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Aequationes Mathematicae

Erratum

Erratum to: Simultaneous Abel equations

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In the original publication, Theorem 8 was published with some errors in the proof of part (a) $\Rightarrow$ (b). The statement "By Theorem 6, ϕ is monotone and surjective. We assume that ϕ is increasing" must be deleted as Theorem 6 cannot be applicable here since it has an assumption that "λ is extendable to a monotone isomorphism" which is to be concluded here. Moreover, in the proof that "λ is strictly increasing", Theorem 6 again was used which is incorrect. This error could be corrected as follows:

- λ is a group homomorphism: This is clear from the definition of λ.
- λ is strictly monotone: Since for each pair f, g of the elements of G one has $f < g$ if and only if $f^{-1} \circ g > i$, and since $\lambda(f^{-1} \circ g) = \lambda(g) - \lambda(f)$, it suffices to show that either

$$\text{for all } f \in G \quad \text{if } f > i, \text{ then } \lambda(f) > 0;$$

or

$$\text{for all } f \in G \quad \text{if } f > i, \text{ then } \lambda(f) < 0.$$

Suppose there exists $f \in G$ such that $f > i$ and $\lambda(f) > 0$. Put $\psi := \phi - \phi(a)$ where a is as above. Then ψ is a continuous solution of system (1) and $\psi(a) = 0$. Put $p := \inf \psi([a, f(a)])$. There exists a positive integer N such that $p + N\lambda(f) > 0$.

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Let $g \in G$ and $g > i$. Since $\lim_{n\to\infty} g^n(a) = \sup I$, there exists $k \in \mathbb{N}$ such that $g^k(a) \geq f^N(a)$. On the other hand $I = \bigcup_{m\in\mathbb{Z}}[f^m(a), f^{m+1}(a)]$; hence $g^k(a) \in [f^n(a), f^{n+1}(a)]$ for some integer $n \geq N$. Thus $g^k(a) = f^n(x)$ for some $x \in [a, f(a)]$. We now have

$$\begin{aligned} k\lambda(g) &= \psi(a) + \lambda(g^k) = \psi(g^k(a)) = \psi(f^n(x)) \\ &= \psi(x) + n\lambda(f) \geq p + N\lambda(f) > 0. \end{aligned}$$

Thus $\lambda(g) > 0$. This shows that λ is strictly increasing. If there was $f \in G$ such that $f > i$ and $\lambda(f) < 0$ one would similarly show that λ was strictly decreasing. □

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