**Rules from Gauldin’s book**

*Summary*

**Rhythm**

* Set tempo and time signature (allow to change the time signature at every bar)
* Later (less important), allow to add dynamic changes to tempo (accelerando...)

**Pitch**

* Scales: Major, minor (combination of the 3, with the 5th degree being major for chords), modes
* Difference between tone (A, B,…) and pitch(A5, B4,…)

**Harmony**

* Build chords from degrees (I, V, IV, iii,…) respecting four-voice texture
* Allow for inversions as well
* Generate cadences
* Allow to specify a harmonic profile in terms of relative lengths (main harmony and embellishing harmony)

**Melody**

* Step-wise motion is preferred with occasional use of melodic leaps, maily 3rds/4ths, with 5th, 6th, and octaves less often. Peut-être préciser quand il faut les privilégier, à voir avec le rock. The larger the leap, the greater the tendency to follow it with motion in the opposite direction.
* Diatonic intervals are preferred, and use of diminished/augmented intervals is restricted.
* Establishment of a stable tonal center at the beginning of a phrase and a clear tonal goal at the cadence, coupled with a sense of tonal direction in the interior of the phrase
* Repetition of rhythmic and pitch patterns.

**Instruments modeling**

*Four-voice texture*

**Voices: (optional)**

* Soprano: C4 (60) -> G5 (79)

dom(soprano) = [60,79]

* Alto: G3 (55) -> D5 (74)

dom(alto) = [55,74]

* Tenor: C3 (48) -> G4 (67)

dom(tenor) = [48,67]

* Bass: F2 (41) -> D4 (62)

dom(bass) = [41,62]

Order constraint: soprano[i] <= alto[i] <= tenor[i] <= bass[i]

**Chordal spacing:**

* Close structure: less than an octave between soprano and tenor

soprano[i] – tenor[i] < 12

* Open structure: More than an octave between soprano and tenor

soprano[i] – tenor[i] > 12

* Neutral structure: Exactly one octave between soprano and tenor

soprano[i] – tenor[i] > 12

* General rule : the distance between consecutive upper voices (not including bass) should not exceed an octave.

**Doubling:**

4 voices, 3 notes in a triad -> one has to be doubled

**MODIFY WITH PART 2 HARMONY**

* Root position major/minor triads: double the bass (root of the chord)

soprano[i] or alto[i] or tenor[i] = bass[i] + j \* 12, j in [0,…[

* First inversion major/minor triads: double the note in the soprano voice (at the unison or octave)

alto[i] or tenor[i] or bass[i] = soprano[i] – j \* 12, j in [0,…[

* Second inversion major/minor triads: double the bass (fifth of the chord)

soprano[i] or alto[i] or tenor[i] = bass[i] + j \* 12, j in [0,…[

* First inversion diminished triads (most common form): double the bass (third of the chord)

soprano[i] or alto[i] or tenor[i] = bass[i] + j \* 12, j in [0,…[

* Seventh chords: One note in each voice (the fifth may be omitted if the root is doubled).

Soprano[i] != alto(i] != tenor[i] != bass[i], TODO cst for when no fifth and 2 roots

**Partwriting:**

The way the voices move from chord to chord

* When changing positions of a root position triad, we can retain or change the structure (open/closed). When we retain the same structure, the 3 upper voices move in the same direction and the same number of chordal members
* When the structure changes, two of the three upper voices will exchange tones, the third one will retain a common tone.
* When moving from a root position to a first inversion triad or vice versa, the first inversion chord may exhibit neutral structure (open/octave).

*Melodic motion between voices*

Can be used when generating 4 voice texture but also when adding a melody to its

Between 2 voices:

* Parallel motion: Voices move in the same direction
* Oblique motion: One stays at the same note, the other moves
* Contrary motion: They move in opposite directions

*Steps of the search : create an accompaniment to a melody*

**Step 1 : analyse the melody knowing the tonality and find the most suitable chords for each part of the melody**

Return a list of notes representing the root of the chord (e.g. 60 for C major in G major)

**Step 2 : generate 4 voice texture for the chords generated before (that might create inversions). Post constraint that the end of the phrase must be in root position**

Return a 4xN matrix representing the succession of chords

**Step 3 : develop the 4 voice texture chords generated in the previous step to have a more complex melody (maybe allow the user to specify what kind of accompaniment they want)**

**TODO determine format (how “on beat” they want it to be, how dense,…)**

**Step 4 : Add ornements to the result of the previous step (this will modify the rhythm). This has to be done sparingly, as this is not the main melody but the accompaniment. A similar approach can be used for melody generation, but a lot more care has to be put into the rhythm generation.**