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On near-rings with two-sided α-derivations

Nurcan ARGAÇ
Ege University, Science Faculty, Department of Mathematics,
35100, Bornova, Izmir, TURKEY
e-mail: argac@sci.ege.edu.tr

Abstract: In this paper, we introduce the notion of two-sided α-derivation of a near-ring and give some generalizations of [1]. Let N be a near ring. An additive mapping f: $N \rightarrow N$ is called an { \it (α, β)-derivation } if there exist functions α, β : $N \rightarrow N$ such that $f(xy)=f(x)\alpha(y)+\beta(x)f(y)$ for all $x,y \in N$. An additive mapping d:$N \rightarrow N$ is called a two-sided α-derivation if d is an $(\alpha,1)$-derivation as well as a $(1,\alpha)$-derivation. The purpose of this paper is to prove the following two assertions: (i) Let N be a semiprime near-ring, I be a subset of N such that $0 \in I$, $IN \subseteq I$ and d be a two-sided α-derivation of N. If d acts as a homomorphism on I or as an anti-homomorphism on I under certain conditions on α, then d(I)= {0}. (ii) Let N be a prime near-ring, I be a nonzero semigroup ideal of N, and d be a $(\alpha, 1)$-derivation on N. If d+d is additive on I, then (N,+) is abelian.

Key Words: Prime near-ring, semiprime near-ring, $(\alpha, 1)$-derivation, $(1, \alpha)$-derivation, two-sided α-derivation.