Simplifying the Understanding and Composition of Microtones with Microtonal Planes

Luke Anthony Villavicencio

State University of New York at Fredonia

0000-0002-6793-2430

Lukev5504@gmail.com

Abstract

Microtonality has been thoroughly experimented with and has accrued many systems by which to incorporate microtones into the modern classical notation style. However, these countless accidentals, noteheads, and expressions (brought about by composers such as Ben Johnston, Julian Carillo, Harry Partch, etc.) seem to only busy the page with their complexity and, in some cases, require new instruments, difficult extended technique, and/or computer generated tones. All of this implies the need for a more simple method of the notation and performance of microtones so that they can eventually gain more frequent placement on concert programs at halls around the world. I have found that tuning an entire instrument to a different tonal standard than the instrument it is playing alongside is one of many possible solutions (say, A = 423 hertz alongside A = 440 hertz). This method of microtonal composition has been experimented with by Charles Ives, among others, and brings forward many compositional techniques which highlight the ways two instruments on different microtonal planes, as I will be referring to them for the purpose of delineating from how Haba's similar but accidental-filled "phase shifting," can interact.

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"Everything we see is perspective, not the truth"

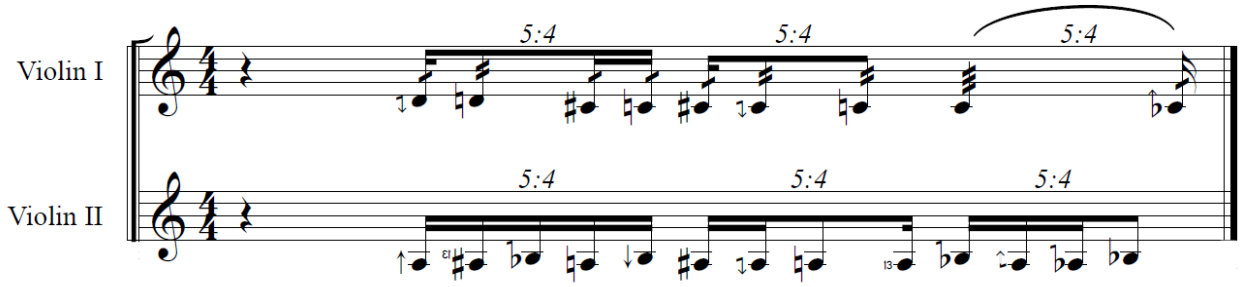
-Marcus Aurelius

Introduction

The contemporary use of microtonality is still young and yet it is far from simple. It has countless deviations, symbols, and systems used throughout the years in an attempt to merge these new ideas with our classic, "tonal" paradigm. But, this method of experimenting and taking mathematical, yet blind shots in the dark hasn't exactly been effective. David H. Cope reinforces this thought in *New Directions in Music* and goes on to say that these systems (consisting more than 12 tones/new instruments such as the creations and compositions of the likes of Julian Carrillo and Harry Partch among others) are no better than our current 12-tone system and are doomed to remain mostly untouched due to their specific requirements and parameters. I believe that, instead of creating new ideas and new systems around those ideas, we should be taking our "tonal" system and use what already works; looking at our modern 12-tone theory and augmenting our understanding of it, rather than changing the theory itself, in order to incorporate microtones.

Music that incorporates microtones has historically gravitated toward atonality; this is mostly because these composers add microtones on top of a modern chromatic scale, utilizing a micro-chromatic range in their instruments (*see Ex. 1*). This way of composing is not at all flawed, though I only wish I could say there existed a larger repertoire of microtonal music that could be considered "tonal" (or, by some miracle, listenable to, say, my non-musical father). This exact thought came to mind while I was listening to Ben Johnston's *String Quartet No. 2*. My roommate was sitting across from me and, rightfully from his non-musical perspective, responded with bewilderment and expressed how it just sounded like noise to him. I deduced from his response that I would receive the same reaction to similar music if I played it for my parents, my sister, my girlfriend, etc. This type of music is not by any means "noise" as he so curtly stated, but it requires a musical, analytical mind and, in some cases, your eyes glued to a copy of the score in order to completely appreciate it.

