BANACH FUNCTION ALGEBRAS AND CERTAIN POLYNOMIALLY NORM-PRESERVING MAPS

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ABSTRACT. Let A and B be Banach function algebras on compact Hausdorff spaces X and Y, respectively. Given a non-zero scalar α and $s, t \in \mathbb{N}$ we characterize the general form of suitable powers of surjective maps $T, T' : A \longrightarrow B$ satisfying $\|(Tf)^s(T'g)^t - \alpha\|_Y = \|f^s g^t - \alpha\|_X$, for all $f, g \in A$, where $\| \cdot \|_X$ and $\| \cdot \|_Y$ denote the supremum norms on X and Y, respectively. A similar result is given for the case where $T = T'$ and T is defined between certain subsets of A and B. We also show that if $T : A \longrightarrow B$ is a surjective map satisfying the stronger condition $R_\pi((Tf)^s(Tg)^t - \alpha) \cap R_\pi(f^s g^t - \alpha) \neq \varnothing$ for all $f, g \in A$, where $R_\pi(\cdot)$ denotes the peripheral range of the algebra elements, then there exists a homeomorphism φ from the Choquet boundary $c(B)$ of B onto the Choquet boundary $c(A)$ of A such that $(Tf)^d(y) = (T1)^d(y)\,(f \circ \varphi(y))^d$ for all $f \in A$ and $y \in c(B)$, where d is the greatest common divisor of s and t.

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