AIMS Mathematics

http://www.aimspress.com/journal/Math

AIMS Mathematics, 4(3): 684–685.
DOI:10.3934/math.2019.3.684
Received: 14 June 2019
Accepted: 14 June 2019
Published: 17 June 2019

Correction

Correction: A note on derivations and Jordan ideals in prime rings

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A correction on

A note on derivations and Jordan ideals in prime rings
by Gurinder S. Sandhu and Deepak Kumar. AIMS Mathematics, 2017, 2(4): 580–585.
DOI: 10.3934/Math.2017.4.580

In the proof of Theorem 2.5 on pp. 583 in [1], the Brauer's trick is used wrongly. Here we give the corrected proof of this. With this correction, Lemma 2.4 will be of independent interest and the following lemma is crucial.

Lemma 1. *Let R be a noncommutative 2-torsion free prime ring and I be a nonzero ideal of R. If R admits a derivation d and an element $0 \neq a \in R$ such that $a[d(x^2), x^2] = 0$ for all $x \in I$, then $d = 0$.*

Proof. Let us assume that $a[d(x^2), x^2] = 0$ for all $x \in I$. Let us set $A = \{x^2 : x \in I\}$ and $\mathcal{G}$ be the additive group generated by the set A. Thus we have $a[d(u), u] = 0$ for all $u \in \mathcal{G}$. In view of Chuang [2], either $\mathcal{G} \subseteq Z(R)$ or char$(R) = 2$ and R satisfies s_4 (the standard identity in 4-variables) unless $\mathcal{G}$ contains a noncentral Lie ideal L of R. By our hypothesis either $\mathcal{G} \subseteq Z(R)$ or there exists a noncentral Lie ideal $L \subseteq \mathcal{G}$. The case $\mathcal{G} \subseteq Z(R)$ (i.e., $x^2 \in Z(R)$ for all $x \in I$) forces the commutativity of R, a contradiction follows. On the other hand if $\mathcal{G}$ contains a noncentral Lie ideal L of R, then we have $a[d(u), u] = 0$ for all $u \in L$. By Filippis [[3], Theorem 1], we find that $d = 0$. □

Correction:

After equation (3) in Theorem 2.5 of [3], we have the situation

$$[u^2, v]u^2 d(u^2) = 0 \text{ for all } u, v \in J. \tag{1}$$

In view of [[3], Lemma 2.2], we may write it as

$$[u^2, v]u^2 d(u^2) = 0 \text{ for all } u, v \in I = 2R[[J, J], J]R. \tag{2}$$

Replacing v by $d(u^2)v$ in (2), we find

$$[u^2, d(u^2)]vu^2d(u^2) = 0 \text{ for all } u, v \in I. \tag{3}$$

Taking vu^2 instead of v in (3), we find

$$[u^2, d(u^2)]vu^2(u^2d(u^2)) = 0 \text{ for all } u, v \in I. \tag{4}$$

Also we have

$$[u^2, d(u^2)]vu^2(d(u^2)u^2) = 0 \text{ for all } u, v \in I. \tag{5}$$

Combining equation (4) and (5), we find $u^2[d(u^2), u^2]vu^2[d(u^2), u^2] = 0$ for all $u, v \in I$. It implies that $u^2[d(u^2), u^2] = 0$ for all $u \in I$. In view of Lemma 1, we have $d = 0$, a contradiction. Further the proof follows from the case $Z(R) \cap J \neq (0)$ in Theorem 2.5 of [3].

Conflict of interest

No potential conflict of interest was reported by the authors.

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