

Young Mathematicians Conference 2018  
*The Ohio State University, August 10-12*

RANK-ONE TRANSFORMATIONS FOR IRRATIONALS WITH CERTAIN DIOPHANTINE PROPERTIES

**Hindy Drillick**

(hindydrillick@gmail.com)

**Alonso Espinosa Dominguez**

(aespdom@mit.edu)

*Williams College*

[Mentor:Cesar Silva]

**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  $\alpha$  as an eigenvalue for irrational numbers  $\alpha$  with certain Diophantine approximations. We show that a class of these transformations are in fact isomorphic to a rotation by  $\alpha$ , 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  $\sigma$ -finite, infinite rank-one measure that is invariant for an irrational rotation.

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

Received: July 23, 2018