

NONCONVENTIONAL COBOUNDARIES

RYO MOORE

Seminario de Sistemas Dinámicos (The Kawin Talk), Santiago, Chile
15 April 2019

ABSTRACT

Let $(X, \mathcal{F}, \mu, T_1, \dots, T_H)$ be a system with several bi-measurable and invertible measure-preserving transformations. Given $f_1, f_2, \dots, f_H \in L^\infty(\mu)$ we will discuss a necessary and sufficient condition for which the equation

$$f_1(x)f_2(x) \cdots f_H(x) = G(x, x, \dots, x) - G(T_1x, T_2x, \dots, T_Hx)$$

is satisfied for μ -a.e. $x \in X$, for some function G on X^H for which the map $x \mapsto G(T_1^n x, T_2^n x, \dots, T_H^n x)$ is bounded and measurable for every integer n . This result was obtained by I. Assani in 2017 during the Ergodic Theory Workshop at UNC Chapel Hill, and announced in 2018 [”Coboundaries for nonconventional ergodic averages”, arXiv:1805.07655]. In particular, we will discuss one of the key ingredients of this result, which is the diagonal-orbit system that was introduced by Assani in December 2013 to study a problem regarding the pointwise convergence of nonconventional ergodic averages [”A.e. multiple recurrence for weakly mixing commuting actions”, arXiv:1312.5270].