

SOME GROUPS WITH THE TWISTED RAPID DECAY PROPERTY

Kankeyanathana Kannan

*Department of Mathematics and Statistics, University of Jaffna, Sri Lanka
P_kkannan@yahoo.com*

Rapid decay property (RD) for groups, generalizes Haagerup’s inequality for free groups. For example, free groups have property RD. Property RD provides estimates for the operator norm of those functions (in the left-regular representation) in terms of the Sobolev norm. Even more, property RD is the non-commutative analogue of the fact that smooth functions are continuous. This property RD for groups has deep implications for the analytical, topological and geometric aspects of groups. Let G be finitely generated group, endowed with a length function ℓ and σ is a multiplier on G . If the group G has σ -twisted Rapid decay property if $H_\ell^\infty(G, \sigma) \subseteq C_r^*(G, \sigma)$.

We had studied the twisted property RD and will attempt to answer the question of existence of a discrete group that satisfies twisted RD but that the ordinary RD. We provide a simple method to establish the connection between property RD and Twisted Rapid Decay Property. In particular, there is the following implication for groups:
Property (RD) \Rightarrow Twisted property RD.

We then use this to show the following groups have twisted property RD: CAT(0)-cube complexes, hyperbolic groups of Gromov, Coxeter groups, torus knot groups, Crystallographic groups, the Discrete Heisenberg group, the abelian free group of rank $R > 1$ and the non-abelian free group of rank $R > 2$. $SL_3(\mathbb{Z})$ does not have Property RD but which has twisted Rapid Decay property. We describe that the analytic properties of Twisted property RD pass to direct products.