Now, you may be wondering why I have been putting the word "tonal" in quotations. I am using the quotations to be specific about my reference to the current definition of "tonal music": *a composition using an organization of pitches surrounding a central note or tonic*. This is a broad definition. On that basis, you could define Easley Blackwood Jr.'s Twelve *Microtonal Etudes for Electronic Music Media* as tonal despite utilizing scales with different tuning and more than 12 tones. These etudes still will not sound "tonal" to the general population because when many people think of "tonal", they think of the western chromatic scale consisting of the keys and scales all tuned relative to A = 440 hz. While this much more concise definition is one that many musicians attach themselves to, I wish to take the broad definition and really push it to its limits. I aim to bring the words "tonal" and "microtonal" closer to synonymity.



Ex. 1 *mm. 2 (violins 1 + 2) Ben Johnston's String Quartet No. 7*

Where The Microtones Lie

In order to approach the overarching subject at hand, I would like to revisit a relevant point in history. Arguments have arisen through the centuries in reference to settling on a specific pitch standard as singers were comfortable in different ranges and pipe organs were built tuned to a specific pitch. However, these (one could say "microtonal") differences made it difficult to collaborate since instruments and vocalists that performed/were tuned to different pitches, would clash. This was looked at as a problem and so the 1939 International Conference finally decided on a universal pitch standard (A = 440 hz). There have been further arguments as to whether 440 hertz was a good decision and there are many communities who make a case for 432 hertz, among others.

These arguments bring up an interesting point, untouched within the argument itself: the words "tonal" and "microtone" are relative. Those who align themselves with A = 432 hz will sound (roughly 1.33… hz off of) ⅓ of a semitone flat of any like-named pitch in A = 440 hz. Taking this angle to view microtones when composing can be very effective and can lead to new methods of microtonal composing (as shown in the following paragraphs, headings, and figures). I have deduced that, because of this relativist take on pitches and "microtones", all pitches,

within the diatonic genus or not, are all microtones. This deduction may seem obvious, but I think it is extremely important to point out to young composers looking beyond the “in tune” climate of modern music. So, to answer this heading, the microtones lie everywhere; 440hz, 432hz, 440.10hz, 440.11hz, etc. All pitches are microtones and as long as all composers understand this, they will be awakened to the fact that every time they write out a perfect authentic cadence or punch a descending chromatic line into Finale, those notes are no more than just numbers on an infinite grid with infinite possibilities.

Microtonal Plane Shifting

Now, let's take a few steps back. In a time when the diatonic pitches we know were relative, each performer would be on their own tonal plane, effectively “out of tune” with their neighbor. Here is where we can use our new perspective to develop a new system - rather, a new thought process. Although writing with microtones as a “new system” is exactly what we are trying to avoid. It is/was seen as a problem to be out of tune with other instrumentalists because most of music was written *with the intention of every instrument present in a specific piece being on the same microtonal plane* (This even includes pieces with any sort of microtones, we still intend for our music to be “in tune” relative to A = 440 hz), but what if the composer *doesn't* intend for every instrument to be on the same microtonal plane? Having one instrument shifted at a microtonal level would effectively simplify the performance of microtones, avoiding new accidentals or more math (God, please, no more math) and maintain our modern diatonic, sonorous system at the same time. No new systems, no new instruments, no atonal connotation.

A definition free of term (though I am choosing to call it microtonal plane shifting), this idea has been experimented with by a few composers; Charles Ives, Agustin Castilla-Avila, and

James Tenny, among others. Many of these composers have put these tonal planes to use by tuning one instrument to the modern standard (A = 440 hz) and then detuning the next instrument and having them interact. For example, in Charles Ives' *Three Quarter Tone Pieces* he has two pianos with one being tuned a quarter tone sharp which allows for interesting microtonal dissonances and yet maintains a kind of "tonal" sound. This phenomenon is much like when two parts are playing in different keys or modes and yet, being well-crafted compositions, create beautiful harmonies within the large scope of the piece. In fact, key and mode changes can be viewed as a sort of tonal shifting as opposed to microtonal shifting since that would all take place on the same microtonal plane.

