

Preface

The purpose of this monograph is to introduce some new aspects to the theory of harmonic functions and related topics. They are a fusion of some recent developments in non-associative functional analysis, semigroups and harmonic analysis. More specifically, we study the algebraic analytic structures of the space of bounded *complex* harmonic functions on a locally compact group G and its non-commutative analogue, the space of harmonic functionals on the Fourier algebra $A(G)$. We show that they are both the ranges of contractive projections on von Neumann algebras and therefore admit Jordan algebraic structures which are usually non-associative. This provides a natural setting to apply new methods and results from non-associative analysis, semigroups and Fourier algebras. We use these devices to study, among others, the Poisson representation of bounded complex harmonic functions on G , the semigroup structures of the Poisson space and the non-associative geometric structures of the harmonic functionals.

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Key words and phrases: Locally compact group. Harmonic function. Liouville property. Poisson representation. Compact semigroup. Almost periodic function. Distal function. Harmonic functional. Fourier algebra. Group von Neumann algebra. Banach algebra. Arens product. C^* -algebra. Jordan algebra. JB*-triple.

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