

Generic representations of abelian groups and extreme amenability

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If G is a Polish group and Γ is a countable group, denote by $\text{Hom}(\Gamma, G)$ the space of all homomorphisms $\Gamma \rightarrow G$. We study properties of the group $\text{cl}(\pi(\Gamma))$ for the generic $\pi \in \text{Hom}(\Gamma, G)$, when Γ is abelian and G is one of the following three groups: the unitary group of an infinite-dimensional Hilbert space, the automorphism group of a standard probability space, and the isometry group of the Urysohn metric space. Under mild assumptions on Γ , we prove that in the first case, there is (up to isomorphism of topological groups) a unique generic $\text{cl}(\pi(\Gamma))$; in the other two, we show that the generic $\text{cl}(\pi(\Gamma))$ is extremely amenable. We also show that if Γ is torsion-free, the centralizer of the generic π is as small as possible, extending a result of King from ergodic theory.

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