I should mention the Czech microtonal composer Alois Hába. He referred to what I am calling "(microtonal) plane shifting" as "field shifting". I am detaching my methodology from his for two reasons: he continued to use microtonal accidentals when field shifting, and he tended to look at these planes as non-interactable. Now, there is a place for microtonal accidentals, and microtonal plane shifting is not meant to be all encompassing, but there is no point to bring about the idea of having two instruments (or keyboards in the case of Hába) tuned to different standards and then not acknowledge the exact microtonal transposition of every interval and therefore every aspect of modern/western composition. It is much simpler to recognize at the beginning of the piece which instruments are on what planes and then proceed to write their notes as transposed to what we know. In doing this, you can present a detuned piano to a pianist who doesn't know about microtonal performance, and achieve a less stressful rehearsal (like you would if you included all these accidentals or were presenting this *new* quarter tone piano you invented). He was on the right track, but I cannot help but think he missed the mark. I would like to reiterate that the creation of new instruments and use of new microtonal accidentals are great

innovations to the production of microtonal music, but it is by my own a priori and a statistical fact that these methods will limit performance opportunities and continue to be rendered as “just a cool experiment” in the eyes of the public.

Flaws in the Method

The main issue with this idea of shifting microtonal planes is its lack of form. I suppose it is not necessary to put restraints on the infinite choices of microtonal planes and distances between your detuned instruments, but the lack of guidelines raises the already likely possibility of this idea being written off like many past microtonal ventures. It is the general, scientific consensus that the distance of 5 hertz is the smallest microtonal interval most humans can recognize; this is, in my opinion, much too small to use for, say, microtonal scale degrees; unless it is used to create a kind of live chorus effect, which could give the solo piece you’ve been working on that perfect sound or interest factor that it may have been previously missing. I align more with microtonal intervals of 50 cents (quarter-tone/half of a semitone) or 33.3 cents (thirds of a semitone). These intervals are just large enough to be useful in melodic content and anything smaller would benefit more from not being directly notated but rather notated as a bend or a microtonal embellishing tone; Simply, the distances of microtonal planes from each other should remain unambiguous so as to provide clear melodic material.

The second issue brought about by this composing style is the matter of which instruments can take part in this. String instruments would simply tune to a different tonal standard such as A = 432 hz or A = Ab, and so on (the same can be said for the piano, though, that is a much taller order and it may be advisable to include piano as your A= 440 instrument within a shifted composition, but if you have the means, then use those means to their fullest).

Wind and brass instruments would similarly tune to a different tonal standard by adjusting their mouth piece or tuning slides. Though, this is only possible if you are detuning within a semitone below A = 440 hz; if you try to tune the instrument above 440 hz, there is much less space to make the tube of air smaller. Additionally, in reference to wind and fretless string instruments, there may be difficulties in training the ear and fingers/mouth to not subconsciously shift back to the pitch standard though this can be remedied by practice and a future roster of intelligent compositions that lend to microtonal performance training. I would like to experiment in the future with creating longer mouth pieces and tuning slides for different tonal standards so changing microtonal planes could be more plug and play for wind instruments. Doing this would also make it so that new instruments are not needed and so that changing microtonal planes between movements or in the middle of a piece could be more feasible. Frankly, this area merely requires more thought, research, and possibly an entire article on its own.

