NORM CONVERGENCE OF NILPOTENT ERGODIC AVERAGES

MIGUEL WALSH

Let $T_1, \ldots, T_l$ be measure preserving transformations of a probability space $(X, \Sigma, \mu)$. We study the question of convergence for the nonconventional ergodic averages

$$\frac{1}{N} \sum_{n=1}^{N} \prod_{j=1}^{d} \left( T_{i_1}^{p_{i,j}(n)} \cdots T_{i_l}^{p_{i,j}(n)} \right) f_j,$$

where $f_1, \ldots, f_j \in L^\infty(X)$ and $p_{i,j}$ are integer valued polynomials. We discuss how the convergence in $L^2(X)$ of these averages can be established when the transformations generate a nilpotent group.