Corrections to the book
"A Modern Introduction to Quantum Field Theory",
by Michele Maggiore
(Last update: March 26, 2007)

- The most important error is on pages 93-94, where eqs. (4.60) and (4.61) are incorrect and must be replaced by

$$[-i\gamma^2 u^1(p)]^* = +v^2(p)\,, \quad [-i\gamma^2 u^2(p)]^* = -v^1(p)$$

and by

$$[-i\gamma^2 v^1(p)]^* = -u^2(p)\,, \quad [-i\gamma^2 v^2(p)]^* = +u^1(p),$$

respectively. As a consequence, eq (4.59) is not the correct definition of the charge conjugation operation. Rather, we must write

$$Ca_{\mathbf{p},1}C = +\eta_C b_{\mathbf{p},2}, \quad Ca_{\mathbf{p},2}C = -\eta_C b_{\mathbf{p},1}$$

and

$$Cb_{\mathbf{p},1}C = -\eta_C a_{\mathbf{p},2}, \quad Cb_{\mathbf{p},2}C = +\eta_C a_{\mathbf{p},1}\,.$$

With these definitions, the relation $C\Psi C = -i\eta_C\gamma^2\Psi^*$ given in eq. (4.62) is correct. Observe that, with this definition, charge conjugation transforms a particle with a given spin state into an antiparticle with the same spin state.

Other corrections:

- on page 67, "(see Exercise 2.4)" should become "(see Exercise 2.6)"
- on page 69, two lines above section 3.5.4, "Correspondingly, energy density ..." should become "Correspondingly, for classical waves energy density ..."
- on page 71, four lines from the bottom, "We see from eq. (3.175)" should become "We see from eq. (3.174)"

- on page 90, third line, "Using the expression for the Noether current given in Section 2.6.2," should become "Computing the corresponding Noether charge in the same way as we did for scalar fields in Section 3.3.1,"

- on page 100, first line, "... *describe particles with momentum* $\mathbf{k}$, energy $\omega_k = |\mathbf{k}|$, *mass zero, spin 1, and helicity* ± 1." should become "... *describe particles with momentum* $\mathbf{k}$, energy $\omega_k = |\mathbf{k}|$, *mass zero, and helicity* ± 1."

- on page 164, three lines below eq. (6.52), "is indeed equal to $-i\Gamma/2$" should become "is indeed equal to $-\Gamma/2$".

- on page 175, Note 6, "and we are left with $\Delta L = \pm 1$. Similarly ..." should become "and we are left with $\Delta L = \pm 1$. (Observe that in eq. (6.107) we are neglecting all terms involving the electron spin, so we are limiting ourselves to transitions with $\Delta L = \Delta J$, with J the total, orbital plus spin, angular momentum). Similarly ..."

- on page 181, 15 lines above the bottom, "2×10^{-16} eV" should become "6×10^{-17} eV", according to the most recent data from the Particle Data Group.

- on page 221, eq. (9.10), dp_m should become

$$\frac{dp_m}{2\pi}$$

  The same for all factors dp_m in eq. (9.11). Similarly, in eq. (9.12), $dp_0 \to dp_0/(2\pi)$, $dp_1 \to dp_1/(2\pi)$, $dp_{N-1} \to dp_{N-1}/(2\pi)$.

- on page 226, eq. (9.37), on the right-hand side the factor 1/2 refers only to the first term, so this equation should read

$$\begin{aligned} &\frac{i}{2}\int d^4x\,\left[\partial^\mu\phi\partial_\mu\phi - (m^2 - i\epsilon)\phi^2\right] + \int d^4x\,\phi(x)J(x) \\ &= \int \frac{d^4p}{(2\pi)^4}\,\left[\frac{1}{2}\tilde{\phi}(-p)i(p^2 - m^2 + i\epsilon)\tilde{\phi}(p) + \tilde{J}(-p)\tilde{\phi}(p)\right]. \end{aligned}$$

- on page 245, two lines below eq. (10.12), "$\bar{\Psi} \to U_R^\dagger$" should become "$\bar{\Psi} \to U_R^\dagger \bar{\Psi}$"

- on page 273, solution to Ex. 4.3, "... the transpose of γ^μ can be written as $(\gamma^\mu)^T = \gamma^0\gamma^\mu\gamma^0$, ..." should become "... the transpose of γ^μ is given by $(\gamma^0)^T = +\gamma^0$, $(\gamma^1)^T = -\gamma^1$, $(\gamma^2)^T = +\gamma^2$, $(\gamma^3)^T = -\gamma^3$, ..."

Finally, some minor typos:

- on page 58, eq. (3.91), we should put a comma between the two equalities, so it becomes

$$\frac{1-\gamma^5}{2}\Psi = \begin{pmatrix} \psi_L \\ 0 \end{pmatrix}, \qquad \frac{1+\gamma^5}{2}\Psi = \begin{pmatrix} 0 \\ \psi_R \end{pmatrix}.$$

- page 59, 5 lines below eq. (3.97), "since $\psi_{L,R}$ are the irreducible representations of the Lorentz group" should become "since $\psi_{L,R}$ belong to the irreducible representations of the Lorentz group"

- page 82, exercise 3.6: "d'Alambertian" should actually be written "d'Alembertian"

- on page 141, eq. (5.147), on the right-hand side, "$8\pi G$" is actually "$8\pi G_N$".

- on page 170, in eq. (6.81), $e^{i\mathbf{qx}}$ should become $e^{i\mathbf{q}\cdot\mathbf{x}}$ (i.e. a dot is missing).

- on page 222, first line, "are not be interested" should become "are not interested"