

ALGORHYTHM

A LIBRARY FOR ALGORITHMIC MUSIC COMPOSITION

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music representation (Music, MusicCore, Scale, Chord, etc...
music manipulation (transpose, retrograde, time-scale, etc...

FOCUS ON GENERATION, IGNORE ANALYSIS



YOU SHALL NOT PARSE!

genState, selectors, diatonic improv, etc...

k-means, etc...

grammar description

GRAMMARS: TABLA RHYTHM

```
tabla :: Grammar () Syllable
tabla = S | :
  [ S |--> TE1 :-: XI
    , XI |--> TA7 :-: XD
    , XD |--> TA8
    , XG |--> TB2 :-: XA
    ...
    , TE4 |--> Ti :-: Rest :-: Dha :-: Ti
    , TC2 |--> Tr :-: Kt
    , TB3 |--> Dha :-: Tr :-: Kt
    , TD1 |--> Rest
    ...
  ]
instance ToMusicCore Syllable where
  ...
```

GRAMMARS: JAZZ IMPROVISATION

```
melody :: Grammar () NT
melody = MQ | :
  [ -- Abstract Rhythm { MQ ~> Q }
    (MQ, 1, (== qn))      |-> Q%:qn
    , (MQ, 25, (> (hn^.))) :-> \t -> Q%:hn :-: MQ%:(t - hn)
    ...
    -- Concrete Rhythm { Q ~> MN }
    , (Q, 47, (== wn)) |-> MN%:qn :-: Q%:hn :-: MN%:qn
    , (Q, 6, (== hn)) |-> HT%:(qn^^^ ) :-: HT%:(qn^^^ ) :-: HT%:(
    ...
    -- Abstract Melody { MN ~> N }
    , (MN, 1, (== wn)) |-> MN%:qn :-: MN%:qn :-: MN%:qn :-: MN%:
    , (MN, 1, (== qn)) |-> HT%:(en^^^ ) :-: HT%:(en^^^ ) :-: AT%:
    ...
    -- Concrete Melody { N ~> NT }
    , (N, 50, (== qn)) |-> ColorTone%:qn
    , (N, 45, (== qn)) |-> Rest%:qn
    , (N, 1, (== en)) |-> ApproachTone%:en
    ...
  ]

mkSolo :: Music SemiChord -> Music NT -> IO Melody
```


GRAMMARS: TONAL HARMONY

```
harmony :: Grammar Modulation Degree
harmony = I |:
[ -- Turn-arounds
  (I, 8, (> wn)) :->
    \t -> Let (I%:t/2) (\x -> x :-: x)
  , (I, 6, (> hn) /\ (<= wn)) :->
    \t -> II%:t/4 :-: V%:t/4 :-: I%:t/2
  , (I, 2, (> hn) /\ (<= wn)) :->
    \t -> V%:t/2 :-: I%:t/2
  , (I, 2) -|| (<= wn)
  -- Modulations
  , (V, 5, (> hn)) :-> \t -> Modulation P5 $: I%:t
  , V -| 3
  , (II, 2, (> hn)) :-> \t -> Modulation M2 |$: I%:t
  , II -| 8
]
```

```
instance Expand Degree Modulation SemiChord where
  ...
```

```
voiceLead :: Music SemiChord -> IO (Music Chord)
```

DEMO: CODE

```
orientalAlgebras = do
  let ?harmonyConfig = HarmonyConfig
    { basePc    = A
    , baseOct   = Oct3
    , baseScale = arabian
    , chords    = equally allChords
    }
  let ?melodyConfig = defMelodyConfig
    { scales    = equally allScales
    , octaves   = [(20, Oct4), (15, Oct5), (5, Oct6)]
    , colorWeight = 0
    , approachWeight = 10
    }
  let ?midiConfig = MIDIConfig (6%5) [Piano, Sitar, Tabla]
  let ?tablaBeat = sn

  (back, fore) <- integrate (12 * wn)
  rhythm <- runGrammar tabla (12 * wn) ()
  writeToMidiFile "out.mid" (dyn (back == fore == rhythm))
```

DEMO: MUSIC SCORE

Oriental Algebras for Metalophone, Sitar & Tablas




System 1 of the musical score, measures 1-4. It features three staves: a top staff with a treble clef and a key signature of one sharp (F#), a middle staff with a treble clef, and a bottom staff with a bass clef. The music is in 4/4 time. The top staff has a melodic line with a fermata over the first measure. The middle staff has a melodic line with a fermata over the first measure. The bottom staff has a rhythmic line with a fermata over the first measure.



System 2 of the musical score, measures 5-8. It features three staves: a top staff with a treble clef and a key signature of one sharp (F#), a middle staff with a treble clef, and a bottom staff with a bass clef. The music is in 4/4 time. The top staff has a melodic line with a fermata over the first measure. The middle staff has a melodic line with a fermata over the first measure. The bottom staff has a rhythmic line with a fermata over the first measure.



System 3 of the musical score, measures 9-12. It features three staves: a top staff with a treble clef and a key signature of one sharp (F#), a middle staff with a treble clef, and a bottom staff with a bass clef. The music is in 4/4 time. The top staff has a melodic line with a fermata over the first measure. The middle staff has a melodic line with a fermata over the first measure. The bottom staff has a rhythmic line with a fermata over the first measure.



System 4 of the musical score, measures 13-16. It features three staves: a top staff with a treble clef and a key signature of one sharp (F#), a middle staff with a treble clef, and a bottom staff with a bass clef. The music is in 4/4 time. The top staff has a melodic line with a fermata over the first measure. The middle staff has a melodic line with a fermata over the first measure. The bottom staff has a rhythmic line with a fermata over the first measure.



System 5 of the musical score, measures 17-20. It features three staves: a top staff with a treble clef and a key signature of one sharp (F#), a middle staff with a treble clef, and a bottom staff with a bass clef. The music is in 4/4 time. The top staff has a melodic line with a fermata over the first measure. The middle staff has a melodic line with a fermata over the first measure. The bottom staff has a rhythmic line with a fermata over the first measure.



System 6 of the musical score, measures 21-24. It features three staves: a top staff with a treble clef and a key signature of one sharp (F#), a middle staff with a treble clef, and a bottom staff with a bass clef. The music is in 4/4 time. The top staff has a melodic line with a fermata over the first measure. The middle staff has a melodic line with a fermata over the first measure. The bottom staff has a rhythmic line with a fermata over the first measure.