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Corrigendum

Corrigendum to “Some problems of Wielandt revisited” [J. Algebra 302 (1) (2006) 167–185]

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ABSTRACT

An error in the proof of Theorem 2 in [W. Knapp, Some problems of Wielandt revisited, J. Algebra 302 (1) (2006) 167–185] (concerning the action of semisimple groups) is corrected.

I am grateful to Dan Levy that he put my attention to an error in part (i) of the proof of [1, Theorem 2].

In this note a correction for the proof of [1, Theorem 2] is given. Of course, the notation and all necessary prerequisites of [1] are used.

Part (i) of the proof of Theorem 2 in [1] should be replaced by the following argument:

“(i) First assume that there is a simple minimal normal subgroup B_1 of G contained in B. We then have $B = B_1 \times B^1$ for a normal subgroup B^1 of G. Since G is perfect $G = C_1 \times B_1$ where $C_1 = \mathrm{C}_G(B_1)$. Clearly C_1 is a nontrivial proper normal subgroup of G and $B^1 = \mathrm{soc}(C_1) \neq 1$.

Consider the subgroup $G_1 := AB_1$. From Lemma 2 it follows that G_1 is semisimple, hence G_1 is a proper subgroup of G and does not contain B^1. Moreover, $G_1 = B_1 \times (G_1 \cap C_1)$ and $A/A \cap C_1$ is isomorphic to a subgroup of $B_1 \cong G/C_1$. Hence there exists a subgroup $\widetilde{A}$ of G_1 isomorphic to A with the property $\widetilde{A} = (\widetilde{A} \cap B_1) \times (A \cap C_1)$ and $G_1 = \widetilde{A} B_1$.

From this fact we may infer that $\widetilde{A} \cap C_1 = A \cap C_1$ contains a subgroup A^1 which is isomorphic to the semisimple group B^1 and is not contained in B^1 (if $\widetilde{A} \geqslant B_1$ then let $A^1 := \widetilde{A} \cap C_1$; otherwise replace a direct factor of $\widetilde{A} \cap C_1$ isomorphic to B_1 by a subgroup isomorphic to $\widetilde{A} \cap B_1$ for a corresponding definition of A^1). Since $C_1 < G$ the minimality of G as a counterexample gives that $1 \neq \mathrm{C}_{C_1}(B^1) = \mathrm{C}_G(B^1) \cap \mathrm{C}_G(B_1) = \mathrm{C}_G(B)$, a contradiction. Therefore G has no simple minimal normal subgroup.”

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Remark. [1, Theorem 2] was considerably generalized in [2]; the result of [2] gives another completion of the proof.

References

[1] W. Knapp, Some problems of Wielandt revisited, J. Algebra 302 (1) (2006) 167–185.
[2] W. Knapp, P. Schmid, Semisimple groups acting on semisimple groups, Beiträge Algebra Geom. (2011), doi:10.1007/s13366-011-0062-6, in press.