

Measure Rigidity and Number Theory

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There is a rich interplay of dynamics on homogeneous spaces and number theory. Recently the dynamics of the diagonal subgroup of $SL(3, R)$ by right multiplication on $SL(3, Z) \backslash SL(3, R)$ (and similar higher rank Cartan actions) has received much attention due to its connections to number theory. For instance, Littlewood's conjecture on Diophantine approximation follows from Margulis' conjecture on invariant measures for that action. In joint work with A. Katok and E. Lindenstrauss we have obtained partial results on these conjectures. However, there are other connections, e.g. the same conjecture by Margulis implies that one can improve Minkowski's theorem about the existence of small representatives in ideal classes. In joint work with E. Lindenstrauss, P. Michel, and A. Venkatesh we use our partial understanding for invariant measures to show a partial result toward that improvement.

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