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Suspending the pigeonhole principle: amenability and the Rokhlin lemma

Abstract:
The Rokhlin lemma is a finite approximation property that underpins a great many constructions in classical ergodic theory, including most spectacularly those at the basis of the Ornstein isomorphism theory for Bernoulli shifts. In the 1970s Ornstein and Weiss showed amenability to be the natural setting for finite approximation in dynamics by establishing a general form of the Rokhlin lemma in this setting, and this led, among other things, to a much broader recasting of the Ornstein isomorphism theory. Over the last couple of decades a growing interest in the interplay between dynamics and the geometric and analytic structure of groups has set the stage for a resurgence of applications of the Ornstein-Weiss Rokhlin lemma, once again confirming its utility as a powerful and versatile tool. I will sketch some of these recent applications, ranging in flavour from orbit equivalence to operator algebras.