Poly-Rhythmic Structures As Frameworks For Improvisation

by

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Research Report

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1. Introduction

When thinking about the relationship between composition and improvisation, particularly in the context of small ensemble improvisation in the tradition of jazz music, a composition can be seen as a set of predetermined musical structures that function as a sort of "map" for the improvisers to navigate, while at the same time providing a cohesive character or "vibe" for the musical performance.The improvisation then occurs in relation to these structures, which can deal with any or all of the main elements of music: Rhythm, Melody and Harmony.

The focus of the research process documented in this report is on the rhythmic aspect of said pre-composed structures and their application in my own compositions. Specifically how the simultaneity of different rhythms can create poly-rhythmic textures that provide structures that have a clear contour, alternating between moments of tension and release.

For that I have defined the following research question:

How can poly-rhythmic structures be used as generators of form when composing for improvisation?

My goal in addressing this question is to develop a personal rhythmic vocabulary- a collection of concepts that I can explore through my music, both in composition and in the improvisational treatment of composed materials.

In order to address the question I started by looking into the rhythmic concepts of some of the musicians whose work inspired my interest in this kind of ideas, in particular the saxophonist Steve Coleman. Fortunately for me, he has been prolific in divulging his ideas. However, the more I learned about his work, the more I realized that his concepts have been developed over years of research and creative practice and that merely taking some of those ideas and trying to use them myself would be a rather superficial approach, and that wasn't the direction I wanted to take. But nonetheless I was able to learn something about their creative processes and saw how important the understanding of fundamental and basic concepts from different sources was to their work.

So before trying out the ideas I was getting from this musicians I decided to go to their sources. I started by looking at some fundamental rhythmic concepts found in some of the music from West Africa, the African Diaspora and to a lesser extent the Carnatic music of South India. There are of course many other musical traditions around the world that have a strong rhythmic component but for the scope of this research I focused on the ones mentioned for different reasons. First of all, I have always been interested in how Jazz relates to other musics of the African Diaspora in the Americas, to many of which I was exposed growing up. Second, I have been studying rhythmic techniques form Carnatic music for a while and I'm interested in their potential use in contemporary jazz music, as is the work of pianist Vijay Iyer, among others.

In the first section of this report I will talk about the rhythmic concepts that I have taken from those various sources, starting with the most fundamental ideas about the function of rhythm in groove-based music, going through the various devices I found useful when looking at the mentioned

musical traditions, and finally touching on some specific techniques I picked up from the work of Steve Coleman.

The section following that covers a group of four compositions on which I used and combined the concepts discussed in the previous section, talking in detail about which devices have been use and how. These compositions are the final product of this research process.

Finally I will talk about the conclusions I have arrived to at the end of this process and what possibilities I see for future investigation. Including some practical considerations regarding practice and internalization of unfamiliar concepts and some problems that may arise in regard to musical notation.

2. Rhythmic Concepts

In this chapter I will lay down the rhythmic concepts I used in my compositions. I will start by defining certain terms and fundamental concepts that will be the framework on which the rest will function. Next, I will go through some of the concepts that I have found useful when I looked into the related musical traditions of West Africa and Cuba and to a lesser extend South India. Finally, I will mention the devices that I have taken directly or indirectly from the music and teachings of Steve Coleman.

2.1 Defining Terms

2.1.1 Rhythm

For the purposes of this report I will use the definition of rhythm proposed by Vijay Iyer: "(…) Any perceived or inferred temporal organization in a series of events. The organization itself need not be cognized thoroughly; it may merely be perceived to exist. The perception of rhythm occurs usually because of some kind of perceptual grouping of events".

2.1.2 Pulse, Beat and Subdivision

Pulse can be defined as "a (repeating) series of identical yet distinct periodic short-duration stimuli perceived as points in time (Winold 1975, quoted in Wikipedia)". The term usually denotes *isochrony* (fixed rate of occurrence) and periodicity.

It is typically what is perceived as the basic rhythmic component of the music, particularly in the range at which most people can comfortably tap their foot to a piece of music (roughly 1,2 to 3,3 Hz or 72 to 198 BPM). This is known as the *tactus* range. As the music gets faster, a listener is inclined to find progressively slower pulses such that they fit within this range, and vice-versa. The tactus seems to correspond to natural timescales involved with human motion (a moderate walking pace, a human heartbeat, the rate of jaw movement in chewing, and the infant sucking reflex).

Beat can mean both a discrete point in time at which a stimulus occurs as well as the continuous interval between such time points. In some contexts it connotes the tactus range but it can function at any timescale. It is the basic unit of time to which faster an slower rates of events can relate (divisions and multiples of the beat level).

