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RANK-ONE TRANSFORMATIONS FOR IRRATIONALS WITH CERTAIN DIOPHANTINE PROPERTIES

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Abstract of Report Talk: Rank-one transformations have played an important role as a source of examples and counterexamples in ergodic theory. These transformations are a generic class in the group of measure preserving transformations and admit an explicit construction by “cutting and stacking” intervals. In 1976, del Junco showed that irrational rotations are rank-one transformations. In another paper, del Junco constructed finite measure preserving rank-one transformations with a given α as an eigenvalue for irrational numbers α with certain Diophantine approximations. We show that a class of these transformations are in fact isomorphic to a rotation by α , thus providing a new explicit cutting and stacking construction of a rotation. In addition, we extend this construction to affirmatively answer a question about the existence of infinite measure rank-one transformations that are totally ergodic but not weakly mixing. This also gives a σ -finite, infinite rank-one measure that is invariant for an irrational rotation.

[Joint work with Jennifer Jones, James Leng, Yelena Mandelshtam]

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