

Doctoral Dissertation Defense

“Norm-preserving criteria for uniform algebra isomorphisms”

by

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We establish sufficient conditions for a surjective map T between uniform algebras A and B to be an algebra isomorphism. Our main result is that if $T : A \rightarrow B$ preserves the norm of the sums of the moduli of algebra elements, then T induces a homeomorphism ψ between the Choquet boundaries of B and A such that $|Tf| = |f \circ \psi|$ on the Choquet boundary of B . This is the case when T preserves the norm of linear combinations of algebra elements. If, moreover, T either preserves both 1 and i or the peripheral spectra of \mathbb{C} -peaking functions, then T is a composition operator and thus an algebra isomorphism. The same result holds if we replace the preservation of the norm of linear combinations with the preservation of the norm of sums and the norm of the sums of the moduli of algebra elements. As a corollary, we obtain that if a linear, surjective isometry between two uniform algebras is unital, then it is automatically multiplicative, which generalizes previous results concerning uniform algebra isomorphisms. Along the way, we strengthen a classical lemma due to E. Bishop.

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1:10 – 3:00 pm in Skaggs 117