Page 254: "Is there a link between power-frequency electric fields and cancer?" should be replaced by "Is there a link between exposure to power-frequency electric fields and cancer?" Found 3-18-11.

Page 269: " $x = 2/3$ " should be " $x^* = 2/3$ ". Found 10-26-12.

Page 280: In the figure in Problem 22, both "t"s should be "τ"s. Corrected 9-30-14. Found when preparing the 5th edition.

Page 284: In the Stark (1957) reference, "Stark, L." should be "Stark, L. and P. M. Sherman". Our apologies to Dr. Sherman. Corrected 9-30-14. Found when preparing the 5th edition.

Page 287: In Problem 12, replace "Serroanalysis" with "Servoanalysis"
[corrected in the second printing]

Page 291: Eq. (11.26d) is missing a "sin". It should read

$$y_j = y(t_j) = a_0 + \sum_{k=1}^n a_k \cos\left(\frac{2\pi jk}{N}\right) + \sum_{k=1}^n b_k \sin\left(\frac{2\pi jk}{N}\right).$$

This error was found by Dr. Ranjith Wijesinghe of Ball State University, 1-17-09.

Page 321: In Problem 17, replace $Y_k = Y_k^e + W^k Y_k^o$ by $Y_k = \frac{1}{2} [Y_k^e + W^k Y_k^o]$.

Also, replace $W = \exp(i2\pi/N)$ by $W = \exp(-i2\pi/N)$. This error was found by Gabriela Castellano of the State University of Campinas - UNICAMP, Brazil.

Page 323: In the Cooley and Tukey (1965) reference, volume “119” should be “19”. Corrected 9-30-14. Found when preparing the 5th edition.

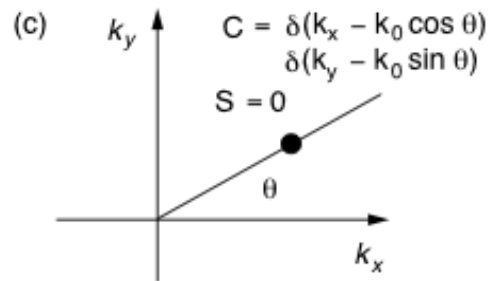
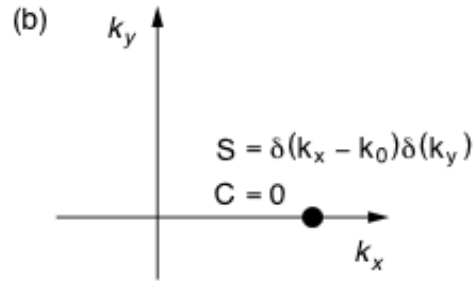
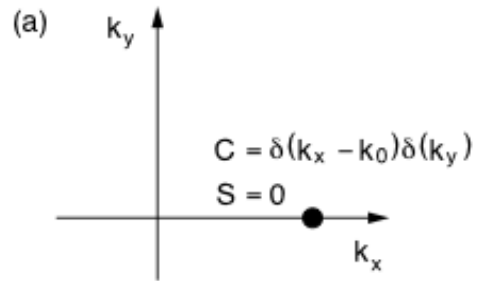
Page 323: In the Gammiatoni et al. (1998) reference, “Gammiatoni” should be “Gammaitoni”. Our apologies to Dr. Gammaitoni. Corrected 9-30-14. Found when preparing the 5th edition.

Page 323: In the Gatland and Thompson (1991), “Parameter bias estimation” should be “Parameter bias elimination”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 323: In the Maughan et al. (1973) reference, “of blood” should be “of the blood” and “the analysis” should be “the statistical analysis”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 323: In the Nedbal and Breznia (2002) reference, “Breznia” should be “Brezina”. Our apologies to Dr. Brezina. Corrected 9-30-14. Found when preparing the 5th edition.

Page 338: In Problem 7, some text is missing in the (c) frame of the figure. The corrected figure is given below. This error was found by Dr. Ranjith Wijesinghe of Ball State University, 2-3-09.



Page 338: In Chapter 12, Problem 10. The final equation, a Bessel function integral, should be " $\int u J_0(u) du = u J_1(u)$ ". Error found 6-10-14.