A beat as a time interval can be divided in equal parts, resulting in pulses that occur at rates that are multiples of the main tempo. When this division is by 2 (and multiples of 2) it is called *duple-pulse subdivision* and when the division is by 3 (and multiples of 2) it is called *triple-pulse subdivision*. Those two are by far the most commonly used worldwide but subdivisions based on other prime numbers are possible.

To be clear, for the remainder of the text I will use *"beat"* to refer to the main time unit at the tactus level and *"pulse"* when talking about the subdivisions of a beat.

2.1.4 Meter

Most generally, meter is a periodic grouping of a musical time unit, the *musical period.* It denotes a subharmonic (or grouping) of a pulse. Traditionally in European concert music, meter connotes a hierarchy of weak and strong beats. However, in other types of music these groupings are perceived but not clearly stated in the actual performance of the music. This can lead to cases when the meter or even the pulse can be incorrectly perceived by a listener who is is unfamiliar with a particular type of music.

2.1.5 Harmonic Rhythm

Also known as *harmonic tempo*, it is the rate at which the chords change (or progress) in a musical composition, in relation to the rate of notes. According to Joseph Swain (2002) harmonic rhythm "is simply that perception of rhythm that depends on changes in aspects of harmony."
While it is usually thought of as the rate at which chords change, a repeating chord progression could be thought of as a musical period or cycle on its own.

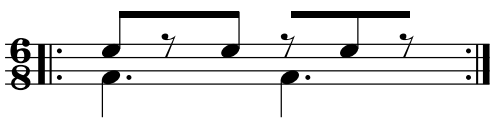
2.1.6 Polyrhythm

This term literally means multiple rhythms appearing simultaneously; it is simply polyphony viewed in its rhythmic dimension. Polyrhythm also frequently connotes multiple cyclically recurring rhythms, but only because the term is used often in conjunction with African musics, in which cyclic rhythms are commonplace. Cyclicality itself is not inherent in polyrhythm.

2.2 West Africa

2.2.1 Cross-Rhythm

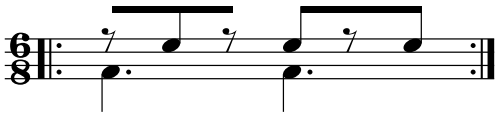
Cross-rhythm is a specific form of polyrhythm. The *New Harvard Dictionary of Music* defines it as “A rhythm in which the regular pattern of accents of the prevailing meter is contradicted by a conflicting pattern and not merely a momentary displacement that leaves the prevailing meter fundamentally unchallenged”.
It is an essential rhythmic concept in Sub-Saharan music and music of the African Diaspora. It arises from the superimposition of two different divisions of the same time interval. Creating a cyclical pattern that begins at the point on which both coincide. The most basic example is that of 3 against 2 (from now on notated as 3:2):



While a cross-rhythm could be seen as the presence of two simultaneous pulses, one will always take precedence over the other, becoming the reference point, the grounding element to which I will refer to as *primary* or *main beat scheme*. In the case of 3:2 it is two beats of triple-pulse subdivision.

When considering one as the main beat the other rhythm becomes a series of attacks in relation to it, referred to as *secondary* or *cross- beat scheme.* The contradiction between the main and secondary beat schemes creates a sense of varying tension and resolution between static and dynamic parts of this 2-beat cycle.

By starting the *secondary beat scheme* one sub-division later the point of resolution is shifted to the second part of the *main beat scheme:*

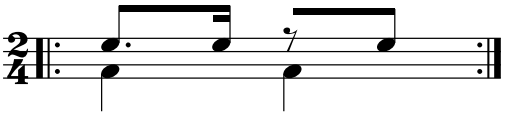


We call this *prime* and *displaced* positions of a rhythmic pattern.

2.2.2 Duple-pulse Correlative

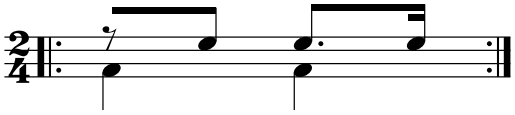
In West-African music there are two fundamental subdivisions of the main beat: 3 pulses per beat (triple) and 4 pulses per beat (duple).
Cross-rhythm, particularly 3:2, is the fundamental model for duple-pulse music in this tradition. Meaning that duple-pulse music "simulates" triple-pulse cross-rhythm. Every rhythmic pattern in triple-pulse has a *duple-pulse correlative.*

The duple correlative of the *secondary beat scheme* is the following:



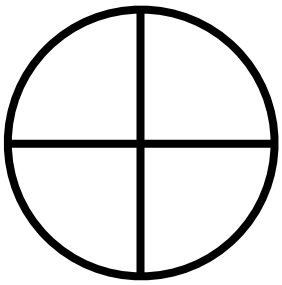
This rhythmic cell, widely used in music around the world, is known in Cuba by the spanish word *tresillo* (which literally means "triplet").