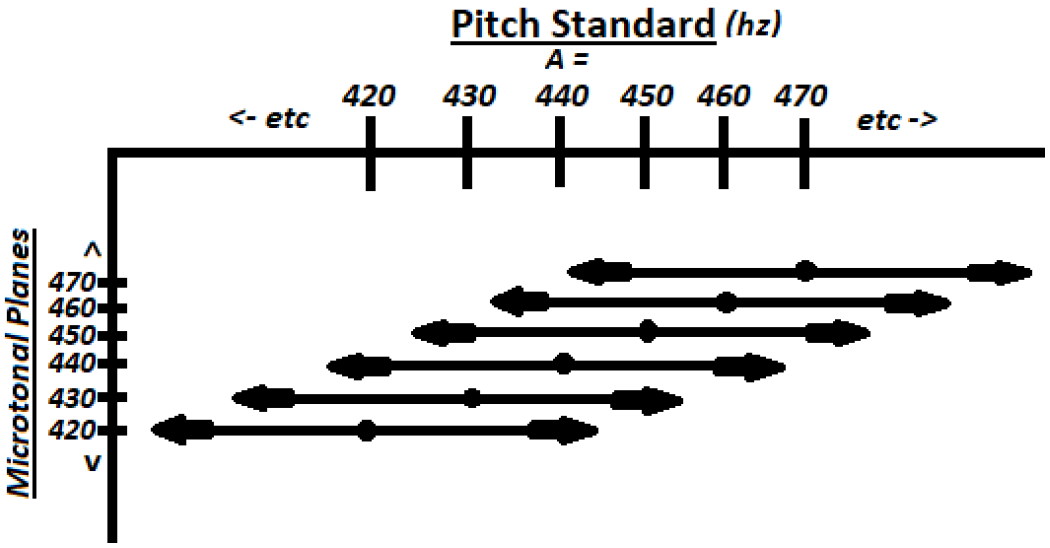
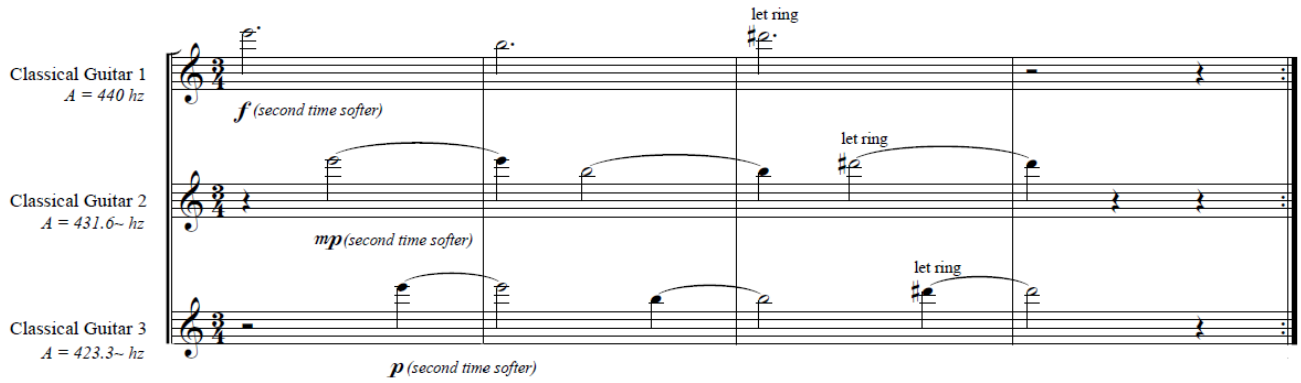


Figure 1 *Graph of my own visualization of microtonal planes*

*Note: The dot in the middle of each line shows the note A4 relative to each plane; The use of intervals of 10 hz between each pitch standard and microtonal plane is an ultra-simplification of an infinite grid.

Compositional Techniques: Degradation

I would also like to bring up previously applied compositional methods, all with my own original names due to the lack of sources on this subject; the first of the three being "degradation" or "degrading". I define this technique as the microtonal detuning of the repetition of a melody or single pitch. This is displayed in the first movement of my piece *Microtonal Study No. 1 (202X WIP)* where each pitch in the main melody degrades across the guitar parts. This particular application creates a very specific echo and the method of degradation is very imitative in nature. Though, like tonal imitation, it doesn't always have to be verbatim. The malleability of the definition really opens up the possibilities of this technique and how you could use it on the advanced level.