Page 339: In Problem 20, "In order the get these coefficients" should be "In order to get these coefficients". Thanks to Madhava Aryal for pointing this correction out, 10-31-09.

Page 340: In Chapter 12, the second line of Problem 32, " $|x| < a$ " should be " $\sqrt{x^2 + y^2} < a$ ". This error found by Gabriela Castellano, UNICAMP, Brazil, 1-27-11.

Page 344: In Eq. 13.2, the derivative on the right-hand side should be a partial derivative. This error was found by Dr. Ranjith Wijesinghe of Ball State University, 2-20-09.

Page 344: In the line before Eq. 13.8, "(Eq. 1.33)" should be "(Eq. 1.32)". This error was found by Dr. Ranjith Wijesinghe of Ball State University, 2-20-09.

Page 355: In Problem 12, "threshold for pain, $I = 10^{-4} \text{ W m}^{-2}$ " should be "threshold for pain, $I = 1 \text{ W m}^{-2}$ ". Corrected 9-30-14. Found when preparing the 5th edition.

Page 355: In Problem 16, " $Z_{\text{tissue}} = 1.5 \times 10^3$ " should be " $Z_{\text{tissue}} = 1.5 \times 10^6$ ". Also, " $T = 2 \times 10^{-4}$ " should be " $T = 0.18$ ". In part (b), " $T = 8 \times 10^{-4}$ " should be " $T = 0.36$ ". Corrected 9-30-14. Found when preparing the 5th edition.

Page 356: Problem 29, as written, is slightly misleading, because it implies that the first reflection off the back surface is a reverberation echo, when in fact it is only the subsequent echoes that are reverberations. The problem should be rewritten

Problem 29 *Suppose that an ultrasound wave is traveling to the right in muscle, toward a 3 mm thick layer of fat (use the data in Problem 10 for the acoustic properties of these tissues). Part of the wave reflects off the left surface of the fat (echo 1), and part is transmitted and then reflects off the right surface. Moreover, part of the wave reflected from the right surface continues to the left and is detected (echo 2), but part undergoes two additional reflections, traveling back and forth again through the fat before it is detected (echo 3). Echo 3 is called a reverberation echo, and is one source of artifact in an ultrasound image. You can have more than one, since the*

wave can reflect back and forth multiple times. Calculate the time between each of the first three reverberation echoes, and the relative intensities of each one (ignore attenuation).

Page 357: In the right column at the top, in Problem 33c, “the speed of the speed of” should be “the speed of”. This error was found by Adam Luterek, 9-21-09.

Page 365: In the caption to Fig. 14.10, “There are T target atoms” should be “There are N_T target atoms”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 369: In the denominator of the right-hand-side of Eq. 14.29, “4D” should be “ $4\pi D$ ”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 372: In Chapter 14, Table 14.3, the last three entries are incorrect. Replace the last three entries of Table 14.3 with

| Color | T(K) |
|--------------|-----------|
| Yellow | 3000-4000 |
| White | 5000-6000 |
| Bluish white | >10000 |

[corrected in the second printing]

Page 374: In Chapter 14, Fig. 14.24. Delete the sentence “The spectrum shown is for a blackbody at 5,800 K, approximately the spectrum of sunlight.” The temperature listed in the figure (3200 K) is correct.
[corrected in the second printing]

Page 377: At the bottom of the left column, " $W \text{ m}^2 \text{ nm}^{-1}$ " should be " $W \text{ m}^{-2} \text{ nm}^{-1}$ ". Corrected 9-30-14. Found when preparing the 5th edition.

Page 390: "Grievenkamp *et al.* (1995)" should be "Greivenkamp *et al.* (1995)". Corrected 9-30-14. Found when preparing the 5th edition.

Page 391: "Schlaer" should be "Shlaer". Corrected 9-30-14. Found when preparing the 5th edition.

Page 396: In Chapter 14 Problems 43 and 44, the magnification should be " $m = -v/u$ " instead of the incorrect " $m = -u/v$ ". [*corrected in the second printing*]

Page 397: In the Cotton (1992) reference, "to take" should be "takes". Corrected 9-30-14. Found when preparing the 5th edition.