Tresillo has a displaced version as well:



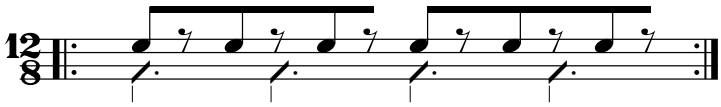
2.2.3 Four Beat Cycle

Cyclicality and recurrence have philosophical importance in traditional African culture. Natural cycles are a shared experience with rhythm and, just like the four seasons divide a year, four beats divide the musical period as a means of basic time measurement. This can be represented by a circle divided into four equal sections.

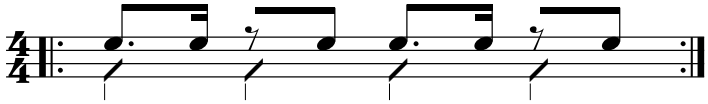


This four beat cycle is known as the *primary* cycle. It's structure has a binary nature. The four main beats are divided into two *cells* and each cell is in turn, divided into two beats, a *frontbeat* and a *backbeat.* So, of the full cycle, beats 1 and 3 are frontbeats and beats 2 and 4 are backbeats.

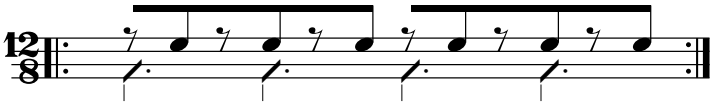
The 3:2 cell occurs twice within the primary cycle creating six cross-beats over four main beats, a 6:4 cross-rhythm. The four beats are the *primary beat cycle* the six cross-beats are the *secondary beat cycle.*

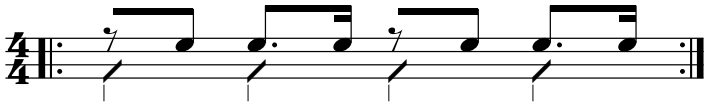


In duple-pulse, two cells of *tresillo* span one primary cycle for a total of six strokes. This six strokes are the duple-pulse correlative of the six-beat cycle.



Both the six-beat cycle and its correlative have displaced variants:



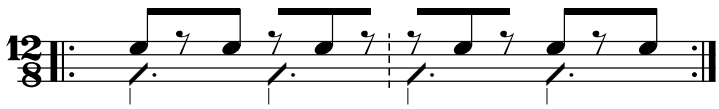


2.2.4 The Standard Pattern

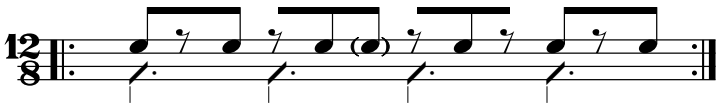
From the polyrhythmic texture created by the primary and secondary beat cycles a third element appears, known as *key pattern* or *timeline*. Key patterns are rhythm figures that indicate not only the primary 4 beat cycle, but also the complete cross-rhythm. Moreover, they express the rhythm's organizing principle, as scales or tonal modes define the harmonic structure. Their function is to guide all the members of the ensemble by conveying the structural core of the rhythm in a condensed form (Peñalosa).

Key patterns present a binary structure consisting of two rhythmically opposed cells.

The most commonly used key pattern in sub-saharan music is sometimes referred to as the *standard pattern* because of its widespread use. It is constructed by putting the two variants of the 3:2 cross-rhythm (prime and displaced) one after the other:

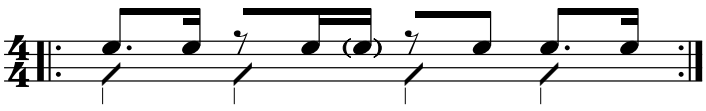


Then adding an extra attack before the second half.

