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Corrigendum

Corrigendum to "Krull property of generalized power series rings" [J. Pure Appl. Algebra 227 (2023) 107179]



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There is a wrong argument in the last part of the proof of [2, Theorem 3.7]: The quotient field of $[\![K^{V,\leq'}]\!]$, say L_1, as a subring of $[\![K^{G,\leq'}]\!]$ and the quotient field of $[\![K^{V,\leq'}]\!]$, say L_2, as a subring of the quotient field of $[\![R_2^{H,\leq'}]\!]$ are different as sets. The intersection $[\![K^{V,\leq'}]\!] = [\![R_2^{H,\leq'}]\!] \cap [\![K^{G,\leq'}]\!] = [\![R_2^{H,\leq'}]\!] \cap L_1$ holds as subsets of T, but the intersection $[\![K^{V,\leq'}]\!] = [\![R_2^{H,\leq'}]\!] \cap L_2$ as subsets of the quotient field of $[\![R_2^{H,\leq'}]\!]$ does not hold.

We give a simple and correct proof of [2, Theorem 3.7], which is similar to the proof of [2, Theorem 3.4].

Theorem 1. *Let $(V, \leq)$ be a torsion-free, $\leq$-cancellative, subtotally ordered monoid, and let K be a field. If V is a discrete valuation monoid, then $[\![K^{V,\leq}]\!]$ is a Krull domain.*

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Proof. Let G be the quotient group of V. Since $(V, \leq)$ is $\leq$-cancellative, the order $\leq$ on V extends naturally to a compatible order, still denoted by $\leq$, on G ([2, Proposition 2.3(6)]). Then $(G, \leq)$ is a torsion-free subtotally ordered group ([2, Proposition 2.3(7)]). Since $(G, \leq)$ is a torsion-free group (and hence cancellative), there exists a compatible strict total order $\leq'$ on G ([2, Proposition 2.4]). Then we have $[\![K^{V,\leq}]\!] = [\![K^{V,\leq'}]\!] \cap [\![K^{G,\leq}]\!]$ ([2, Lemma 3.3]). Moreover, it is equal to $[\![K^{V,\leq'}]\!] \cap \text{q.f.}([\![K^{V,\leq}]\!])$, since $[\![K^{G,\leq}]\!]$ is a field ([2, Proposition 2.5(2)]).

Assume that V is a discrete valuation monoid. Then $V \cong H \oplus \mathbb{N}_0$, where H is the group of units of V and $\mathbb{N}_0$ is the submonoid of $\mathbb{Z}$ of nonnegative integers (cf. [1, Theorem 6.8]). Therefore, by [3, (5.5)], $[\![K^{V,\leq'}]\!]$ is a Noetherian ring. Also, since $(V, \leq')$ is a totally ordered and completely integrally closed monoid, $[\![K^{V,\leq'}]\!]$ is a completely integrally closed domain by [4, (5.3)]. Thus $[\![K^{V,\leq'}]\!]$ is an integrally closed Noetherian domain and hence a Krull domain. Therefore, it follows that $[\![K^{V,\leq}]\!] = [\![K^{V,\leq'}]\!] \cap \text{q.f.}([\![K^{V,\leq}]\!])$ is also a Krull domain. □

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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