NEW TRENDS IN RINGS AND MODULES I
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A CERTAIN IDENTITY OF SKEW DERIVATIONS IN PRIME RINGS

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Abstract. Throughout R will represent an associative prime ring of characteristic different from 2, with a center $Z(R)$, Q its two sided Martindale quotient ring, and C its extended centroid of R (i.e., $C = Z(Q)$). Let σ be an automorphism of a ring R. An additive mapping $\delta : R \to R$ is called a σ-derivation (or a skew derivation) on R if $\delta(xy) = \delta(x)y + \sigma(x)\delta(y)$ for all $x, y \in R$ and σ is called an associated automorphism of δ. For $x, y \in R$, set $[x, y]_0 = x$, $[x, y]_1 = [x, y] = xy - yx$ and $[x, y]_k = [[x, y]_{k-1}, y]$ for $k > 1$. Notice that an Engel condition is a polynomial $[x, y]_k = \sum_{i=0}^{k}(-1)^i \binom{k}{i} y^i x y^{k-i}$ for all noncommutative indeterminates x, y in a ring R. A ring R satisfies an Engel condition if there exists a positive integer k such that $[x, y]_k = 0$ for all $x, y \in R$.
In this talk we aim to prove the following:

Main Theorem.
Let R be a noncommutative prime ring of characteristic different from 2, with its two-sided Martindale quotient ring Q, C the extended centroid of R and $a \in R$. Suppose that δ is a nonzero σ-derivation of R such that $a[\delta(x^n), x^n]_k = 0$ for all $x \in R$, where σ is an automorphism of R, n and k are fixed positive integers, then $a = 0$.

Our work is mainly motivated by the work in [3].

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