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Projectivity in topological dynamics

Motivated by Gleason's result on projective compact spaces we study projectivity in the category of G -flows and affine G -flows for Polish groups G . We present a characterization of extreme amenability and amenability for closed subgroups $H \leq G$ in terms of the Samuel compactification of G/H being projective. Then we introduce a new notion of extensions between affine G -flows, called proximally irreducible, and use it to prove an analogues result characterizing strong amenability of subgroups. This answers an open question of Zucker and provides a structure theorem for when the universal minimal proximal flow is metrizable or contains a comeager orbit.