

962-08-87

Robert W Peck* (rpeck@lsu.edu), School of Music, Louisiana State University, Baton Rouge, LA 70803. *Musical and Mathematical Applications of Composite Interval Cycle Sets.*

The study of the interrelation of mathematics and music is ancient; however, theories in music analysis have incorporated algebraic systems only in recent decades. Specifically, in atonal music of the 20th century, we follow the isomorphism of the 12 chromatic pitches onto the integers modulo 12: the residue classes of mod 12 correspond to 12 pitch-classes (pcs). Using techniques from set theory and group theory, we reveal coherence in musical structures, and at the same time, provide musical examples of mathematical concepts. We apply the operations of translation and inversion to individual pcs and, by extension, to pc-sets. We derive a translation subgroup from the interval between two pcs. A CYC-set, then, is the set of orbits on pcs under the translation subgroups determined by the intervals in a pc-set. We will use two binary relations (one of which is an equivalence relation) among CYC-sets, focusing on the sets of operators which function in these relations. These procedures illustrate aspects of musical symmetry. The relationship between these disciplines is complex, and deserves greater scholarly attention. In addition to the above applications, these techniques may serve as a paradigm for further studies in mathematics and music. (Received July 25, 2000)