CORRIGENDA TO “CALCULATION OF THE REGULATOR OF $Q(\sqrt{D})$ BY USE OF THE NEAREST INTEGER CONTINUED FRACTION ALGORITHM”

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Abstract. There are some minor errors in one of the algorithms and two of the tables in a paper by Williams and Buhr. These errors do not affect the major conclusions of the paper.

We present corrections to one of the algorithms and two of the tables in [1]. These corrections do not affect the major conclusions of the paper.

In the algorithm for computing the NICF of $\sqrt{D}$ on the bottom half of page 373, when $Q'_k < 0$, $T_k$ should be defined as

- If $Q'_k + F + 1$ is even, then $T_k = d + \lfloor (Q'_k + F + 1)/2 \rfloor$.
- If $Q'_k + F + 1$ is odd, then $T_k = 1 + d + \lfloor (Q'_k + F + 1)/2 \rfloor$.

$R'_{k+1}$ should be defined as

- If $Q'_{k+1} < 0$ and $Q'_{k+1}$ divides $P'_{k+1} + T_{k+1}$ evenly, then $R'_{k+1} = |Q'_{k+1}|$.
- Otherwise, $R'_{k+1}$ is, as in [1], the remainder on dividing $P'_{k+1} + T_{k+1}$ by $Q'_{k+1}$.

Note that the formula for $R'_{k+1}$ has to be used with $k = -1$ in order to set the value of $R'_0$. In the other formulas in this algorithm $k \geq 0$. Also, $P'_{k+1} = T_k - R'_k$.

The description of Table 1 in [1] should read, “In Table 1 we give the frequency of occurrence of each of these criteria for the NICF expansion of $\sqrt{D}$ for each nonsquare $10 \leq D < M$.” Corrected values for the Table 1 in [1] are given in “Table 1 (with corrections)”.

Table 1 (with corrections)

<table>
<thead>
<tr>
<th>Condition</th>
<th>$M = 10,000$</th>
<th>$M = 100,000$</th>
<th>$M = 1,000,000$</th>
<th>$M = 10,000,000$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7,370</td>
<td>76,155</td>
<td>776,894</td>
<td>7,882,803</td>
</tr>
<tr>
<td>2</td>
<td>880</td>
<td>9,698</td>
<td>101,347</td>
<td>1,032,817</td>
</tr>
<tr>
<td>3</td>
<td>324</td>
<td>2,340</td>
<td>18,093</td>
<td>146,161</td>
</tr>
<tr>
<td>4</td>
<td>785</td>
<td>6,819</td>
<td>60,702</td>
<td>552,135</td>
</tr>
<tr>
<td>5</td>
<td>153</td>
<td>1,302</td>
<td>11,734</td>
<td>106,995</td>
</tr>
<tr>
<td>6</td>
<td>382</td>
<td>3,363</td>
<td>30,224</td>
<td>275,920</td>
</tr>
</tbody>
</table>

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The corrected Table 1 agrees with that in [1] for \( M = 10,000 \), but most of the values to 100,000 and to 1,000,000 in the corrected table are slightly different from those in [1]. We have added counts to 10 million.

In Table 2 of [1] each \( \Theta \) should be \( 2\Theta \). For Case 6, the \( \log(\sqrt{D} + |Q'_{\rho-1}/2|) \) in [1] should be \( \log(\sqrt{D} - |Q'_{\rho-1}/2|) \).

References


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