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The similarity problem for Fourier algebras and corepresentations of the group von Neumann algebras

Let G be a locally compact group, let $A(G)$ be the Fourier algebra of G , and let $VN(G)$ be the von Neumann algebra generated by the left regular representation of G . We study the similarity problem for $A(G)$, i.e., whether every bounded representation of $A(G)$ on a Hilbert space H is similar to a $*$ -representation. We show that the answer is affirmative if G is a SIN-group and we consider completely bounded representations.

We apply these results to classify the corepresentations of $VN(G)$ for large classes of groups including SIN-groups, maximally almost periodic groups, and totally disconnected groups. This partially answers a question of Effros and Ruan.

This is a joint work with Michael Brannan (Queen's University).