Corrigendum


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We extend the result of Lemma 4, [1] to the case that $e = 0$ and $\ell = 1$ which was missing in [1] but used in the proof of Theorem 1, [1].

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1. The correction

On page 15, [1], in Case (ii), it is claimed in the fifth display that for \( e \in \{0, 1\} \), the following holds.

\[
\frac{1}{p-1} + \max \left\{ \frac{1}{p-1}, \frac{1}{p-2}, \frac{2 \log(2n + \beta)}{p^s \log p} \right\} > \frac{1}{k}.
\]

This was obtained by arguing that \( \mu_e(g) \geq 1/k \) and that

\[
\mu_e(g) < \frac{1}{p-1} + \max \left\{ \frac{1}{p-1}, \frac{1}{p-2}, \frac{2 \log(2n + \beta)}{p^s \log p} \right\}.
\]

For the latter estimate, we had referred to Lemma 4, [1]. The bound obtained in Lemma 4, [1], is valid only for \( e \geq \ell \). While, according to (b), Corollary 4, if \( e = 0 \), then \( \ell = 1 \), i.e., \( e < \ell \). Thus, in order for our arguments to work in case (ii), we must justify the validity of (1) in Lemma 4, [1], in the case that \( e = 0 \) and \( \ell = 1 \). In the present note, we achieve this.

We follow the notations of [1]. In the case under consideration, \( e = 0 \) and \( \ell = 1 \). By (b), Corollary 4 [1], this is the case if \( \beta \neq -2 \). We let \( p \) be a prime factor of \( n - \ell = n - 1 \) satisfying \( p > 2\ell + |\beta| = 2 + |\beta| \), as required in Lemma 4, [1]. We are to establish that

\[
\mu_0(g) < \frac{1}{p-1} + \max \left\{ \frac{1}{p-1}, \frac{1}{p-2}, \frac{2 \log(2n + \beta)}{p^s \log p} \right\}.
\]

We recall from [1] that

\[
\mu_e(g) = \mu_{e,p}(g) = \max \left\{ \frac{\nu(b_0) - \nu(b_j)}{j} : e < j \leq n \right\}
\]

where \( g(x) = \sum_{j=0}^{n} b_j x^j \) and \( \nu(b_j) \) is the highest power of \( p \) that divides \( b_j \). From Lemma 4, [1], we already have that

\[
\mu_1(g) < \frac{1}{p-1} + \max \left\{ \frac{1}{p-1}, \frac{1}{p-2}, \frac{2 \log(2n + \beta)}{p^s \log p} \right\}.
\]

Thus, in order to establish (2), it would suffice to show that

\[
\nu(b_0) - \nu(b_1) \leq 0.
\]

Next, we recall from [1] that

\[
b_j = \binom{n}{j} \frac{(2n + \beta - j)!}{(n + \beta)!}.
\]

Thus,
\[ \frac{b_0}{b_1} = \frac{(2n + \beta)!}{(n + \beta)!} \frac{(n + \beta)!}{n(2n + \beta - 1)!} = \frac{2n + \beta}{n}. \]

Therefore, \( \nu(b_0) - \nu(b_1) > 0 \) implies that \( p | (2n + \beta) \). Also, as per our hypothesis, \( p \) divides \( n - 1 \). Thus, \( p \) divides \( 2n + \beta - 2n + 2 = \beta + 2 \). Since \( p > 2 + |\beta| \), it must be that \( \beta + 2 = 0 \). But this is a contradiction since \( |\beta| \neq -2 \) in this case. Our assertion now follows.

References