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Addendum: Automated consistent truncations and stability of flux compactifications

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The expressions (2.19) and (2.20) for the scalar potentials obtained from type IIA and IIB supergravity could be improved to the following ones

$$V^{\rm IIA}(\varphi^i) = \frac{M_p^2}{2}\frac{e^{2\phi}}{vol_6}\Bigg(-R_6 + \frac{1}{2}|H_3|^2_{\rm int} - e^{\phi}\sum_{p=4,6,8}\frac{T_{10}^{(p)}}{p+1} + \frac{e^{2\phi}}{2}\Bigg[F_0^2 + |F_2+F_0B_2|^2_{\rm int} + \Big|F_4 + C_1\wedge H_3 + F_2\wedge B_2 + \frac{1}{2}F_0\ B_2\wedge B_2\Big|^2_{\rm int} + \Big|F_6 + C_3\wedge H_3 + F_4\wedge B_2 + C_1\wedge H_3\wedge B_2 + \frac{1}{2}F_2\wedge B_2\wedge B_2 + \frac{1}{6}F_0\ B_2\wedge B_2\wedge B_2\Big|^2_{\rm int}\Bigg]\Bigg)$$

in type IIA and

$$V^{\rm IIB}(\varphi^i) = \frac{M_p^2}{2}\frac{e^{2\phi}}{vol_6}\Bigg(-R_6 + \frac{1}{2}|H_3|^2_{\rm int} - e^{\phi}\sum_{p=3,5,7,9}\frac{T_{10}^{(p)}}{p+1} + \frac{e^{2\phi}}{2}\Bigg[|F_1|^2_{\rm int} + |F_3 - C_0\wedge H_3 + F_1\wedge B_2|^2_{\rm int} + \Big|F_5 - C_2\wedge H_3 + F_3\wedge B_2 - C_0\wedge H_3\wedge B_2 + \frac{1}{2}F_1\wedge B_2\wedge B_2\Big|^2_{\rm int}\Bigg]\Bigg)$$

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in type IIB. There, one uses the definition

$$\frac{M_p^2}{2}\frac{T_{10}^{(p)_I}}{p+1} = \frac{1}{(2\pi)^3(\alpha')^2}\left(2^{p-5}N_{O_p}^I - N_{D_p}^I\right)\frac{volB_{p-3}^I}{vol_6}\,,$$

slightly modifying (2.17). In addition, the fluxes appearing in these scalar potentials are given by (the internal forms in) (2.2) including axion terms, and the gauge fields B_2 and C_q contain only 4d axions. These expressions for the scalar potentials match those used in the code `MSSV`, and have been successfully tested against 10d equations as discussed in section 4.

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