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 $\mathcal{D}_{K/\mathbf{Q}}$ and $x\mathcal{O}_K$ are invariant under complex multiplication, ...". First of all, "x" should be "z" here. Moreover, it isn't quite that simple: we need $z^{-1}\mathcal{D}_{K/\mathbf{Q}} = \mathfrak{h}\mathcal{O}_K$ for a fractional $\mathcal{O}_{K_0}$-ideal $\mathfrak{h}$. This does not follow from Galois-invariance of $z\mathcal{O}_K$ and $\mathcal{D}_{K/\mathbf{Q}}$. However, it does follow from the fact that $z^{-1}\mathcal{D}_{K/K_0}$ is generated by $z^{-1}(\alpha - \overline{\alpha})$ where α 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 $\epsilon_0 = \epsilon^k$ to find $\epsilon_0^2 = (\pm\epsilon_0^l)^k$ for some integer l. (pointed out by an anonymous referee)
- p.49, line -5 (Section 4.1): replace "$(\xi x\overline{y})$" by "$(\xi\overline{x}y)$"
- p.53, paragraph above (5.2), "$\mathrm{SL}_2(\mathbf{Z})$ acts on Y via $(U, Y) \mapsto UYU^{\mathrm{t}}$", replace "$UYU^{\mathrm{t}}$
by "$(U^{\mathrm{t}})^{-1}YU^{-1}$" (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

$$\Big(\theta[\tfrac{1}{2}b_1, \tfrac{1}{2}b_2, \tfrac{1}{2}b_3, \tfrac{1}{2}b_4] \;\; \theta[\tfrac{1}{2}c_1, \tfrac{1}{2}c_2, \tfrac{1}{2}c_3, \tfrac{1}{2}c_4] \;\; \theta[\tfrac{1}{2}d_1, \tfrac{1}{2}d_2, \tfrac{1}{2}d_3, \tfrac{1}{2}d_4]\Big)^4$$

  (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 "=" by "$\leq$" in "$\epsilon(\widetilde{A}_{i+1}) = \ldots$".
- p.74, near the end of the proof of Proposition 7.14: replace h_{10}^{-2} by h_{10}^{-1}.

- 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: $n_1 n_2 y_3$ should be $2n_1 n_2 y_3$ and $\frac{3}{4}$ 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 κ_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 §1 by §13.

Chapter V

- p.126, last line of the proof of Lemma 2: replace $\deg \mathfrak{p}_i$ by $\#(\mathcal{O}_K/\mathfrak{p}_i) = p^{f_i}$.
- 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: "$\log(Y) > -\sum_q \frac{17}{q}$" 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 $\frac{1}{2}(I_2 I_4 - 3I_6)$.

Appendix 2

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