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**Kevin Dilks, Oliver Pechenik and Jessica Striker\***, jessica.striker@ndsu.edu. *Resonance in orbits of plane partitions and increasing tableaux.*

We introduce a new concept of resonance on discrete dynamical systems. This concept formalizes the observation that, in various combinatorially-natural cyclic group actions, orbit cardinalities are all multiples of divisors of a fundamental frequency. Our prototypical example of this phenomenon is B. Wieland's gyration action on alternating sign matrices.

Our main result is an equivariant bijection between plane partitions in a box (or order ideals in the product of three chains) under rowmotion and increasing tableaux under  $K$ -promotion. Both of these actions were observed to have orbit sizes that were small multiples of divisors of an expected orbit size, and we show this is an instance of resonance, as  $K$ -promotion cyclically rotates the set of labels appearing in the increasing tableaux. We extract a number of corollaries from this equivariant bijection, including a strengthening of a theorem of [P. Cameron–D. Fon-der-Flaass '95] and several new results on the order of  $K$ -promotion. Along the way, we adapt the proof of the conjugacy of promotion and rowmotion from [J. Striker–N. Williams '12] to give a generalization in the setting of  $n$ -dimensional lattice projections. (Received February 15, 2016)