

On a functional equation related to generalized inner derivations

By IRENA KOSI-ULBL (Maribor) and JOSO VUKMAN (Maribor)

Abstract. The purpose of this paper is to prove the following result. Let X be a real or complex Banach space, let $\mathcal{L}(X)$ be the algebra of all bounded linear operators on X , and let $\mathcal{A}(X) \subseteq \mathcal{L}(X)$ be a standard operator algebra, which possesses the identity operator. Suppose there exists a linear mapping $F : \mathcal{A}(X) \rightarrow \mathcal{L}(X)$ satisfying the relation $F(A^n) = F(A^{n-1})A - AF(A^{n-2})A + AF(A^{n-1})$ for all $A \in \mathcal{A}(X)$ and some fixed integer $n \geq 3$. In this case, F is of the form $F(A) = AB_1 + B_2A$ for all $A \in \mathcal{A}(X)$ and some fixed $B_1, B_2 \in \mathcal{L}(X)$. In particular, F is continuous.

IRENA KOSI-ULBL
FACULTY OF MECHANICAL ENGINEERING
UNIVERSITY OF MARIBOR
SMETANOVA 17
2000 MARIBOR
SLOVENIA

JOSO VUKMAN
DEPARTMENT OF MATHEMATICS
AND COMPUTER SCIENCE
FACULTY OF NATURAL SCIENCES
AND MATHEMATICS
UNIVERSITY OF MARIBOR
KOROŠKA 160
2000 MARIBOR
SLOVENIA

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