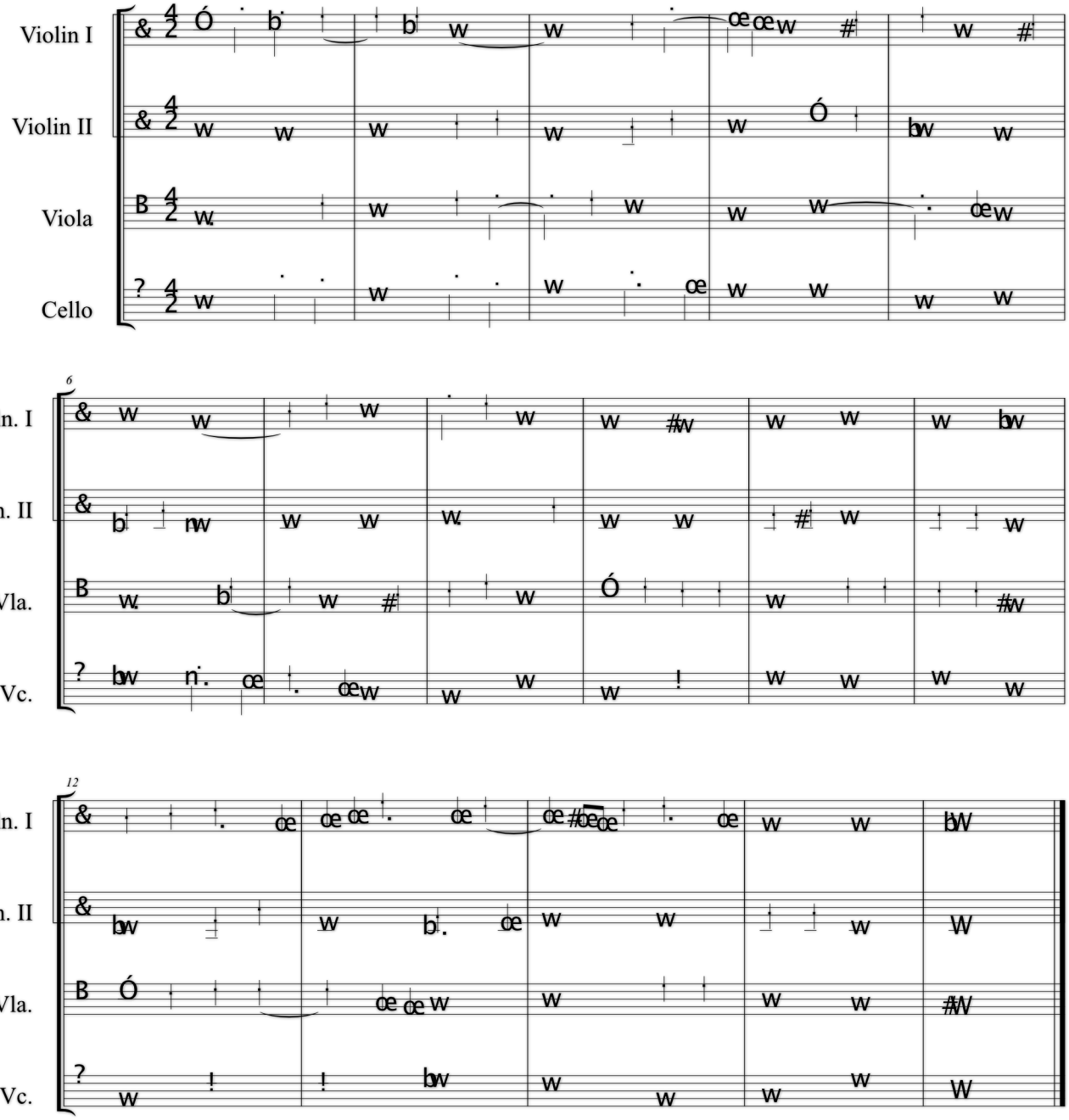
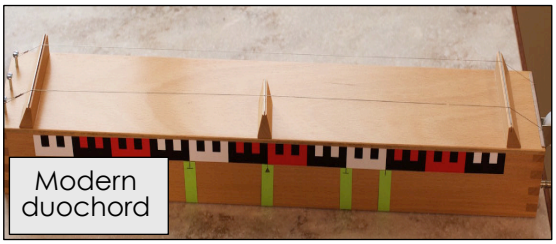
Vincenzo Galilei

Discorso particolare intorno all'unisono, c. 1590

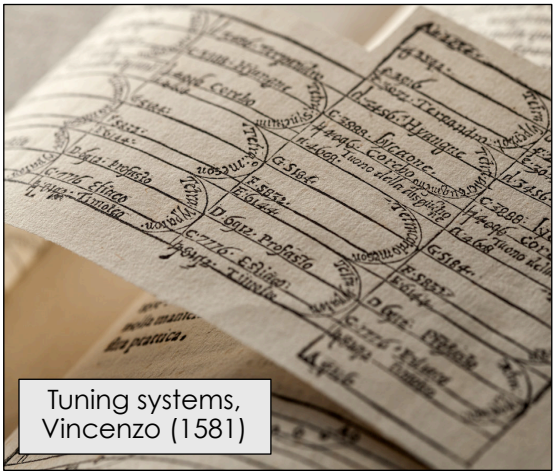


ed. Jonathan A. Annis (2016)

Should tuning be guided by perfect mathematics or practical performance?



Modern duochord



Tuning systems, Vincenzo (1581)

Vincenzo Galilei, 1581

Vincenzo's New Tuning System

Vincenzo Galilei was among the first music theorists to advocate for a new system of tuning based on performance, instead of the mathematical principles of music set fourth by Pythagoras. Pythagorean music theory bases pitch on the mathematical proportions of dividing a string. Vincenzo's primary problem with this system is that, although it is great for the mathematician and the music theorist, it is impractical for the performer. All music based on this particular system of tuning would inevitably sound out of tune and unpleasant.

The reason for this is very simple after some thought. We are taught today that, for example, C# and Db are the same note. While this is true, it has not always been the case. We find enharmonic equivalence in notes that share the same key on a piano. C# and Db indeed share the black key to the right of C in every octave across the piano, and so we learn that they have the same pitch class because they are the same audible note. It might be surprising to find out that in Vincenzo's time C# and Db were completely different notes!

C# is higher than Db according to the Pythagorean system of tuning. After calculating the mathematical distance of a semitone one must begin from the note sharing the same letter name. (C—>C# or D—>Db) This places the C# closer to D and the Db closer to C. The space between these notes was, in that time, referred to as the syntactic comma. This is the reason that enharmonic equivalence could not exist in the time of Galilei.

Galilei was proposing, in the choral (reverse side), the invention of a new system of tuning in which enharmonic equivalence was possible so that he could play a fretted lute. The proof of his theory is found in the chords that contain both sharps and flats. These chords, today, sound beautiful. They would have sounded out of tune and strange enough to be off putting in Vincenzo's day. The last chord is a clear example. It is a B major chord that is spelled with an Eb instead of a D# as the third of the chord. In Galilei's time this chord would have sounded almost minor, or at least extremely out of tune.

In the end Galilei won, and the system of tuning was changed to equal temperament, so that all of the semitones were equal. We have since moved on to just intonation, a system in which each interval is adjusted slightly to sound more in tune. The question of an effective tuning system is one that will never truly find an answer, but through the study of our perception and the mathematics that facilitate the sounds that we do hear, we will be able to continue making advances with the passing centuries.

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