Erratum to Perfect Lattices in Euclidean Spaces

Note. The English edition of my book takes into account the (numerous) errors detected early enough in the French edition. Some of the errors listed below are reproduced from the French edition. They are marked “FE”, and are quoted in the French erratum. Amazingly, I introduced some errors while making the translation into English (for instance on page 338, because I had to make use of a new package). These are marked “E”.

Since May 2015, the erratum for the French edition is no longer maintained.

page 41 (FE; Gabriele Nebe). In Th. 2.2.8, replace \( \left( \frac{1}{2} \right)^{(n-1)/2} \) by \( \left( \frac{1}{2} \right)^{n(n-1)/2} \).

page 48, last line: replace \( \Lambda' = \lambda u \) by \( \Lambda' = \lambda u(\Lambda) \).

page 59, line 4 (FE; Bertrand Meyer):
\[
\det(\Lambda) = \gamma'_{n,n-k}(\Lambda^2) d_{n-k}(\Lambda^*) = \gamma'_{n,n-k}(\Lambda^2) d_k(\Lambda) \]

instead of
\[
\det(\Lambda) = \gamma'_{n,n-k}(\Lambda^2) d_{n-k}(\Lambda^*) = \gamma'_{n,n-k}(\Lambda^2) d_k(\Lambda) \]

page 64, line 12: replace 1991 by 1891.

page 77, l. 11 (E; Robin Chapman) — “lost in translation!”:
read: of \( V \) by \( V/W \) where \( W \) is the intersection . . .

page 80, (E; after Robin Chapman): l. 4 to 6, suppress The derivative . . .

page 100, l. 16(E) replace \( n \geq 8 \) by \( n \geq 6 \).

page 141, (E) Exer. 4.4.7, line 1: ”psl odd” is a slip for odd (slanted)

page 160, (FE) line 2: replace \( \varphi(n) \) by \( \varphi(n+1) \).

page 182, (E) In the fourth column of the table, exchange 2048 and 2300.

pages 190–194 (FE), Robin Chapman (www.maths.ex.ac.uk/~rjc/rjc.html) pointed out an imperfection at the end of the long induction process used to prove Korkine and Zolotareff’s Theorem 6.1.2.

page 197, l. 7 (E): \( s + s^* \geq \frac{n(n+1)}{2} + 1 \) instead of \( s + s^* \geq n + 1 \).

page 202 (E), displayed formula in Theorem 6.4.6. The summation is
\[
\sum_{i=1}^{n} \text{ instead of } \sum_{i=1}^{n} .
\]

page 203, l. 7–8 (E): \( \gamma_{5/2} < 3 \) instead of < 2.

page 213, l. 5 (E): 180 · 3 instead of 1803.

page 215, l. 6 (FE): \( P_6^2 \) instead of \( P_6^2 \).

page 227, l. 8: when instead of where

page 229 (FE; remark of Gael Collinet). In Proposition 7.1.4, it is true that the Voronoi cone is the convex hull of the half-lines containing the projections, but the assertion on the projection cone in not correct in dimensions \( n \geq 3 \).
Page 236, line 14: (F; E; G. N.). Read: \( A + XB = A(I_n + XA^{-1}B) \)
(in the book, \( X \) is missing).

Page 242, line 1: (E) Read: \( 1 \leq i < j \leq n \).

Page 259, Exercise 7.6.1, 1. (E) Suppress cyclic
Page 299 (F; E). Suppress Theorem 8.7.2 and its proof; and subsequently,
Page 304 (F; E). Suppress “One could construct ... BW_{32}.”

The “proof” of Theorem 8.7.2 actually shows the existence of \( \mathfrak{O} \)-module structures
on the lattice \( E_8 \) for all the listed orders \( \mathfrak{O} \). However, these structures are not
Hermitian structures, since the scalar product has nothing to do with these module
structures.

I realized the error in Theorem 8.7.2 thanks to a work in progress by Stephanie Vance
(now [Van1]), extending to Hermitian situations Mordell’s Theorem 2.3.1. Applied with
the order \( 2M_3 \), her work together with Theorem 8.7.2 would have implied that \( \Lambda_8 \sim E_8 \)
is contained in \( K_{12} \), whereas the densest 8-dimensional sublattice of \( K_{12} \) is the less dense
lattice \( K_8 \).

Page 338, (E) fig. 9.3.3 (a): add the class \( a_3 \) and the obvious edges \( a_3 \rightarrow a_4 \)
(E) fig. 9.3.3 (b): the edges \( c_6 \rightarrow c_7 \) and \( b_5 \rightarrow b_6 \) are missing.

[The text is correct; corrected diagrams are reproduced below.]

\[
\begin{tikzpicture}
  \node (a3) at (0,0) {\( a_3 \)}; \node (a2) at (-1,-2) {\( a_2 \)}; \node (a6) at (2,0) {\( a_6 = \text{cl}(h_3) \)};
  \node (a5) at (1,2) {\( a_5 \)}; \node (a4) at (0,2) {\( a_4 \)}; \node (a3) at (0,0) {\( a_3 \)}; \node (b4) at (1,0) {\( b_4 \)}; \node (a3) at (0,0) {\( a_3 \)};
  \draw (a2) -- (a3) -- (a4) -- (a5) -- (a6) -- (a3) -- (b4) -- (a3);
\end{tikzpicture}
\]

Figure 9.3.3 (a). Inclusion graphs for minimal classes in dimensions 2 and 3.
Figure 9.3.3 (b). Inclusion graphs for minimal classes in dimension 4.

page 341 (E), Theorem 9.4.4: ... proportional to an algebraic ...; also the proof works under the weaker hypothesis “weakly eutactic” instead of “eutactic”.
page 358 (F E), Exercise 9.2.2. $\mathbb{Z}^3$ instead of $\mathbb{Z}^n$.
page 377 (F E) (Justin Martel). Prop. 10.6.2: $\Lambda$ instead of $E$.
page 400 (F E), l. 17. $A_3^3$ instead of $A_3^2$
page 454 line 12. $A_4, A_0^{(2)}$ instead of $A_5, A_7^{(2)}$
page 454 (E), line 13.4+4, ... according to the nature...

page 473 (F E) page 473 (F E) Rogers’s (or Rogers’) instead of Roger’s
page 493. In Theorem 16.4.1, read: $2 + 2 \left\lfloor \frac{(r+1)n}{48} \right\rfloor$ (in the book, the term “2+” is missing).
page 494, l. 14 (G. N.). $\sum \phi(s^2)$ instead of $\sum \phi(s)$

REFERENCES, LIST OF SYMBOLS, INDEX

The exact title of the “Monographie 37 de l’Enseignement Mathématique” is “Réseaux euclidiens, designs sphériques et formes modulaires” (not “et groupes”, which was a former provisional title). This error occurs on pages 497 (ref. [Bc-V2] and [Bac-V]), 501 (ref. [Cou6]), 504 (ref. [Mar6], [Mar7], [Mar-V]), and 508 (ref. [Ven3]).

In “C. Batut. See also ...”: [Mar6] instead of [Mar5].

page 515, l. 6: Well-rounded instead of Well-ounded.