

Title: Co-commutators with generalized derivations in prime and semiprime rings

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Let R be a prime ring of characteristic different from 2 with Utumi quotient ring U and extended centroid C , F and G two nonzero generalized derivations of R , I an ideal of R and $f(x_1, \dots, x_n)$ be a multilinear polynomial over C which is not central valued on R . If

$$F^2(f(x_1, \dots, x_n))f(x_1, \dots, x_n) - f(x_1, \dots, x_n)G^2(f(x_1, \dots, x_n)) = 0$$

for all $x_1, \dots, x_n \in I$, then one of the following holds:

1. $F(x) = xa$ and $G(x) = xb$ for all $x \in R$ with $a^2 = b^2 \in C$;
2. $F(x) = xa$ and $G(x) = bx$ for all $x \in R$ with $a^2 = b^2$;
3. $F(x) = ax$ and $G(x) = xb$ for all $x \in R$ with $a^2 = b^2 \in C$;
4. $F(x) = ax$ and $G(x) = xb$ for all $x \in R$ with $a^2 = b^2$ and $f(x_1, \dots, x_n)^2$ is central valued on R ;
5. $F(x) = ax$ and $G(x) = bx$ for all $x \in R$, with $a^2 = b^2 \in C$.

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