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Title: On a functional equation related to generalized inner derivations

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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 posses the identity operator. Suppose there exists a linear mapping $F : \mathcal{A}(X) \to \mathcal{L}(X)$ 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.

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