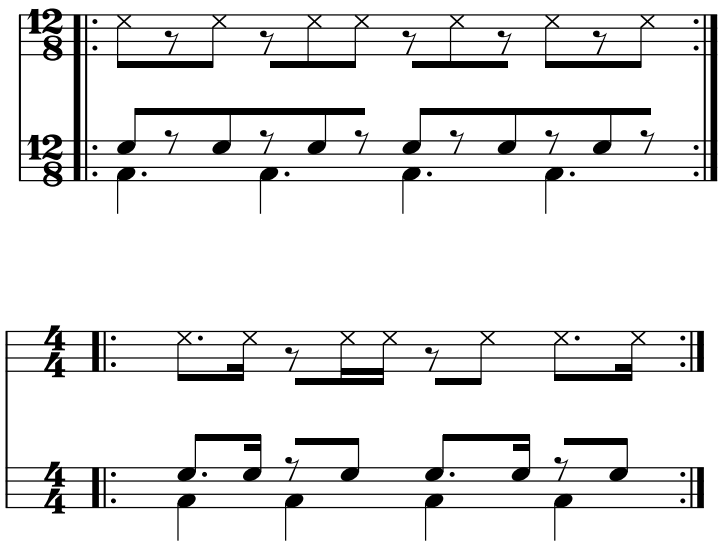


This gives the pattern two sets of double strokes that enable it to alternatively shift from one form of cross-rhythm to the other.

The standard pattern has a duple-pulse correlative. It has the *tresillo* in prime and displaced positions connected by an added attack which has the same effect as in triple-pulse:

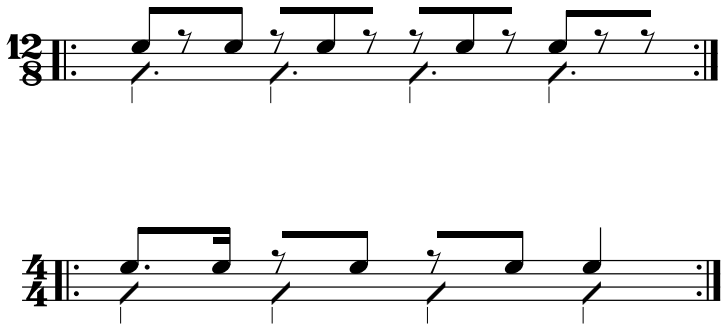


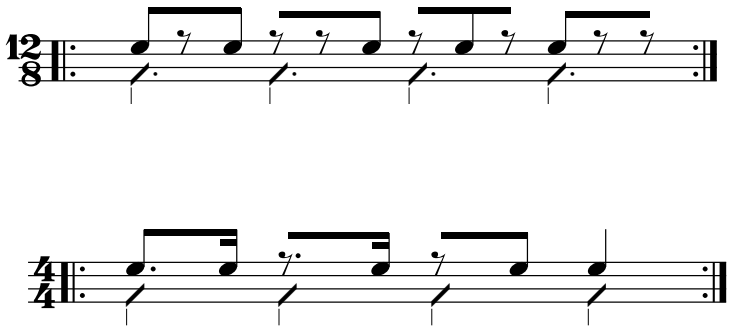
When the primary and secondary beats (or tresillo) are combined with the standard pattern, a three-part *rhythmic counterpoint* is generated.



All three rhythmic elements align or coincide only on main beat 1. The first half of the standard pattern aligns with the secondary beat cycle. In the second half, the pattern diametrically opposes the secondary beats and connects with main beat 4. This creates tension-release dynamic. Music governed by key patterns express (explicitly or implicitly) this three-part contrapuntal foundation.

Two variants of the standard pattern are also used. They appear when one note is removed from each side (with two possibilities for the first half). The resulting patterns express the essential contrapuntal characteristics of the standard pattern with a reduced number of strokes, both in triple and duple form:





This same figures are known in Afro-cuban music as *clave.*

2.3 Cuba

2.3.1 Clave

Clave is a spanish word that means “key” or “code”. In the context of Afro-Cuban music it’s used to name the rhythmic figures that function as key patterns as well as the instruments used to play them (a pair of hardwood sticks called *claves,* in plural). In a broader sense, *clave music* refers to music which is organized according to the contrapuntal texture expressed by the key pattern.

During the 19th century, African and European sensibilities blended in Cuba, as it happened other regions of the Americas. Cuban popular music became the conduit through which Sub-Saharan rhythmic elements were first codified within the context of Western music theory. In a sense, the cubans standardized their myriad rhythms, both folkloric and popular, relating nearly all of them to the clave.The contemporary concept of clave and its terminology perhaps reached its full development in Cuban popular music in the 1940’s.

The figures derived from the standard pattern are the two main clave patterns in cuban music: *son clave* and *rumba clave.* The only difference between them is the placement of their third stroke.

