

Pacific Journal of Mathematics

**CORRECTION TO: “SPINOR NORMS OF LOCAL INTEGRAL
ROTATIONS. II”**

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ERRATA

Correction to

SPINOR NORMS OF LOCAL INTEGRAL ROTATIONS, II

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One consequence of the 2-adic spinor norm calculations in [3] is an improvement of a theorem of Kneser [5; Satz 5] giving bounds on the power of two dividing the reduced discriminant of an indefinite quadratic \mathbf{Z} -lattice having class number exceeding one (see also [6; p. 111] for a weaker version, and [2; Thm. 1.3, Chap. 11] for a restatement of Kneser's theorem).

Contrary to the claim made in [3], the bounds obtained in Theorem 4.2 of that paper are not best possible. The example $L \cong \langle -7, 2^2, 2^4, \dots, 2^{2(n-1)} \rangle$ (see Remark 4.5) which purports to demonstrate that bounds attained are best possible in fact has class number one, not two as claimed. This can be seen by observing that $\theta(O^+(L_2)) \supseteq \dot{\mathbf{Q}}_2^2 \cup 5\dot{\mathbf{Q}}_2^2$ (by Proposition 1.8) and applying the argument in the last paragraph of Lemma 4.3.

We became aware of this error in reading a preliminary draft of Brzezinski's paper [1], where a bound better than that appearing in our Theorem 4.2 is obtained for a special class of indefinite ternary quadratic \mathbf{Z} -lattices. In fact, the methods of our paper apply directly to yield this improved bound for all indefinite ternary \mathbf{Z} -lattices.

Lemma 4.4 and, consequently, Theorem 4.2 of [3] can be improved to produce the correct best possible bounds for all ranks. The appropriate strengthened version of that lemma is:

LEMMA 4.4'. *Let L be as in [3; Thm. 4.2]. If $s_p < n(n-1)/2$ whenever p is odd and if $h^+(L) \neq 1$, then $s_2 \geq b'_2$, where*

$$b'_2 = \begin{cases} (3n-2)(n-1)/2 & \text{if } n \text{ is odd,} \\ n(3n-5)/2 & \text{if } n \text{ is even.} \end{cases}$$

Proof. As in the proof of Lemma 4.4,

$$2^{-k}L \cong \langle \varepsilon_1, 2^{r_2}\varepsilon_2, \dots, 2^{r_n}\varepsilon_n \rangle,$$

$0 < r_2 < \dots < r_n$. It suffices to verify that $r_3 \geq 6$, $r_n \geq 3n-3$ for $n > 3$ odd, and $r_n \geq 3n-5$ for $n > 2$ even. Note first that if $r_s - r_t = 4$ for any s, t , then $\theta(O^+(L_2)) \supseteq \dot{\mathbf{Q}}_2^2 \cup 5\dot{\mathbf{Q}}_2^2$ (by Proposition 1.8) and $h^+(L) = 1$ follows as in the proof of Lemma 4.3. From this fact and Theorem 2.2, it can be seen that $r_2 \geq 1$ implies that $r_3 \geq 6$ under our assumption that $h(L) \neq 1$. Assume the above inequalities on r_j , $j = 1, 2, \dots, k$. If $k+1$ is even and greater than 4, then $r_{k+1} \geq r_k + 1 \geq (3k-3) + 1 = 3k-2 = 3(k+1) - 5$ as desired

($r_4 \geq 7$ holds since $r_3 \geq 6$). If $k + 1$ is odd, then, arguing as for r_3 above, $r_{k+1} \geq (3k - 5) + 5 = 3(k + 1) - 3$. \square

Theorem 4.2 remains valid with the values of b'_2 given as above. Moreover, the examples $L \cong \langle 1, -2^6, 2^7 \rangle$, $L \cong \langle 1, -2^6, 2^7, \dots, 2^{3n-3} \rangle$ if n is odd, $n \geq 5$, and $L \cong \langle 1, -2^6, 2^7, \dots, -2^{3n-5} \rangle$ if n is even, $n \geq 4$, show that the new bounds b'_2 are best possible for all $n \geq 3$. For small values of n , the last column of Table 4.8 should show the best possible bounds b'_2 to be 7, 14, 26, 39, 57, 76, 100 and 125 for $n = 3, \dots, 10$, respectively. The bounds shown for b''_2 in the third column of that table are indeed best possible (note that the final exponent in the example L of Remark 4.7 should read “ $4k$ ”, not “ $2k$ ”).

Finally, for completeness we note that in Theorem 3.14, (i) should read “If all $2^{r_i} L_i \dots$ ”, (ii) should read “ $\dots 2^{r_j} L_j \dots 2^{r_k} L_k \dots$ ”, and the Hilbert symbol appearing in (ivb) should read “ $(2^{r_k - r_{i_0}} a_{i_0} \varepsilon_k, -\det L_{i_0})$ ”. These modifications were noted in [4].

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