

Year: 2016

Vol.: 88

Fasc.: 1-2

Title: Strong 2-commutativity preserving maps on prime rings

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Let $\mathcal{R}$ be a unital prime ring and $k \geq 1$ a positive integer. A map $f : \mathcal{R} \rightarrow \mathcal{R}$ is called preserving strong k -commutativity if $[f(x), f(y)]_k = [x, y]_k = [[x, y]_{k-1}, y]$ for all $x, y \in \mathcal{R}$. In this paper, it is shown that, if $\mathcal{R}$ contains a nontrivial idempotent, $\text{char}\mathcal{R} \neq 2$ and f is surjective, then f is strong 2-commutativity preserving if and only if $f(x) = \beta x + \mu(x)$ for all $x \in \mathcal{R}$, where β is in the extended centroid of $\mathcal{R}$ with $\beta^3 = 1$ and μ is a central valued map. Based on this, a characterization of general strong 2-commutativity preserving maps on factor von Neumann algebras is obtained.

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