

STUDY OF ADDITIVELY REGULAR Γ -SEMIRINGS AND DERIVATIONS

MADHU DADHWAL¹ AND NEELAM

*Department of Mathematics and Statistics
Himachal Pradesh University
Summer Hill, Shimla-171005, India*

e-mail: mpatial.math@gmail.com

Abstract

In this paper, the notions of commutator and derivation in additively regular Γ -semirings with (A_2, Γ) -condition are introduced. We also characterize Jordan product for additively regular Γ -semiring and establish some results which investigate the relationship between commutators, derivations and inner derivations. In 1957, E.C. Posner has shown that if there exists a non-zero centralizing derivation in a prime ring R , then R is commutative. This result is extended in the frame work of derivations of prime additively regular Γ -semirings.

Keywords: semirings, Γ -semirings, additively regular Γ -semirings, derivations and commutators.

2010 Mathematics Subject Classification: 16Y60, 16Y99.

REFERENCES

- [1] K.I. Beidar, S.C. Chang, M.A. Chebotar and Y. Fong, *On functional identities in left ideals of prime rings*, Commun. Alg. **28** (2000) 3041–3058.
<https://doi.org/10.1080/00927870008827008>
- [2] G.M. Benkart and J.M. Osborn, *Derivations and automorphisms of non associative matrix algebras*, Trans. Proc. Amer. Math. Soc. **263** (1981) 411–430.
<https://doi.org/10.2307/1998359>
- [3] M. Bresar and J. Vukman, *Jordan derivations on prime rings*, Bull. Austral. Math. Soc. **37** (1988) 321–322.
<https://doi.org/10.1017/S0004972700026927>

¹Corresponding author.

- [4] M.A. Chebotar and P.H. Lee, *On certain subgroups of prime rings with derivations*, Commun. in Alg. **29** (7) (2001) 3083–3087.
<https://doi.org/10.1081/AGB-5008>
- [5] J.S. Golan, *Semirings and Their Applications* (Kluwer Academic Publishers, Dordrecht, 1999).
- [6] I.N. Herstein, *Lie and Jordan structures in simple, associative rings*, Bull. Amer. Math. Soc. **67** (6) (1961) 517–531.
- [7] M. Muralikrishna Rao, Γ -semirings-I, Southeast Asian Bull. Math. **19** (1995) 49–54.
- [8] M. Muralikrishna Rao, Γ -semirings-II, Southeast Asian Bull. Math. **21** (1997) 281–287.
- [9] R.P. Sharma and Madhu, *On connes subgroups and graded semirings*, Vietnam J. Math. **38** (3) (2010) 287–298.
- [10] R.P. Sharma and Madhu, *Prime correspondence between a semiring R and its G -fixed semiring R^G* , J. Combin. Inf. & Syst. Sci. **35** (2010) 481–499.
- [11] R.P. Sharma and T.R. Sharma, *G -prime ideals in semirings and their skew group semirings*, Commun. Alg. **34** (12) (2006) 4459–4465.
<https://doi.org/10.1080/00927870600938738>
- [12] Z. Yang, *Derivations in prime Γ -rings*, J. Math. Res. Expo. **11** (1991) 565–568.

Received 5 June 2020

Revised 25 June 2020

Accepted 5 January 2021