Page 397: In the De Boer *et al.* (2002) reference, the final page "298" should be "274". Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Farmer (1997) reference, "The Design of Pulse Oximeters" should be "Design of Pulse Oximeters". Also, "J. Webster" should be "J. G. Webster". Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the reference to the paper by Fitzgerald *et al.*, "Zinonev" should be "Zinovev". Our apologies to Dr. Zinovev. Error found 10-5-12.

Page 398: In the Gilchrist *et al.* (1999) reference, "Gilchrist" should be "Gilchrest". Our apologies to Dr. Gilchrest. Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Grievenkamp et al. (1999) reference, "Grievenkamp" should be "Greivenkamp". Our apologies to Dr. Greivenkamp. Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Hecht et al. (1942) reference, "Schlaer" should be "Shlaer". Our apologies to Dr. Shlaer. Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Kimlin et al. (1999) reference, "Radiation" should be "Ultraviolet radiation". Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Knobler et al. (2002) reference, "immunotherapy" should be "photochemotherapy". Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Kripke (2003) reference, "protective" should be "protection". Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Lever and Lawrence (1995) reference, "with the use" should be "with use". Corrected 9-30-14. Found when preparing the 5th edition.

Page 398: In the Messina et al. (2003) reference, "Bruglio" should be "Brugiolo". Our apologies to Dr. Brugiolo. Corrected 9-30-14. Found when preparing the 5th edition.

Page 399: In the Poon et al. (2003) reference, "Barneston" should be "Barnetson". Our apologies to Dr. Barnetson. Corrected 9-30-14. Found when preparing the 5th edition.

Page 399: In the Soffer and Lynch (1999) reference, “organization” should be “optimization”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 399: In the Verheye et al. (2002) reference, “the atherosclerotic” should be “the vulnerable atherosclerotic”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 399: In two places, “The Design of Pulse Oximeters” should be “Design of Pulse Oximeters”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 408: In the caption of Fig. 15.8, “Hubbell (1975)” should be “Hubbell et al. (1975)”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 416: In Eq. 15.52, “W” should be “ W_{\max} ”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 420: In the second term of Eq. 15.58, “ $I(z)$ ” should be “ $I(Z)$ ”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 431: In the list of symbols, kerma should have units of “ J kg^{-1} ”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 433: Problem 30 actually contains two distinct homework problems. The first problem ends with “on Fib. 15.7.” The second problem begins “(a) For 50-keV”. Corrected 9-30-14. Found when preparing the 5th edition.

Page 434: In the Bambynek et al. (1972) reference, "P. Y. Rao" should be "P. Venugopala Rao". Our apologies to Dr. Rao. Also, "716-717" should be "716-813". Corrected 9-30-14. Found when preparing the 5th edition.

Page 434: In the Hubbell (1969) reference, "Photon Cross Section" should be "Photon Cross Sections". Corrected 9-30-14. Found when preparing the 5th edition.

Page 435: In ICRU Report 49 (1993), "Stopping Powers" should be "Stopping Power". Corrected 9-30-14. Found when preparing the 5th edition.

Page 442: In the caption of Fig. 16.7, "Rossman" should be "Rossmann". Corrected 9-30-14. Found when preparing the 5th edition.

Page 469: In footnote 27, "McCollough" should be "McCullough". Our apologies to Dr. McCullough. Corrected 9-30-14. Found when preparing the 5th edition.

Page 475: In Problem 6 of Chapter 16, the equation to verify is missing a minus sign. It should read "use the chain rule to verify that $d\Psi/d\lambda = -(h^2c^2/\lambda^3) d\Phi/dE$." I thank Madhava Aryal for pointing out this error, 10-12-09.

Page 477: In the BEIR VI (1999), "BEIR VI" should be "BEIR Report VI". Corrected 9-30-14. Found when preparing the 5th edition.

Page 478: In the Cohen (1998) reference, "the discrepancy" should be "our discrepancy". Corrected 9-30-14. Found when preparing the 5th edition.

Page 478: Our format is to list both the first and last page of an article entirely. Therefore, in the Cohen (2002) reference, "1137-43" should be "1137-1143". Found 1-14-12.

Page 478: In the Doi et al. (1976) reference, "Rossmann" should be "Rossmann". Our apologies to Dr. Rossmann. Corrected 9-30-14. Found when preparing the 5th edition.

