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The k-Derivation of a Gamma-Ring

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Abstract: In this paper, the k-derivation is defined on a Γ-ring M (that is, if M is a Γ-ring, d:M\to M and k:Γ\to Γ are to additive maps such that d(aβ b)= d(a)β b + ak(β)b + aβ d(b) for all a,b\in M, \quad β \in Γ, then d is called a k-derivation of M) and the following results are proved. (1) Let R be a ring of characteristic not equal to 2 such that if xry=0 for all x, y\in R then r=0. If d is a k-derivation of the (R=)Γ-ring R with k=d, then d is the ordinary derivation of R. (2) Let M be a nonzero prime Γ-ring of characteristic not equal to 2, γ be an element of Γ and a is an element in M such that [[x, a]$_\gamma$, a]$_\gamma$ =0 for all x\in M. Then aγ a = 0 or a\in C$_\gamma$. (3) Let M be a prime Γ-ring with CharM \ne 2, d be a nonzero k-derivation of M, γ be a nonzero element of Γ and k(γ) \ne 0. If d(M) \subseteq C$_\gamma$, then M is a commutative Γ-ring.

Key Words: k-derivation, derivation, commutativity, gamma-ring.

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