MATHEMATICA, 63 (86), N° 2, 2021, pp. 199–207

DIFFERENTIAL IDENTITIES IN PRIME RINGS

ABDELKARIM BOUA and AHMED Y. ABDELWANIS

Abstract. Let $\mathcal{R}$ be a prime ring with center $Z(\mathcal{R})$ and $\alpha, \beta : \mathcal{R} \to \mathcal{R}$ be automorphisms. This paper is divided into two parts. The first tackles the notions of (generalized) skew derivations on $\mathcal{R}$, as the subject of the present study, several characterization theorems concerning commutativity of prime rings are obtained and an example proving the necessity of the primeness hypothesis of $\mathcal{R}$ is given. The second part of the paper tackles the notions of symmetric Jordan bi (α, β)-derivations. In addition, the researchers illustrated that for a prime ring with $\text{char}(\mathcal{R}) \neq 2$, every symmetric Jordan bi (α, α)-derivation D of $\mathcal{R}$ is a symmetric bi (α, α)-derivation.

MSC 2010. 16W25, 16U80.

Key words. Prime rings, skew derivations, symmetric Jordan bi (α, β)-derivation.

REFERENCES

[1] M. Ashraf, A. Asma and A. Shakir, *On Lie ideals and generalized (θ, ϕ)-derivations in prime rings*, Comm. Algebra, **32** (2004), 2977–2985 .

[2] M. Ashraf and N. Rehman, *On commutativity of rings with derivation*, Results Math., **42** (2002), 3–8.

[3] M. Ashraf, N.-ur-Rehman and M. Rahman, *On generalize derivations and commutativity of rings*, Internat. J. Math., Game Theory, and Algebra, **18** (2008), 19–24.

[4] M. Bresar and J. Vukman, *Jordan derivations on prime rings*, Bull. Aust. Math. Soc., **37** (1988), 321–322.

[5] M. Bresar and J. Vukman, *On left derivations and related mappings*, Proc. Am. Math. Soc., **10** (1990), 7–16.

[6] Y. Çeven and Z. Çiloğlu, *On symmetric Jordan and Jordan left bi-derivations of prime rings*, Afr. Mat., **29** (2018), 689–698.

[7] I.N. Herstein, *Jordan derivations of prime rings*, Proc. Am. Math. Soc., **8** (1957), 1104–1110.

[8] G. Maksa, *A remark on symmetric biadditive functions having nonnegative diagonalization*, Glas. Mat., **15** (1980), 279–282.

[9] E. Posner, *Commuting derivations in prime rings*, Proc. Amer. Math. Soc., **8** (1957), 1093–1100.

The authors thank the referee for his helpful comments and suggestions.

DOI: 10.24193/mathcluj.2021.2.06

Received January 23, 2020
Accepted August 31, 2020

Sidi Mohammed Ben Abdellah University
Polydisciplinary Faculty
LSI, Taza, Morocco
E-mail: abdelkarimboua@yahoo.fr

Cairo University
Faculty of Science
Department of Mathematics
Giza, Egypt
E-mail: ayunis@sci.cu.edu.eg