Errata for the thesis *Complex multiplication of abelian surfaces* by Marco Streng.

For corrections to *A CM construction for curves of genus 2 with p-rank 1* by Laura Hitt, Gary McGuire, Michael Naehrig and Marco Streng, see “Chapter V” below (though page numbers do not match up).

Chapter I

- p.23, last line: replace $E(f(u), f(v))$ by $E'(f(u), f(v))$ (pointed out by an anonymous referee)

- p.25, line -4 (proof of Proposition 5.3): “As $D_{K/Q}$ and $xO_K$ are invariant under complex multiplication, ...”. First of all, “$x$” should be “$z$” here. Moreover, it isn’t quite that simple: we need $z^{-1}D_{K/Q} = hO_K$ for a fractional $O_K$-ideal $h$. This does not follow from Galois-invariance of $zO_K$ and $D_{K/Q}$. However, it does follow from the fact that $z^{-1}D_{K/K_0}$ is generated by $z^{-1}(\alpha - \overline{\alpha})$ where $\alpha$ runs over $K$. Indeed, we have $z^{-1}(\alpha - \overline{\alpha}) \in K_0$, so that the result is correct.

- p.26, line 2 (proof of Proposition 5.3): remove “totally positive” (pointed out by Emmanuel Thomé)

- p.37, first displayed formula of the proof of Theorem 10.5: the definition of $a_i$ is missing, but can be found a few lines later.

Chapter II

- p.46, second paragraph of the proof of Lemma 3.3, missing explanation why $k$ is 1 or 2: take the norm $N_{K/K_0}$ of the identity $\epsilon_0 = z^k$ to find $\epsilon_0^m = (\pm \epsilon_0)^k$ for some integer $m$. (pointed out by an anonymous referee)

- p.49, line -5 (Section 4.1): replace “($\xi x\overline{y}$)” by “($\xi x y$)”

- p.53, paragraph above (5.2), “$SL_2(\mathbb{Z})$ acts on $Y$ via $(U,Y) \mapsto UYU^\dagger$”, replace “$UYU^\dagger$” by “$(U^\dagger)^{-1}YU^{-1}$” (to make the action compatible with the one on the upper half plane).

- p.60, line above Lemma 5.17: in $h(Z) \leq 2(\log |M| + h(Z_0) + \log 4)$, replace 2 by 16 (pointed out by Christopher Daw)

- p.68, second formula from the bottom of the page: the $b_i, c_i, d_i$ should be integers, that is, this formula should read

$$\left(\theta_{[\frac{1}{2}b_1, \frac{1}{2}b_2, \frac{1}{2}b_3, \frac{1}{2}b_4]} \theta_{[\frac{1}{2}c_1, \frac{1}{2}c_2, \frac{1}{2}c_3, \frac{1}{2}c_4]} \theta_{[\frac{1}{2}d_1, \frac{1}{2}d_2, \frac{1}{2}d_3, \frac{1}{2}d_4]}\right)^4$$

(pointed out by Michael Naehrig).

- p.73, step 3 of Algorithm 7.13 (line 17 of the page): remove the factors $2^8$ and $2^5$

- p.73, proof of Proposition 7.14: replace “$\leq$” by “$=$” in “$\epsilon(\overline{\theta_{a_{1+1}}}) = \ldots$”.

- p.74, near the end of the proof of Proposition 7.14: replace $h_{10}^{-2}$ by $h_{10}^{-3}$. 
• p.74, step 1 of Algorithm 7.15: $R$ should be $\lceil(0.51s + 2.55)^{1/2}\rceil$ (see the next item).

• p.75, just above the middle of the page: $n_1n_2g_3$ should be $2n_1n_2g_3$ and \( \frac{1}{2} \) on the same line should be \( \frac{1}{2} \). The rest of the proof should be changed accordingly. The correct details will appear in the published version.

• p.85, definition of $\kappa_k$ on the middle of the page: the $p$ here is not the $p$ from step 2 of the algorithm (which depends on $t$). Instead, it is $p = u + \log_2 s + 3 \log_2 n + 3$, which is $\sum_{j \in d(t)} s_j$ larger and does not depend on $t$.

Chapter III

• p.98, reference for the Shimura-Taniyama formula, Theorem 4.1: replace \( \S \) 1 by \( \S \) 13.

Chapter V

• p.126, last line of the proof of Lemma 2: replace $\text{deg } p_i$ by $\#(O_K/p_i) = p^{f_i}$.

• p.129, line 3 of the second paragraph of the proof of Lemma 7: “trivial decomposition group $H/K$” should be “trivial decomposition group in $H/K$”

• p.132, line 8, first line of the last paragraph of the proof of Theorem 9: “$\log(Y) > -\sum q \frac{\log n}{q}$” is only true up to adding a function that is $\sum_q O(1/q^2) = O(1)$, which does not affect the validity of the rest of the proof

• p.132, line 9, second line of the last paragraph of the proof of Theorem 9: replace “$17 \log \log X$” by “$-17 \log \log X$”

Appendix 1

• p.147, first line of the last paragraph: replace $I_6$ by $I'_6$, which is $\frac{1}{2}(I_2I_4 - 3I_6)$.

Appendix 2

• pp.153, Algorithm 2.5, step 3: replace “$\phi(a) > 0$” by “$\phi(a)$ has the same sign as $\text{Im}(\phi(\sqrt{D\delta}))$”. Otherwise, the algorithm restricts to an incorrect CM-type. Indeed, we need $\text{Im}(\phi(\xi)) > 0$ and have $\xi = (z - \overline{z})\delta^{-1} = 2\sqrt{D}/(a\delta)$, whose imaginary part does not always have the same sign as $\phi(a)$.