manuscripta math. 155, 597–598 (2018)

Erratum

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Erratum to: Rational approximation to values of G-functions, and their expansions in integer bases

Published online: 3 January 2018

Erratum to: manuscripta math. DOI 10.1007/s00229-017-0933-8

In this note we correct a mistake in the proof of the main result of [1], pointed out to us by Dimitri Le Meur.

At the beginning of §2.3 of [1] appears the inequality

$$H(A_1 \cdots A_n) \leq \binom{d_1 + \cdots + d_n}{n-1} H(A_1) \cdots H(A_n)$$

for polynomials A_j of degree less than or equal to d_j. Actually, this upper bound is false in general, as the example $A_j = X + 1$ for any j shows. However, this mistake has no consequence on the rest of [1] because this inequality was used only to prove that

$$H(Q_k) \leq 2^{2q+(d-1)k+1} H(\mathcal{D})^k H(Q), \tag{1}$$

and we shall prove now that Eq. (1) holds.

Indeed, for any $A, B \in \mathbb{C}[X]$, we have

$$H(AB) \leq \min(1 + \deg A, 1 + \deg B)\, H(A)\, H(B)$$

so that

$$H(\mathcal{D}^k) \leq (1 + \deg \mathcal{D})^{k-1} H(\mathcal{D})^k \leq (d+1)^{k-1} H(\mathcal{D})^k$$

and

$$H(Q_k) \leq c_k H(\mathcal{D})^k H(Q)$$

for any $k \geq 0$, where $c_k = 0$ if $k > q$ and, if $k \leq q$,

$$\begin{aligned} c_k &= \min(1 + k \deg \mathcal{D}, 1 + \deg Q^{(k)})(d+1)^{k-1} 2^q \\ &\leq (q - k + 1)(d+1)^{k-1} 2^q \\ &\leq 2^{q-k}(d+1)^k 2^q \\ &\leq 2^{2q} \left(\frac{d+1}{2}\right)^k \\ &\leq 2^{2q+(d-1)k} \end{aligned}$$

The original article can be found online at https://doi.org/10.1007/s00229-017-0933-8.

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https://doi.org/10.1007/s00229-017-0988-6

where the last inequality comes from the fact that $\frac{d+1}{2} \leq 2^{d-1}$ for any positive integer d.

Reference

[1] Fischler, S., Rivoal, T.: Rational approximation to values of G-functions, and their expansions in integer bases. Manuscripta math. (2017). https://doi.org/10.1007/s00229-017-0933-8