

**LEFT ANNIHILATOR OF IDENTITIES WITH
GENERALIZED DERIVATIONS IN PRIME
AND SEMIPRIME RINGS**

MD HAMIDUR RAHAMAN

Department of Mathematics
Aligarh Muslim University, Aligarh, 202002, India

e-mail: rahamanhamidmath@gmail.com

Abstract

Let R be a noncommutative prime ring of char $(R) \neq 2$, F a generalized derivation of R associated to the derivation d of R and I a nonzero ideal of R . Let $S \subseteq R$. The left annihilator of S in R is denoted by $l_R(S)$ and defined by $l_R(S) = \{x \in R \mid xS = 0\}$. In the present paper, we study the left annihilator of the sets $\{F(x) \circ_n F(y) - x \circ_n y \mid x, y \in I\}$ and $\{F(x) \circ_n F(y) - d(x \circ_n y) \mid x, y \in I\}$.

Keywords: prime ring, derivation, generalized derivation, extended centroid, Utumi quotient ring.

2010 Mathematics Subject Classification: 16W25, 16R50, 16N60.

REFERENCES

- [1] S. Ali and H. Shuliang, *On derivations in semiprime rings*, *Algebra Represent Theor.* **15** (2012) 1023–1033.
doi:10.1007/s10468-011-9271-9
- [2] M. Ashraf, A. Ali and R. Rani, *On generalized derivations of prime rings*, *Southeast Asian Bull. Math.* **29** (2005) 669–675.
- [3] M. Ashraf and N. Rehman, *On commutativity of rings with derivations*, *Results Math.* **42** (2002) 3–8.
doi:10.1007/BF03323547
- [4] H.E. Bell and N. Rehman, *Generalized derivations with commutativity and anti-commutativity conditions*, *Math. J. Okayama Univ.* **49** (2007) 139–147.
- [5] H.E. Bell and W.S. Martindale III, *Centralizing mappings of semiprime rings*, *Canad. Math. Bull.* **30** (1987) 92–101.
doi:10.4153/CMB-1987-014-x

- [6] K.I. Beidar, *Rings of quotients of semiprime rings*, Vestnik Moskow. Univ. Ser. I. Mat. Mekh. (Engl. Transl: Moskow Univ. Math. Bull.) **33** (1978) 36–42.
- [7] C.L. Chuang, *Hypercentral derivations*, J. Algebra **166** (1994) 34–71.
doi:10.1006/jabr.1994.1140
- [8] C.L. Chuang, *GPIs having coefficients in Utumi quotient rings*, Proc. Amer. Math. Soc. **103** (1988) 723–728.
doi:10.1090/S0002-9939-1988-0947646-4
- [9] B. Dhara, S. Ali and A. Pattanayak, *Identities with generalized derivations in semiprime rings*, Demonstratio Math. **XLVI** (2013) 453–460.
doi:10.1515/dema-2013-0471
- [10] T.S. Erickson, W.S. Martindale III and J.M. Osborn, *Prime nonassociative algebras*, Pacific J. Math. **60** (1975) 49–63.
doi:10.2140/pjm.1975.60.49
- [11] I.N. Herstein, *Topics in Ring Theory* (The University of Chicago Press, Chicago, 1969).
- [12] S. Huang, *Generalized derivations of prime rings*, Int. J. Math. & Math. Sci. Volume 2007, Article ID 85612, 6 pages.
doi:10.1155/2007/85612
- [13] N. Jacobson, *Structure of rings*, Amer. Math. Soc. Colloq. Pub. **37**, Amer. Math. Soc. (Providence, RI, 1964).
- [14] V.K. Kharchenko, *Differential identity of prime rings*, Algebra and Logic. **17** (1978) 155–168.
doi:10.1007/BF01669313
- [15] T.K. Lee, *Generalized derivations of left faithful rings*, Comm. Algebra **27** (1999) 4057–4073.
doi:10.1080/00927879908826682
- [16] T.K. Lee, *Semiprime rings with differential identities*, Bull. Inst. Math. Acad. Sinica **20** (1992) 27–38.
- [17] W.S. Martindale III, *Prime rings satisfying a generalized polynomial identity*, J. Algebra **12** (1969) 576–584.
doi:10.1016/0021-8693(69)90029-5
- [18] M.A. Raza and N.U. Rehman, *On generalized derivation in rings and Banach Algebras*, Kragujevac J. Math. **41** (2017) 105–120.
doi:10.5937/KgJMath1701105R

Received 31 January 2020

Revised 16 May 2020

Accepted 16 May 2020