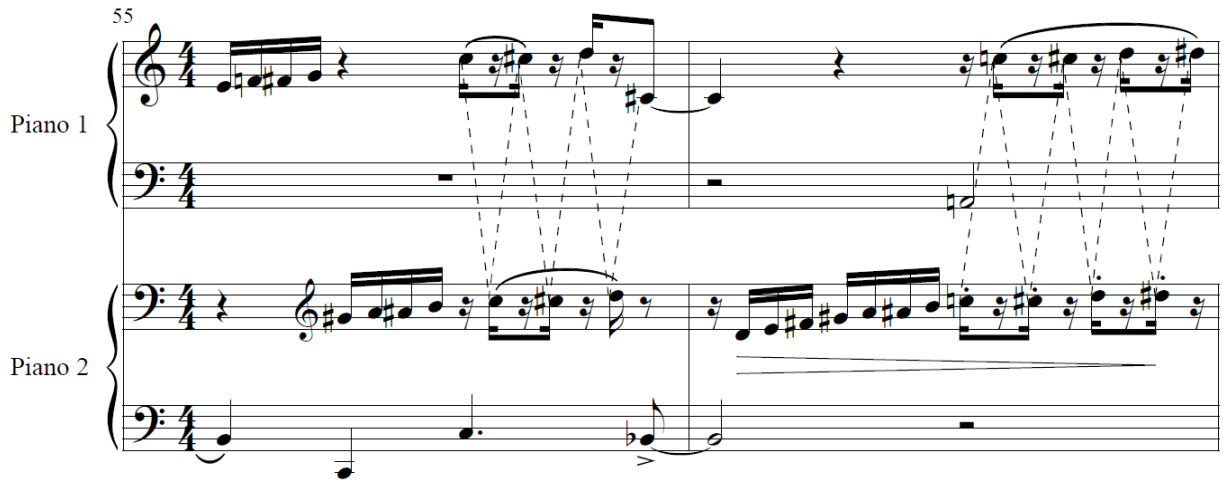


Ex. 2 mm 1-4 (Guitars 1-3) Luke Anthony Villavicencio's *Microtonal Study No.1 "Degradation"*

Compositional Techniques: Scale Trading

Scale trading is not a new idea by any means, but it is important to note and extremely applicable when working with microtonal planes. Simply, scale trading is when two or more instruments trade notes in a stepwise melodic line. This is done as an interesting effect when the ensemble is on the same microtonal plane, but when their planes are askew, scale trading is

almost impossible to avoid. If you want a microtonal melodic line and your instruments are shifted apart, you will need to trade notes between them to achieve the microtonal scales and intervals. This is displayed beautifully in Charles Ives' *Three Quarter-tone Pieces (*as shown below). I've added dotted lines to show the scale between the two pianos.



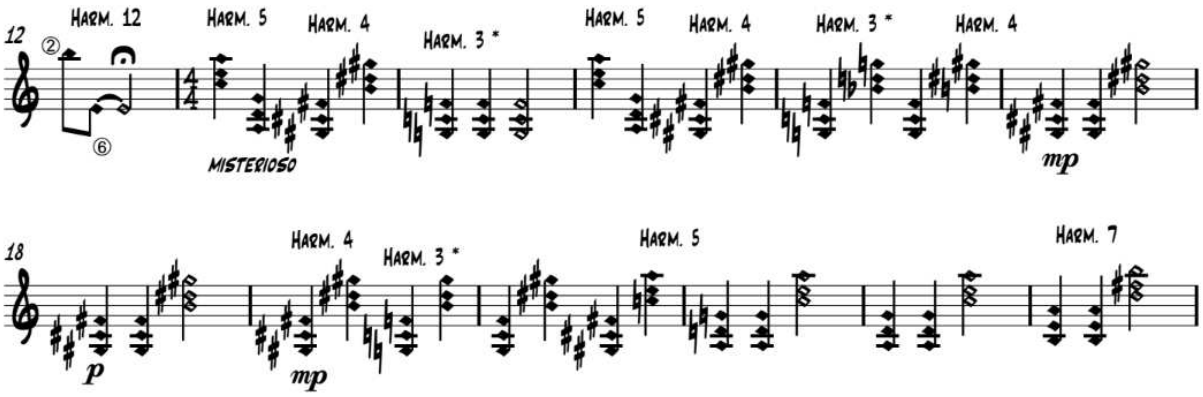
Ex. 3 mm. 55-54 Charles Ives *Three Quarter-tone Pieces* for two pianos

*Note the lack of accidentals due to the 2nd piano being shifted to a lower microtonal plane

Compositional Techniques: Microtone Clusters and Diads of Adjacent Microtones

Henry Cowell defines tone clusters as "...large groups of adjacent tones…" and while he is referring to tone clusters on the keyboard specifically, we can apply these not only across an ensemble, but also bringing the idea to a microtonal level. There is a large difference in the sound of a tone cluster and a microtone cluster; microtonal clusters can sound much more dissonant while tonal clusters are simply a group of minor and major second intervals. A great example of the sound these microtone clusters provide is the section of Agustín Castilla-Ávila's *Sakura* for microtonal guitar shown below. Despite this, you can lower the amount of notes to a simple diad made up of two adjacent microtones to create either a similarly dissonant sound or a

natural chorus effect of sounding like one note depending on the distance in hertz. The latter is an interesting sound that could effectively be an audibly pleasing microtonal variation on the unison interval.

