

Computational Musicology:
Musical Signal Processing
At Brooklyn College, Fall 2018
With Prof. Johanna Devaney
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**Preliminary Annotated Bibliography
and Short Description
Of the Final Project Topic in
Computational Musicology:
Musical Signal Processing**

Brief description of the final project:

The goal of my project is to present microtonality in just intonation, using divisions of tetrachords with theories from Pythagoras to Vicentino to 20th century theorists and composers, juxtaposed to the equi-tempered chromatic half-step scale and diatonic scales: using the tetrachordal divisions in those systems as well and looking at the differences in perception, ratios, pitch, frequency and timbral characteristics. It will be facilitated by investigating linear sound progressions as well as chords.

Annotated Bibliography:

Akant, K. A., Limaye, S. S., Pande, Rajesh. "Accurate Monophonic Pitch Tracking Algorithm for QBH and Microtone Research." *Pacific Journal of Science and Technology* 11, no. 2 (2010): 342-352.

As the title suggests, this article is concerned with research of microtones, more specifically it presents a computationally efficient algorithm which is applied for microtone research. It makes use of the Fourier or Fourier transform in order to track fundamentals. It furthermore sheds light on tuning issues and techniques: the equi-tempered 12-tone scale with its logarithmically equidistant notes and the just tuned scale, which is based on perfect harmonies, depending on simple ratios instead of being in a geometric progression. The resulting variations in frequencies can be called microtones.

Alves, Bill. "The Just Intonation System of Nicola Vicentino." *Journal of the Just Intonation Network* 5, no. 2 (Spring 1989): 8-13.

This article explores the just intonation system of 16th century theorist and composer Nicola Vicentino, one of the early advocates of chromatic and even microtonal music. Vicentino's system includes ratio lists, scale types, and even keyboard instruments that allow to play in all of the Greek genera he based his scales-theories on. So it is an amazing source of how to apply the theory in music.

Barbera, C. André. "Arithmetic and Geometric Division of the Tetrachord." *Journal of Music Theory* 21, no. 2 (Autumn 1977): 294-323.

In the spirit of the Greek theories about intonations based on ratios, the author of this article is presenting the different concepts of intonation by looking at divisions of tetrachords (Pythagoreans) = arithmetics, juxtaposing it to a geometric conception of music (Aristoxenus) = geometry, complicating mathematical issues. This writing helps in regard of putting the theory of ratios within scales into a frame, the tetrachord. This will be also applied with systems and materials of the other sources, such as Vicentino's or by composers mentioned in Chalmers' *Divisions of the Tetrachord* from 1993.

Blackwood, Easley. "Modes and Chord Progressions in Equal Tunings." *Perspectives of New Music* 29, no. 2 (Summer 1991): 166-200.

In this article, four different types of equal tunings are being covered, those with fifteen, sixteen, seventeen and nineteen notes, helping a study to find and explain chord progressions and scales within equal tunings of 13 to 24 notes while one can perceive tonal functions causing discordant intervals, occasionally even without any consonances.

So, this paper presents a variety of scales, modes and chordal progressions which can be juxtaposed, mathematically as well as sonically, comparing their sound signals as well.

Chalmers, John. *Divisions of the Tetrachord*. Hanover: Frog Peak Music, 1993.

This book looks at the history of the tetrachord, intonations (such as just intonation), and 20th century uses of those. It is a detailed summary of the aforementioned topics.

Kirnbauer, Martin. "»Viertönigkeit« instead of Microtonality: The Theory and Practice of Sixteenth- and Seventeenth-Century »Microtonal« Music." In *Experimental Affinities in Music*, edited by Paulo de Assis, 64-90. Leuven, Belgium: Leuven University Press, 2015.

This chapter brings together theories and practices of microtonal music of the 16th and 17th centuries. It combines material from previously described articles, and goes further into detail about literature by different composers and "viertöniger" ("multi-tonal") music while describing their approaches and systems.