

Banach Algebras 2009

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Generalising uniform algebras over complete valued fields.

ABSTRACT. Uniform algebras have been extensively investigated because of their importance in the theory of uniform approximation and as examples of complex Banach algebras. As enquiry broadens one may ask whether analogous algebras exist when a complete valued field other than the complex numbers is used as the underlying field over which the algebra is a vector space. The Stone-Weierstrass theorem shows that the real Banach algebra of all continuous real-valued functions on a compact Hausdorff space is without a proper subalgebra that satisfies the conditions of the theorem. However Kulkarni and Limaye in a paper from 1981 explicitly defined a real Banach algebra of complex-valued functions that has proper subalgebras analogous to uniform algebras. We show that their definition generalises to accommodate any complete valued field as the underlying field by involving Galois automorphisms. Classical uniform algebras now appear as subalgebras of one instance of the new definition.