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Harmonic operators: a look from the dual side

Let G be a locally compact group, and let μ be a probability measure on G. Then a function $\phi \in L^\infty(G)$ is said to be *μ-harmonic* if $\mu * \phi = \phi$. The μ-harmonic functions do not form a von Neumann subalgebra of $L^\infty(G)$, but can be equipped with a product turning them into a von Neumann algebra in its own right. Dual to this situation, for a continuous, positive definite function σ on G with $\sigma(1) = 1$, A. T.-M. Lau and C.-H. Chu called an element x of the group von Neumann algebra $\mathrm{VN}(G)$ of G, *σ-harmonic* if $\sigma \cdot x = x$. Interestingly, the collection of all σ-harmonic elements is a von Neumann subalgebra of $\mathrm{VN}(G)$.

Recently, W. Jaworski and M. Neufang extended the notion of a harmonic function to that of a harmonic operators. In this talk, which is based on joint work with Neufang, we develop a theory of harmonic operators from the dual perspective, thus extending Lau's and Chu's approach.