Errata to "An Introduction to the Physics of Particle Accelerators", 2nd Ed.

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Chapter 3

1. p. 54: Line before Eq. (3.95): Change "Subtracting 1 . . ." to "Subtracting **I** . . .".
2. p. 60: Add $+\mathcal{O}(h^3)$ to Eq. (3.128).
3. p. 61: Eq. (3.133) should read:

$$b = -\frac{2^{1/3}}{1-2^{1/3}}.$$

4. p. 61, second line from bottom: First condition of bilinearity should read:

$$[ax + by, z] = a[x, z] + b[y, z].$$

5. p. 65, line after Eq. (3.143) should read: which is not quite antisymmetric. . .
6. p. 68, line after Eq. (3.167): Change "term" to "terms".
7. Problem 3–3, second line: Change the reference number "78" to "7,8".
8. Problem 3-9, line after equation should start: Note that this gives . . . .

Chapter 4

9. p. 87, Eq. (4.57) should be

$$\vec{B}(s) = B_0\hat{s}\frac{\sqrt{l^2+4a^2}}{2l}\left[\frac{s}{\sqrt{s^2+a^2}} + \frac{l-s}{\sqrt{(s-l)^2+a^2}}\right].$$

10. p. 88, The last line of Eq. (4.59) should read:

$$= -B_0\frac{\sqrt{l^2+4a^2}}{2l}\left(\frac{a^2}{(s^2+a^2)^{3/2}} - \frac{a^2}{[(s-l)^2+a^2]^{3/2}}\right)r$$

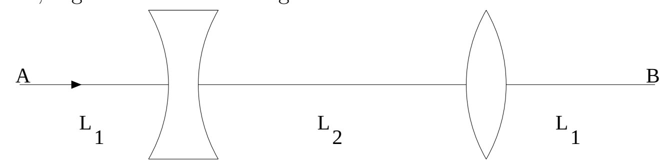
11. p. 92: Problems 4-9 and 4-10 are essentially identical. I'm not sure how that happened. Delete 4-10.
12. p. 94: The last term inside the brackets of the equation for A_z in part b of problem 4–15 should have a cosine rather than a sine function.

Chapter 5

13. p. 97, 3rd line after Eq. (5.3): Change "eigenvaluesof" to "eigenvalues of".
14. p. 99, 6th line from bottom: Change "this of solution" to "this solution".
    p. 113, Problem 5–11, the 2$^{\rm nd}$ conversion formula should be: $\epsilon_{95\%} \simeq 5.991\epsilon_{\rm rms}$.

Chapter 6

15. p. 121, Fig. 6.2 should be changed to:



16. p. 128, In Eq. 6.67 and the following line, replace A and B with $\mathbf{A}$ and $\mathbf{B}$.
17. p. 129, 4 lines before Eq. (6.89): The second sentence of the paragraph is wrong. There are some cases of stable matrices with equal tunes and some coupling elements. One example is

$$\mathbf{M} = \begin{pmatrix} \cos\mu & \sin\mu + \frac{a^2}{\sin\mu} & a & 0 \\ -\sin\mu & \cos\mu & 0 & -a \\ a & 0 & \cos\mu & \sin\mu + \frac{a^2}{\sin\mu} \\ 0 & -a & -\sin\mu & \cos\mu \end{pmatrix}.$$

18. p. 132, Eq. (6.98) should read

$$\mathbf{T}^{-1} = \begin{pmatrix} \tilde{\mathbf{M}} & \tilde{\mathbf{m}} \\ \tilde{\mathbf{n}} & \tilde{\mathbf{N}} \end{pmatrix} = \begin{pmatrix} f & -b & p & -k \\ -e & a & -n & j \\ h & -d & r & -m \\ -g & c & -q & l \end{pmatrix}.$$

Chapter 7

19. p. 162, Problem 7-3: Replace "γtr" with "$\gamma_{\rm tr}$".
20. p. 162, Problem 7-3: The atomic number of gold is $A = 197$ and not 179.

