

All Harmonies

in Twelve-Tone Equal Temperament

Tao Gaede

The purpose of this book is to provide a context for every harmony, no matter how uncommon it may be in music today or any other day, so that musicians can more easily make use of any harmony. All Harmonies is a comprehensive list of all possible chords and scales (together here called harmonies) that can be formed using the twelve pitch classes of twelve-tone equal temperament (12-TET). In particular, it provides a new systematic organization of the 12-TET harmonies according to features that are both musically relevant and unorthodox.

The harmonies are listed in tables, beginning with 2-note harmonies and ending with the 10-note harmonies. Each harmony is presented on the treble staff, along with several of its features to provide the musician with a context for how to use it. Some of these features include: orientation, whether it is ascending or descending; evenness, how spread apart its pitch classes are within the octave; and stretch, how spread apart its pitch classes are around the circle of fifths. To provide further context for scales (harmonies with more than 4 pitch classes), a series of complementary triads is also included for each scale.

A main goal of this book is to encourage organized exploration, so each section begins with a summary table containing the harmonic interval patterns found in the section alongside blank space for note taking.

Tao Gaede is an amateur composer and graduate student in mathematics at the University of Victoria, Canada. One of Tao's primary interests is to discover new music using combinatorial mathematics to organize musical structures in musically significant ways. This book is the result of such an organization in the context of 12-TET harmony. At the time of publication, Tao is researching the mathematics of combining Erdős-deep rhythms with one another to discover when these mathematical combinations correspond to musically compelling ways of overlapping such rhythms in percussive music.