Page 478: In the Hendee and Ritenour (2002) reference, "R. Ritenour" should be "E. R. Ritenour". Our apologies to Dr. Ritenour. Corrected 9-30-14. Found when preparing the 5th edition.

Page 478: In ICRU Report 31 (1979), "Average Energy to Produce" should be "Average Energy Required to Produce". Corrected 9-30-14. Found when preparing the 5th edition.

Page 479: In the Lubin (1998b) reference, the volume number "85" should be "75". Corrected 9-30-14. Found when preparing the 5th edition.

Page 479: In the Schlesinger and James (1995) reference, "Nuclear Applications" should be "Nuclear Detector Applications". Corrected 9-30-14. Found when preparing the 5th edition.

Page 479: In the Sues et al. (1995) reference, "Tomanaga" should be "Tomonaga". Our apologies to Dr. Tomonaga. Corrected 9-30-14. Found when preparing the 5th edition.

Page 480: In the Wagner (1983) reference, the volume "MI-12" should be "MI-2". Corrected 9-30-14. Found when preparing the 5th edition.

Page 482: In the second paragraph of Sec. 17.1, "relativitythat" should be "relativity that". This error found by Nick Myziuk, 11-21-09.

Page 499: In the units for the second column of Table 17.4, "kg⁻¹" should be "kg". Corrected 9-30-14. Found when preparing the 5th edition.

Page 507: In Chapter 17 Problem 9, "Ci" should be "μCi". [*corrected in the second printing*]

Page 507: In Chapter 17 Problem 13, "a solution of the form $N_2 = Bte^{-\lambda t}$ and obtain" should be "a solution of the form $N_2 = Bte^{-\alpha t}$, where α is to be determined, and obtain". I thank Kenneth Abbott for pointing out this error, 11-18-09.

Page 510: In Chapter 17 Problem 47: The text "Show that $R_t = R_o(1 - R_o\tau)$ and $R_o = R_t / (1 + R_t\tau)$ " should be "Show that $R_t = R_o / (1 - R_o\tau)$ and $R_o = R_t / (1 + R_t\tau)$ ". Found 4-10-13.

Page 512: Chapter 17 Problem 59c has a subscript missing on one of the λ 's. It should read $\lambda_2 \gg \lambda_1$. [*corrected in the second printing*]

Page 513: In the Coffey et al. (1979) reference, "Calculating the dose" should be "Calculating dose". Corrected 9-30-14. Found when preparing the 5th edition.

Page 513: In the Hunt et al. (2004) reference, "Hunt J.G., F. C. da Silva, and C. L. Mauricio (2004)" should be "Hunt J. G., F. C. A. da Silva, C. L. P. Mauricio, and D. S. dos Santos (2004)". Our apologies to Dr. dos Santos. Also, "simulators" should be "phantoms". Corrected 9-30-14. Found when preparing the 5th edition.

Page 513: In the Snyder et al. (1976) reference, "1976" should be "1978". Also, "Specific" should be "Estimates of Specific" and "Radiation

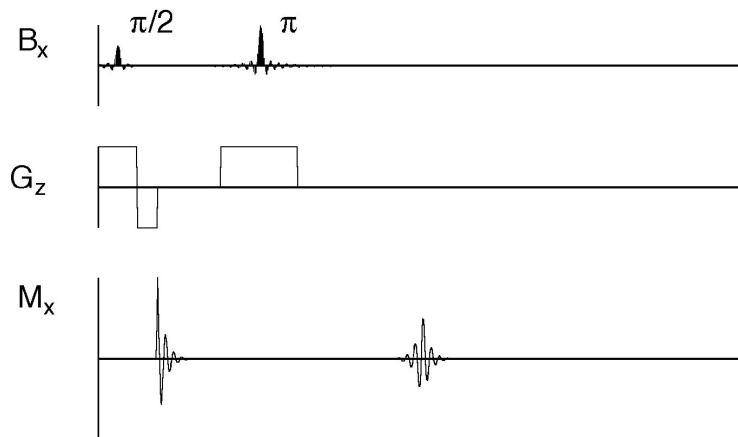
Sources" should be "Photon Sources". Corrected 9-30-14. Found when preparing the 5th edition.

Page 513: In the Patterson and Mosley reference, "positron tomography" should be "positron emission tomography". Found 12-1-11.