Chapter 8

21. p. 166, 4 lines before Eq. (8.13) and again 3 lines after Eq. (8.15): Change "loose" to "lose".
22. p. 168, First line: There should not be a bar over the derivative $(dU_\gamma/dU)_s$. (I don't know if this is in all copies. It appears to be a flaw in printing process, since it wasn't in the original electronic files.)
23. p. 169, 3 lines before Eq. (8.37): Change "loose" to "lose".
24. p. 173, Replace the two lines ("In averaging $A\,d(\Delta A)$ over . . . becomes") before Eq. (8.63) with "Dropping the second order differentials, Eq. (8.62) combined with Eq. (8.61) yields"
25. p. 177, Eq. (8.89) should read:

$$\omega \propto \frac{1}{\delta t} \propto \frac{\gamma^3}{\rho}.$$

26. p. 180, In Eq. (8.104), the right-hand side should be

$$\cdots = \frac{1}{c\tau_s}\oint N_\gamma\langle u_\gamma^2\rangle\,ds.$$

27. p. 186, Problem 8-5: The last part should be labelled “c” not “b”.

Chapter 10

28. p. 214, In Eq. (10.9) the M_{12} term of the matrix should be “$\beta \sin \mu$”.
29. p. 229, Problem 8-2: There should be an additional factor of x in the second term on the left side of the equation.

Chapter 11

30. p. 233, Eq. (11.17) should read:

$$\delta Q_{\mathrm{V}} = -\frac{\beta_{\mathrm{V}} N r_0}{2\pi B_f \sigma_{\mathrm{V}}(\sigma_{\mathrm{H}} + \sigma_{\mathrm{V}})\beta^2\gamma^3}.$$

31. p. 233, 2 lines after Eq. (11.17): Change $\beta^3\gamma^2$ to $\beta^2\gamma^3$.

Chapter 13

32. p. 275, Eq. (13.42) should read:

$$M^{\mu}{}_{\nu} = \Lambda(-\delta\vec{\beta}')^{\mu}{}_{\kappa} R_x(\theta)^{\kappa}{}_{\nu} + \mathcal{O}(\delta\beta^2) = R_x(\theta)^{\mu}{}_{\kappa} \Lambda(-\delta\vec{\beta}')^{\kappa}{}_{\nu} + \mathcal{O}(\delta\beta^2). \quad 13.42$$

33. p. 284, Eq. (13.106) should read

$$\frac{dS^{\mu}}{d\tau} = \frac{q}{m}\left[F^{\mu\nu} + \frac{g-2}{2}(F^{\mu\nu} + \beta^{\mu}\, F^{\nu\kappa}\beta_{\kappa})\right] S_{\nu}.$$

34. p. 284, Eq. (13.107) should read

$$\frac{dp^{\mu}}{d\tau} = \frac{q}{m} F^{\mu\nu} p_{\nu}.$$

35. p. 296, Eq. (13.191) should read

$$\mathbf{D}^1_{\hat{z}}(\theta) = \begin{pmatrix} \frac{\cos\theta+1}{2} & \frac{i\sin\theta}{\sqrt{2}} & \frac{\cos\theta-1}{2} \\ \frac{i\sin\theta}{\sqrt{2}} & \cos\theta & \frac{i\sin\theta}{\sqrt{2}} \\ \frac{\cos\theta-1}{2} & \frac{i\sin\theta}{\sqrt{2}} & \frac{\cos\theta+1}{2} \end{pmatrix}.$$

36. p. 302, First line should be changed to: Using this with $\vec{E} = 0$, Eq. (13.68) transforms into . . .
37. p. 302, The second line of Eq. (31.212) is missing a factor of i.
38. p. 313, In Eq. (13.261) $W_{\uparrow\downarrow}$ should be replaced by $W_{\downarrow\uparrow}$.
39. p. 315, In problems 13–6 and 13–7, the undefined matrices $\mathbf{R}_{\hat{j}}(\cdots)$ should be replaced by spinor rotation matrices $\mathbf{D}^{\frac{1}{2}}_{\hat{j}}(\cdots)$.

Chapter 14

40. p. 327, The summation variable in Eq. (14.24) should be m and not i.

Appendix A

41. p. 337, Change first line of §A.9 to “We define the phase slip factor[7]”.

42. Reference 7 should be added.

    E. D. Courant, “Computer Studies of Phase-Lock Acceleration”, 1961 Int. Conf. on H. E. Accelerators, Ed. M. H. Blewett, Brookhaven National Lab, p. 201 (1961).

    H. Koziol, “Beam Diagnostics for Accelerators”, CERN 94-01, v. II, p.565-599 (1994). See page 599.

Appendix D

43. p. 346, Eq. (D.13): Replace N_z with N.

Appendix F

44. p. 359, 7th line from bottom, the 2nd Hankel function is missing an argument of x, i. e. it should read $H^{(2)}(x)$.