

Some notes on the fibrations

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October 9, 2014

Some notes on the conventions used for fibration data within our code.

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1 Conventions!

We work with the following form of elliptic fibrations:

$$y^2 = 4z^3 - g_2(u)z - g_3(u) \quad (1)$$

with

$$\Delta(u) = (g_2(u))^3 - 27(g_3(u))^2. \quad (2)$$

2 $SU(2)$ $N_f = 1$

From section 2 of 9706145 (Bilal-Ferrari)

$$y^2 = x^2(x - u) + \frac{m\Lambda^3}{4}x - \frac{\Lambda^6}{64} \quad (3)$$

rescaling y by a factor of 2, and shifting $z \rightarrow z + u/3$ brings this into Weierstrass normal form

$$\begin{aligned} y^2 &= 4z^3 - g_2(u)z - g_3(u) \\ g_2(u) &= -\Lambda^3 m + \frac{4u^2}{3} \\ g_3(u) &= \frac{\Lambda^6}{16} - \frac{\Lambda^3 m u}{3} + \frac{8u^3}{27} \end{aligned} \quad (4)$$

which is the form appearing in the code.