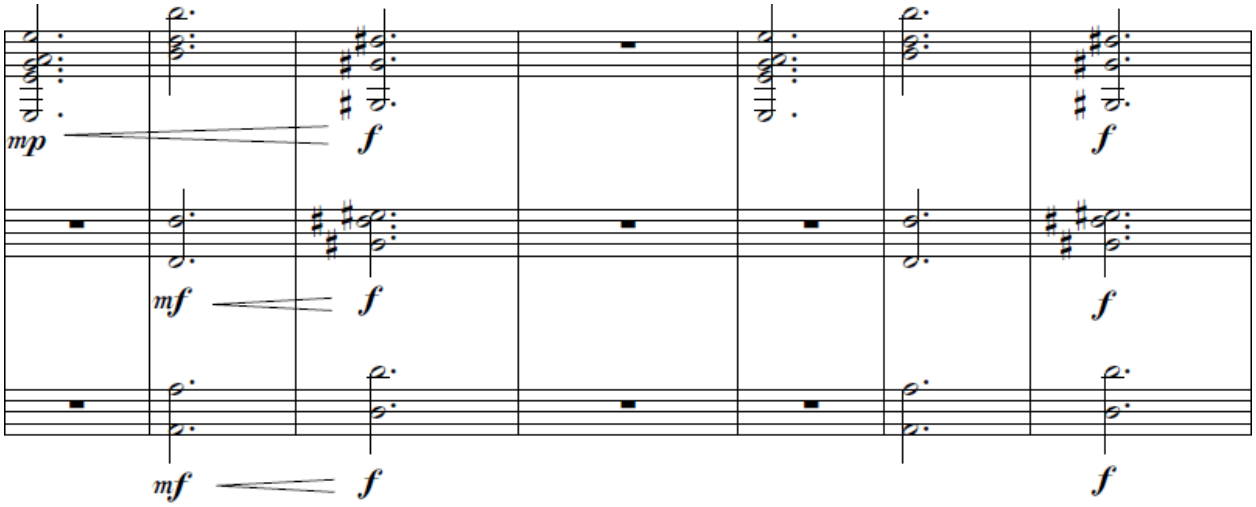


Ex. 4 mm 12-23 Agustín Castilla-Ávila's *Sakura* for microtonal guitar

It is important to note that the composition above is transcribed for a guitar with its 6 strings tuned to pitches within 2 semitones (each one is ⅓ of a half step away from each other).

Compositional Techniques: Multi-Plane Chords

This method is relatively self-explanatory: a multi-plane chord includes multiple notes from multiple microtonal planes. This can also be viewed as a chord that is made up of pitches outside of 12-EDO in combination with those that are within. A common example of this would be the neutral third within a triad. This third is usually presented with a quarter tone between a major third and a minor third though, theoretically, you could adjust whether the third is closer to major or minor to produce different, complex degrees of some of the simplest triads. And then, of course, this can be done on a much larger scale as shown, once again, in my piece *Microtonal Study No.1 "Degradation."*



Ex. 2 mm 33-39 (Guitars 1-3) Luke Anthony Villavicencio's *Microtonal Study No.1 "Degradation"*

**Remember: each guitar is detuned by a third of a tone from the previous (so, gtr 1, gtr 2 -⅓ , gtr 3 -⅔)*

Conclusion

I would like to close with this thought: In a time where classical music is losing public interest and concert halls are selling less and less tickets, we must innovate, not just for the composer, but for the listener. My current project *Microtonal Study No. 1 "Degradation"* is not only playing with the technique of degradation, but it is also experimenting with landing and remaining on a different microtonal plane; This is done by smoothly transitioning to a new plane and remaining there to condition the listener's ear to it. Eventually, it will return to the home tonality of A440 - not dissimilar to a I-V-I progression, though, on a larger, microtonal scale. My point is that composers would be out of a job without listeners, and if we wish to make microtonal music more palatable, we must accommodate for their untempered western ear; Whether we do this by shifting the 12 tone scale to a different tonal standard or some other way matters not.

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