RANDALL MCCUTCHEON, University of Memphis, Memphis, TN 38152, USA

Central sets and multiple recurrence for non-amenable group actions

Measurable multiple recurrence results for non-nilpotent groups have up to now been limited to an ergodic Roth theorem of Bergelson, McCutcheon and Zhang, which states that for any measure preserving actions $\{T_g\}_{g\in G}$ and $\{S_g\}_{g\in G}$ of a countable amenable group G on a probability space $(X,\mathcal{B},\mu)$ that commute in the sense $T_gS_h = S_hT_g$ for all $g,h\in G$, and any $A\in\mathcal{B}$ with $\mu(A)>0$, $\lim_n \frac{1}{|\Phi_n|}\sum_{g\in\phi_n}\mu(A\cap T_g^{-1}A\cap(T_gS_g)^{-1}A)>0$ for any Følner sequence (Φ_n) for G. This yields, in particular, that $\{g:\mu(A\cap T_g^{-1}A\cap(T_gS_g)^{-1}A)>0\}$ is syndetic. I'll be talking about some new techniques for doing what might be called "ergodic theory without averaging" that can be utilized to remove the amenability condition in this result while simultaneously strengthening the conclusion.