Page 523: "For long correlation times T_1 is proportional to the Larmor frequency" should be "For long correlation times T_1 is proportional to the square of the Larmor frequency". Corrected 9-30-14. Found when preparing the 5th edition.

Page 526: At the end of Sec. 18.8.2, "Joseph and Axel (1984)" should be "Joseph et al. (1984)". Corrected 9-30-14. Found when preparing the 5th edition.

Page 529: Jacob Schmidt of the UCLA Department of Bioengineering found a subtle error in several of our figures in Chapter 18, Magnetic Resonance Imaging. For example, in Fig. 18.24 the $\pi/2$ pulse is modulated by a sinc function and is applied while the slice selection gradient G_z is on. However, the π pulse is modulated by a sinc function but G_z is off. For the π pulse, the slice selection gradient should be turned on again. The corrected Fig. 18.24 is shown below. *[corrected in the second printing]*



Note that one could alternatively use a square π pulse (like in Fig. 18.18) and not have G_z turned on during it. You would then flip the

spins in the entire sample, but only those spins in the selected slice would have a transverse component and therefore contribute to the M_x signal. Either a square π pulse with no G_z or a sinc π pulse with G_z would be correct, but a sinc π pulse with no G_z does not make sense. Similar changes should be made in Figs. 26, 28, 29, 30, 31, and 41.

Another issue Schmidt pointed out is that Figs. 16, 18, 19 and 21 show square π pulses that are the same duration and twice the amplitude of a $\pi/2$ pulse. One could alternatively double the duration and keep the amplitude the same. In theory, either way works. My colleague Dr. Yang Xia of Oakland University tells me that because of instrumentation issues, the π pulse typically has the same amplitude but twice the duration of the $\pi/2$ pulse. Note that when imaging, the slice thickness and G_z gradient determine the duration of the sinc-modulated $\pi/2$ and the π pulses; their amplitudes must be different.

Page 530: In the last line in the left column, " G_x/G_y " should be " G_y/G_x ".
Corrected 9-30-14. Found when preparing the 5th edition.

Page 535: Following Eq. 18.56, " $v \gg T_R/\Delta z$ " should be " $v \gg \Delta z/T_R$ ".
Corrected 9-30-14. Found when preparing the 5th edition.

Page 538: This is not really a correction to Chapter 18, Problem 10, but merely an improvement in wording. "of a static field B ." should be "of a static field B , if initially $M_x=M_0$, $M_y=0$, and $M_z=0$." Corrected 12-2-09.

Page 539: In Chapter 18, Homework Problem 18, "while the line between them makes an angle θ with the x axis" should be "while the line between them makes an angle θ with the z axis". Also, in the accompanying figure following the homework problem, the angle θ should be measured from the z (vertical) axis, not the x (horizontal) axis. Corrected 1-18-13.

Page 539: In Chapter 18 Problem 19d, the equation for the SAR has an extra factor of 4 in the denominator. It should read

$$SAR = \left(\frac{1}{T_R \Delta t} \right) \left(\frac{\sigma}{2\rho} \right) R^2 B_0^2 \theta^2.$$

We thank Dr. Hugo Vrenken, Department of Physics and Medical Technology, VU University Medical Center, Amsterdam, The Netherlands for pointing out this mistake. *[corrected in the second printing]*

Page 540: In Chapter 18, Problem 27, “about z' by θ again” should be “about z' by 2θ ”. Corrected 12-2-09.

Page 540: In Chapter 18, Problem 29, “Spins are excited by applying a field gradient” should be “Spins are excited while applying a field gradient”.

Page 541: Chapter 18 Problem 38b, the equation for $M_{y'}$ is missing a minus sign. It should be $M_{y'} = -M(0)e^{-t/T_2} \sin(\gamma G_z z t)$. *[corrected in the second printing]*

Page 542: “Joseph, P. M., and L. Axel (1984)” should be “Joseph, P. M., L. Axel, and M. O'Donnell (1984)”. Our apologies to Dr. O'Donnell. Corrected 9-30-14. Found when preparing the 5th edition.

Page 598: In the index, the entry for “Hodgkin-Huxley model” is missing the most important pages where the model is discussed. It should read “Hodgkin-Huxley model, 154-159, 268, 275”. This error was found by Nick Charteris, 12-4-09.