TECHNICAL DOCUMENTATION

Piano Voicing

Timbre and tuning: a functionality guide

Ivan Pisino
Piano tuner and technician

+39 352 088 5361 · +33 7 83 72 65 19

ivanpisino.com

INTRODUCTION

Two things that can go wrong

A piano can go wrong in two different ways: how it sounds, and how it's tuned. Piano Voicing measures both with the same physical rigour — a single app, born from the timbral diagnostic system built for desktop research, now extended to real-time tuning, straight from the phone.

Timbre

How hard or soft a hammer strikes, how bright or dull a note sounds — measured through spectral analysis and compared against a physical model of the instrument, not judged by ear alone.

Tuning

Whether the pitches themselves are correct — not just against standard equal temperament, but against any scale you choose to build, measuring the real inharmonicity of each individual string instead of reading it from a theoretical table.

The following pages describe the main features, starting with the newest part: real-time tuning.

REAL-TIME TUNING

A needle that moves while you play

The centrepiece of the app is an analogue dial that updates itself while the note rings — meant to be watched while you're turning the pin, not read after the fact.

Nothing to press — play the note, hold the key down, the needle moves in real time

Still at centre = in tune — colour-coded deviation (green close, blue intermediate, red far)

Inharmonicity genuinely measured — FFT analysis on each individual string, not a generic table

Precise measurement on demand — a deeper analysis (~1 second) for the definitive figure, when needed

Real beat rate between two notes — finds the closest-coinciding partials between two already-measured notes, and calculates the beat rate in Hz you'd actually hear playing them together

The target isn't fixed to equal temperament: it's read automatically from the active scale, whatever that scale is — see the next page.

Not just equal temperament

The app includes three different ways to define the tuning target, built for work on contemporary, microtonal, and historical-instrument repertoire.

Interval editor

Write the interval (in cents) between each pair of consecutive chromatic degrees. The last one is always calculated automatically, to close the octave exactly at 1200 cents — whatever you write for the other eleven, the scale is always correct by construction.

Harry Partch's tonality diamond

Pure ratios (just intonation), generated from a set of odd numbers — not hand-typed tempered intervals. Choose the limit (5, 7, 9 or 11), tap a cell to see which note it corresponds to and by how much it deviates, apply it to the scale.

Equal-division scale calculator

Octave divisions of 12, 24, 36 or 48 steps — useful as a quick reference before building the final scale with either of the other two tools.

TIMBRAL DIAGNOSIS

The foundation the app grew from

Before tuning even comes into it, Piano Voicing brings to the phone the same timbral diagnostic system developed for desktop research: it measures the spectral descriptors of each note — centroid, rolloff, spread, flatness — and compares them against a reference curve built on a stiff-string physical model.

For every note, a deviation score indicates how far the instrument sits from the reference, with no prescriptive labels — just the raw figure, to be interpreted by ear and experience.

In summary

- Note-by-note timbral diagnosis, same physical basis as the desktop version
- Real-time tuning dial, nothing to press
- Inharmonicity measured per string via FFT
- Interval-based scale editor, octave closure guaranteed by construction
- Harry Partch's tonality diamond, for just intonation
- Equal-division scale calculator (12/24/36/48-EDO)
- Real beat-rate calculation between two measured notes

Physical model shared with the full timbral diagnostic documentation, available at ivanpisino.com — references to Bettin, Chaigne & Kergomard, McAdams et al.