

AMENABILITY AND REPRESENTATION THEORY OF PRO-LIE GROUPS

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We develop a semigroup approach to representation theory for pro-Lie groups satisfying suitable amenability conditions. As an application of our approach, we establish a one-to-one correspondence between equivalence classes of unitary irreducible representations and coadjoint orbits for a class of pro-Lie groups including all connected locally compact nilpotent groups and arbitrary infinite direct products of nilpotent Lie groups. The usual C^* -algebraic approach to group representation theory positivey breaks down for infinite direct products of non-compact locally compact groups, hence the description of their unitary duals in terms of coadjoint orbits is particularly important whenever it is available, being the only description known so far.

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