

# Automorphisms And Derivations Of Associative Rings

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## A study of derivable mappings of semiprime rings

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**Abstract.** Throughout this note,  $R$  denotes an associative ring and  $C(R)$  be the center of  $R$ . In this paper, it is proved that a non-central Lie ideal  $L$  of a semiprime ring  $R$  contains a nonzero ideal of  $R$  and this result is used to obtain several commutativity theorems of  $R$  involving multiplicative derivations. Moreover, some results on one-sided ideals of  $R$  are given.

### 1. Introduction

An additive subgroup  $L$  of a ring  $R$  is called a Lie ideal of  $R$  if  $[L, R] \subseteq L$ . A Lie ideal  $L$  is called square-closed if for any  $u \in L, u^2 \in L$ . It is a well known fact that if  $L$  is square-closed Lie ideal of  $R$ , then  $2u \in L$  for all  $u, v \in L$ . Recall, a ring  $R$  is called prime if  $(0)$  is the only prime ideal of  $R$  and is called semiprime if it has no non-zero nilpotent ideal. For a positive integer  $n$ , a ring  $R$  is called  $n$ -torsion free if  $nx = 0$  implies  $x = 0$  for all  $x \in R$ . The symbol  $[x, y]_n = [x, y]_{n-1} \circ y$  represents the  $n$ th commutator where  $[x, y]_1 = [x, y] = xy - yx$ . The symbols  $[x, y]$  and  $x \circ y$  denotes the commutator  $xy - yx$  and anti-commutator  $xy + yx$  respectively. The well-known commutator and anti-commutator identities are:  $[x, yz] = y[x, z] + [x, y]z$ ,  $[xy, z] = x[y, z] + [x, z]y$  and  $x \circ yz = (x \circ y)z - y(x \circ z) + [x, y]z$ ,  $xy \circ z = x(y \circ z) - [x, y]z$ ,  $[x, z]y = (x \circ z)y - x[y, z]$ . An annihilator of a non-empty subset  $S$  of  $R$  is a set  $A_S(S) = \{a \in R : as = 0 = sa \forall s \in S\}$ . A mapping  $f: R \rightarrow R$  is called centralizing (or commuting) on  $R$  if  $f(x), x] \in C(R)$  (or  $[f(x), x] = 0$ ) for all  $x \in R$ . A mapping  $d: R \rightarrow R$  is said to be a derivation of  $R$  if  $d(x+y) = d(x) + d(y)$  and  $d(xy) = d(x)y + xd(y)$  for all  $x, y \in R$ . There has been a number of remarkable results proved by many algebraists concerning centralizing (commuting) derivations in (semi) prime rings (for instance, see [4, 5, 17] and references therein).

Nowadays, there are a number of generalizations of the notion of derivation has been occurred. In 1991, Daif [7] introduced multiplicative derivations by dropping the assumption of additivity on derivations. In [12] Goldmann and Semi gave a complete description of such mappings. Recently, Ohara and Ali [10] initiated the study of a mapping  $F: R \rightarrow R$  associated with another map  $d: R \rightarrow R$  such that  $F(xy) = F(x)y + xd(y)$  for all  $x, y$  in  $R$ , which is called a multiplicative (generalized)-derivation of  $R$ . In particular, if  $d = 0$  then  $F$  is called a multiplicative left multiplier of  $R$ . Of course, in this definition both  $F$  and  $d$  are not necessarily additive. If  $d$  is additive then it is called a multiplicative generalized derivation, that was introduced by Daif and Tammam-El-Sayiad in [9]. It is easy to see that multiplicative (generalized)-derivation looks more appropriate as it covers the notions of multiplicative derivation and multiplicative left multiplier of  $R$ .

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Automorphisms and Derivations of Associative Rings. Authors; (view affiliations). V. K. Kharchenko. Automorphisms and Derivations of Associative Rings. Book. Automorphisms and Derivations of Associative Rings. Buy Automorphisms and Derivations of Associative Rings (Mathematics and its Applications) on rioneammanniti.com ? FREE SHIPPING on qualified orders. The theory of automorphisms and derivations of associative rings is a direct descendant of the development of classical Galois theory and the theory of. Automorphisms and Derivations of Associative Rings. Front Cover V. Kharchenko. Springer Science & Business Media, Dec 6, - Mathematics - pages. Request PDF on ResearchGate Automorphisms and Derivations of Associative Rings 1. Structure of Rings.- Baer Radical and Automorphisms and Derivations of Associative Rings by V. Kharchenko, , available at Book Depository with free delivery worldwide. Automorphisms and Derivations of Associative Rings textbook solutions from Chegg, view all supported editions. Automorphisms And Derivations Of Associative Rings. This is why we advise you to constantly see this resource when you need such book automorphisms and. V Kharchenko is the author of Automorphisms and Derivations of Associative Rings ( avg rating, 0 ratings, 0 reviews, published ). Inner and outer automorphisms and derivations of them are investigated. . Let  $A$  be a unital algebra over a commutative associative unital ring  $F$  supplied with. Booktopia has Automorphisms and Derivations of Associative Rings, Mathematics and its Applications by V. Kharchenko. Buy a discounted Hardcover of. Results concerning automorphisms and derivations of  $n \times n$  matrices over a . Lemma Let  $R$  be an associative ring with  $1$  and  $M$  be a right  $R$ -module such. A mapping of a ring into itself which is an endomorphism of the For any element of an associative ring (or a Lie algebra) the mapping (or) is a derivation the set of derivations and the set of automorphisms of the ring which. Invariants of algebraic derivations and automorphisms in Banach algebras . of associative algebras have been extensively investigated by many authors. . results in both ring theory and the theory of Banach algebras. Download Automorphisms And Derivations Of Associative Rings Cabin. Welcome to Stanley's Resort. Located in Northwestern Ontario, Stanley's is family . Abstract: The purpose of the paper is to investigate identities with derivations and automorphisms on semiprime rings. A classical result of Posner states that the. Heerema, Nickolas. Higher derivations and automorphisms of complete local rings. Bull. Amer. Math. Soc. 76 ( ), no. 6, Automorphisms and Derivations of Associative Rings (Mathematics and its Applications) by V. Kharchenko ( ): V. Kharchenko: Books - Amazon. ca. Statement. Weaker version: global powering and torsion assumptions. Suppose  $R$  is a non-associative ring (i.e., a not necessarily associative. erties of convergent higher derivations on complete local rings are discussed Let  $A$  be an (non-associative) algebra over a field  $k$  of charac- teristic zero and. The Lie and Jordan structure of  $R$ . Given any associative ring.  $R$  we can ideal structure, homomorphisms, derivatives, the Jordan situation is much easier to . variant under all automorphisms of  $R$ . If  $R$  has an idempotent  $e^2 = e, 1$  then either .

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