Errata and Comments for

Geometry of String Theory Compactifications

Alessandro Tomasiello

Last Updated: July 26, 2022

- **Comment:** (4.3.46) shows that D_m and ∇_m agree in an appropriate sense. You might still be unsettled by its particular instance (4.3.47), which contains the connection explicitly. If so, consider a vector-spinor ψ^m (such as the gravitino that will appear in later sections). Since it has both an index m and an (implicit) spinor index, the appropriate notion of covariant derivative for such an object contains both the spin connection and the ordinary one:

$$\hat{D}_m(\psi^n) = \partial_m \psi^n + \frac{1}{4}\omega_m^{ab}\gamma_{ab}\psi^n + \Gamma^n_{mp}\psi^p = D_m\psi^n + \Gamma^n_{mp}\psi^p\,. \tag{0.1}$$

  Now (4.3.47) can be recast as

$$\hat{D}_m(\gamma^n\eta) = \gamma^n D_m\eta\,. \tag{0.2}$$

  Compare with the hint for Exercise 4.3.15. In the language used here, the term $D_m D^m$ should be written more precisely as $\hat{D}_m D^m$.

- In equation (4.3.75), the 1/8 on the right-hand side should be 1/4. [Thanks to S. Raucci.]

- Below (4.4.34): "elements T_i^0" should be "elements T_i".

- (4.5.38) should read

$$\begin{aligned} X_\mu &= \cosh\lambda\,\hat{x}_\mu \quad (\mu = 0, \ldots, d-2)\,, \qquad \eta^{\mu\nu}_{(d-1)}\hat{x}_\mu\hat{x}_\nu = -1\,; \\ X_{d-1} &= \sinh\lambda\cosh t\,, \qquad X_d = \sinh\lambda\sinh t\,. \end{aligned} \tag{0.3}$$

  Comment: (4.5.38) as written in the book is actually the solution to the second half of exercise (4.5.44).

- In (4.5.39), the S^{d-2} should be H_{d-2}, thus making the comment right below a little more sensible.

- Above (7.3.18), below (7.3.20), and above (7.3.25), "$\mu = 1$" should be "$\mu = \mathrm{i}$"; below (7.3.20), "$\mu = -1$" should be "$\mu = -\mathrm{i}$". [Thanks to S. Giri.]

- Two lines above (7.4.11), the reference to (7.4.10) should be more precisely to (7.4.10c).
- Last line before section 7.4.6: "KE_4" should be "$\mathrm{KE}_4 = \mathbb{CP}^2$".
- In equation (8.4.33a), "α_1^2" should be "$|\alpha_1|^2$".
- Two lines below (8.4.34), "$\mathrm{d}\alpha_1$" should be "$\mathrm{d}\alpha_1 = 0$".
- In (9.1.38), the index on the α in the second equation should be raised. (It would have been more natural to use α_J and β^J on the right-hand side, here and in (8.3.16).)
- In (9.4.30), the exponent should of course not be $-1/12$, but $-1/6$ as in the previous equation. Unfortunately this propagates in the next few lines: in the next line again $-1/12 \to -1/6$, in the one right below $1 - 1/24 \to 1 - 1/12$; then in (9.4.31) and twice below, again $-1/12 \to -1/6$. Finally the sum of the deficit angles should not be 2π but 4π. **Comment:** the 2π looks reassuring, but in fact it is easy to see that 4π is the right result by considering a polyhedron (such as the cube, where a $\pi/2$ deficit appears eight times).
- Above (9.5.26), there should be an i in front of $\tilde{\zeta}_a$.
- Three lines below (9.5.29): "$D_\alpha W$" should be "$D_a W$".
- Three lines above (10.1.35); "[429, App. B]" should be "[429, App. D]".
- In (11.1.17): "CFT in d dimensions" should be "CFT in $d-1$ dimensions". [Thanks to S. Giri.]
- In (11.3.11), $\tan\theta$ should be $\cot\theta$.
- In (11.3.39), last line: the "8" should be a "-8"; in the last equation, an extra term $-\delta$ should be added to the right-hand side. [4/5/22]
- In the paragraph leading to (12.1.1), "$2\pi\mathrm{i}$" should be "-2π"; "$T = \sigma + \mathrm{i}$" should be "$T = \sigma + \mathrm{i}\tilde{\zeta}$".
- In reference 257, the title is not "Superspace and Supergravity" but "Supersymmetry and Supergravity". [Thanks to M. Ramspeck.]