

Harmonic DRIVE ANALYZER

Users' Guide V1.3

Drive Analyzer is a tool for analysing musical events (chords/notes) in an xml music score; it searches for common chord configurations (triads / sevenths etc). It shows results in a grid and can export PDF output. It is a useful method of analysing 20th century art-music in the western tradition, which, through its tonal complexity, often obscures diatonic drive. It may, however, have other uses.

The method of musical analysis – “drive analysis” – is explained in this video, as well as at the bottom of this page, and complements Kenneth Smith’s book, *Desire in Chromatic Harmony* (OUP, 2020).

As an advanced feature, the program further allows users to track “entropy” across the course of a piece as described in the article, “The Enigma of Entropy in Extended Tonality” (*Music Theory Spectrum* 43, no. 1, 2021).

Installation


Download the latest version and open the zip file. The programme requires no installation. However, because I have no security certificate, your operating system is likely to try and prevent the file opening. This will require you to insist; be firm with your OS – don’t let it win.

Load XML

Load a music xml file – either made by you, or downloaded from one of many online repositories. The programme will analyse the file. The window will be populated with information about the “drives” (recognisable chord shapes within larger chord complexes). This may look like this:

Bar 2, Beat 1 (3/8): A#m7 , C#, F#, G#7 (bass = F#+G#)

Bar 2, Beat 2 (3/8): A#2 (bass = C#)

Ignore the  and any 2 or 3 markers; these are part of the advanced entropy analysis.

This list of events can be saved as a .txt file and reloaded. Users can change the text file to suit their own needs, or even create their own list, following this format precisely.

Before loading the “Grid view,” users may wish to tweak the settings, depending on the piece of music they are analysing.

Settings

The settings dialog contains the following options: click “apply” to operate the profile and re-load the analysis:

Analysis Mode

Choose the fundamental approach for analyzing your music:

Event-based (recommended): Detects actual musical events like chord attacks and changes. Provides the most musically meaningful analysis.

Time-segment based: Divides music into regular time intervals (half-beats, beats, or bars) and analyzes all active notes in each segment. Useful for studying harmonic density over time.

Include triads

This setting allows users to include or exclude triads from the analysis. (Because, in drive analysis, triads are considered to have a weaker sense of drive than most seventh chords, users may not wish to include them in the search).

Include anacrusis

In pieces which commonly have an "up-beat", this option may be useful. It joins the upbeat to the subsequent chordal analysis.

Arpeggio searching

Where chords are commonly constructed as arpeggios (i.e., the notes are not literally all present at the same time), turn this option on.

Neighbour notes

This option records both passing notes in the melody and any neighbour notes that resonate with a recognisable chord in the harmony. Be warned, this can lead to a heavily populated graph.

Remove repeated patterns

In music with significant repetition, it can be desirable to reduce the chord progressions to show patterns only once. For example, when selected, this option will reduce a pattern of events ABABA to ABA. It will, however, allow ABCAB.

Include non-drive events

Where four-pitches that do not produce a common chord are found together, this option registers only the bass note. This is only recorded at moments where there are no other common chords present. Thus, the pitches c, c#, d might yield the result: "no recognisable drive (bass C)", but the pitches c, c#, d, g, b would still record "G" as a triad.

Sustain Pedal

Simulates piano sustain pedal to create richer harmonic analysis:

Every Beat: Pedal lifts at each beat boundary

Strong Beats: Pedal lifts on beat 1 and the halfway point of each bar

Half Bar: Pedal lifts at bar starts and exact bar midpoints

Every Bar: Pedal lifts only at bar boundaries

Auto: Intelligent pedal simulation using harmonic shift detection, mass note endings, and bar boundaries

Duration Filter

Enabled: Excludes notes shorter than the specified duration (32nd notes, 16th notes, 8th notes, or quarter notes) to focus on structurally significant events.

Disabled: Analyzes all notes regardless of duration.

Event Change Sensitivity

Controls how events are grouped and merged:

Record all variations: Captures every harmonic fluctuation as separate events

Capture small changes: Detects subtle differences between similar harmonies

Default: Balanced approach for most musical styles

Focus on clear changes: Merges similar events, emphasizing significant harmonic shifts

Show only major shifts: Aggressive grouping, displaying only the most important changes

Drive Strength Configuration

Opens advanced dialog to customize Individual chord type strength values (affects priority and color coding), and harmonic priority hierarchies

Show Grid

The scrollable grid shows detected musical events. Time flows along the x-axis, showing every recorded event; the y-axis represents the circle of fifths. Tetrachords are shown in circles; triads are shown as triangles (upward pointing = major; downward pointing = minor).

The grid has three optional parameters:

Show resolution patterns

This produces arrows where drives move to their related local "tonic". Assuming no global tonic, the option simply shows patterns of local V-I or II-V progression. It only considers the root, and does not consider the modal quality of the chord.

Colour-code chords

When checked, this codes the chords in terms of their strength. The strongest chords are rendered in black; the weakest in white or light grey. Strength is determined by 8 variables; the inner-workings of this formula can be examined by clicking "show entropy" and exploring the grid contained there. You can change these values in the settings.

Show entropy

This is an advanced feature, following the method of calculating entropy shown in this video. In brief, the feature calculates the tonal "randomness" at any given moment. The strength of each chord within a complex is modelled and returned as a probability score, essentially asking the question: "if any one of these chords is going to resolve; what's the chances of it

being this one?" This is then fed into Claude Shannon's formula for calculating "entropy" or "information" (measured in bits) and plotted on a line graph beneath the main grid. The individual variables used to calculate the probabilities (strengths) themselves are shown on a list at the foot of the pop-up window table of information.

Save as pdf

This option produces a beautifully rendered pdf version of the scrollable window.

Save / Load

Save as a text file; Load a text file. Useful if you have particular settings that you want to keep, or you want to edit the results yourself later on.

Keyboard

This opens a keyboard window in which users can either (a) click the keys with the mouse, or (b) play live using a midi-device if available. Playing this keyboard does not affect, or draw from, the main analysis; it's just a place to noodle around and play chords with a display that shows the drives present. Have a play around below!