Errata for First Edition

A Practical Introduction to Beam Physics and Particle Accelerators
ISBN: 978-1-6817-4012-6

This document lists corrections to errors, misconceptions, and other problems that were found in the first edition of the book. If you find errors that are not listed here, please email me at sabern@umd.edu. Most of these problems have been corrected in the second edition of the book.

[Book Home Page](#)

Last update 1/9/2024

Author Biography:

p. xi, The correct title of the book mentioned is *Modern Devices: The Simple Physics of Sophisticated Technology* (Wiley, 2016).

Chapter 1

p. 1-3 Equation 1.2.1**:** this definition of effective length is inconsistent with the discussion in section 2.6. However, it is a reasonable definition if the field profile of the lens is not dominated by "tails", i.e. significant fringe features (lack of extended flat-top.) See also below under "Appendix."

Chapter 2

p. 2-4, near bottom of page: the workshop presentation on "Solenoid Dynamics" by R. B. Palmer is no longer available online (Ref. [4]).

Chapter 3

p. 3-10 Equations (3.5.1) and (3.5.3), right-hand sides: "+" should be substituted for "−".

Chapter 4

p. 4-8 Second line: substitute "Equation (4.3.1) can be derived from equation (3.3.6) …" for "Equation (4.3.1) is related to equation (3.3.6) …"

p. 4-8 First line following equation (4.3.2): the statement "Note that the equations for either $X(s)$ or $R(s)$, unlike the ones for $w(s)$ or $w_{\max}(s)$, involve the statistical quantity ε_{xrms}…" should read "Note that the equations for either $X(s)$ or $R(s)$, unlike the one for $w(s)$, involve the statistical quantity ε_{xrms} …"

p. 4-9 Fourth line after equation (4.3.5): "$k_0{}^2 a$" should be substituted for "$k_0 a$".

Chapter 5

p. 5-15 Equation (5.5.18), fraction multiplying the square root: the constant in the denominator should be $\varepsilon_{zz'}$ instead of ε_0.

p. 5-18 Reference [1]: the correct title of the book is *Modern Devices: The Simple Physics of Sophisticated Technology*.

Chapter 6

p. 6-7 Equation (6.2.11), left-hand size: missing power "2" in ν_{X0}.

p. 6-7 Fourth and sixth lines after equation (6.2.11): $\beta^2 b_0$ should be $\beta^2 b_1$

Appendix

p. A-4 Table A.3: Several hyperlinks do not work anymore. See Errata for the 3rd Edition for most recent hyperlinks.

p. A-5 third paragraph: unfortunately, the use of the word "thick" when referring to lenses is generally inaccurate in the literature. Thick lenses, meaning those with significant fringe-fields, are non-symplectic, but "thick" lenses in the sense of a combination of 2 or more thin lenses, as discussed in chapter 1, *are* symplectic (see Mathcad or SmathStudio documents.) Furthermore, the matrix in equation (3.1.1) is often, and inconsistently (no explicit connection to fringe fields), described as the matrix for a thick lens, as opposed to the thin-lens matrix in equation (1.1.5). However, both matrices are symplectic!

p. A-14, p. A-15

MAD-8 AND MAD-X

Laurent Deniau, project manager of the MAD series at CERN, has kindly pointed out a number of problems with this section and the file FODOUMER.MADX. He has also provided us with a revised, much better version of the example. First, the MATCH command in the original example is not required to obtain periodic solutions of lattice functions; the TWISS command that precedes it is sufficient; second, there is no need to slice the quadrupole and drifts to obtain smooth curves; third, there is no need to use the symbol "<" to run the example (just typing 'madx FODOUMERrev.MADX' for the revised example will work).