A central element of the clave concept is its binary structure of two opposing cells; with three strokes on one cell and two on the other, known as the *three-side* and the *two-side*. The tension-release dynamic generated by the three-part rhythmic counterpoint determines the attributes associated with each side of the clave. The three-side is thought to be “strong” , “positive” or “round” while the two-side is perceived as “weak”, “negative” and “square”. In duple-pulse, the three-side is associated with an *offbeat* character (at the 16th note level) and the two-side with an *onbeat* character.

2.3.2 Clave Orientation

In folkloric music, which has doesn't use chordal instruments, the start of the clave is always beat 1. But when popular music uses harmonic progressions that start midway through the cycle, the clave is perceived as being reversed. This brought about the idea of the clave having to orientations: 3-2 and 2-3. This is a terminology mostly used outside of Cuba.

Rhythms that tend to coincide with the clave attacks are said to be *with-clave,* rhythms that opposed the clave attacks are *counter-clave.* However, a binary cell that has the character of the clave reversed (i.e a "three-side figure" on the two-side, and vice versa) is called *"cruzado"* (crossed) and it's considered incorrect. A repeating single-celled is an expression of the secondary beat or tresillo cycle and it's not considered *cruzado*. Wether other rhythms are considered *counter-clave* or *cruzado* depends on the conventions of a specific genre.

2.3.3 'Flipping' the Clave

There is an arranging technique, widely used in New York in the 1940's by latin music orchestras such as "*Machito and his Afro-Cubans*" by which different sections of an arrangement have different orientations of the clave but the clave's alternation is not disturbed. It is achieved by extending or reducing a musical phrase by half a cycle before starting the next one. This way, a new section can have a different character without interrupting the rhythmic momentum of the clave.
More recent arrangements even have the melody of a song change orientation several times within the same section.

2.3.4 Non-strict clave music

Strict adherence to the principles of the *clave* system described seems to vary depending on time period and region. Specially with regards of what constitutes *counter-clave* or *cruzado.* Even cuban musicians seem to break their own rules.
However, I have found that an understanding of how the contrapuntal texture works and how opposing rhythmic figures relate to each other (and to a key pattern) is very useful when looking at other music of African origin that may not be as strict or have not been codified as much.

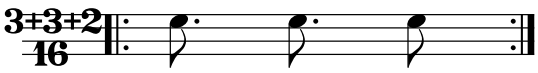
2.4 Other Rhythmic Concepts

2.4.1 Additive Rhythm

The term *additive rhythm* refers to a rhythm in which a larger musical period is constructed by concatenating a series of nonidentical or irregular grouping of pulses; as opposed to the *divisive* rhythms we have discussed so far. This results in a non-isochronous beat, i.e beats of different durations. Usually these are groups of two and three pulses and are sometimes referred to as *short beats* and *long beats* respectively.

The *tresillo* cell has and additive form. In its divisive form, the three strokes of tresillo contradict the main beats mimicking a cross-rhythm but in its additive form these strokes *are* the beats.

The configuration of tresillo in additive rhythm is 3+3+2, meaning two beats of three pulses and one of two pulses. It can be also described as *long long short* (abbreviated as LLS):



Tresillo, in its additive form is found within a wide geographic belt stretching from Morocco in North Africa to Indonesia in South Asia.

Balkan folk dance music is largely based on additive rhythm we cycles of 5, 7, 9, 11, 13, and 15 beats can be found that use different combinations of short and long beats.

2.4.2 Carnatic Music

Carnatic Music is the classical music of South India. It has a complex and thoroughly organized system that I've been studying for the last two years. However, for the purpose of this report I will mention only two of its many elements.

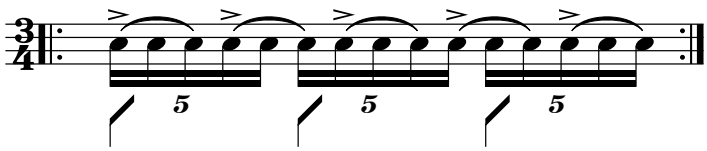
The first one is called *Gati* or *Nadai.* It is the subdivision of the beat, the "style" or character of the rhythm at a given time, the speed of the sub-division pulses. An important characteristic of this musical idiom is that there can be subdivisions of the beat other than duple or triple.

Each subdivision is based on a prime number and, as is the case with African music, duple subdivision is based on 4 instead of 2.

Name	**Prime Number**
Tisra	*3*
Chatusra	*4*
Khanda	*5*
Misra	*7*

A *gati* of 6 is still *Tisra* but at double the speed; and a *gati* of 9 (*sakirna*) can be used as well.

The second element I will mention here is called *Jathi.* This word can have different meanings but in this case it means a grouping of pulses different that the *gati.* This creates a cross-rhythm between the main beats and the first pulse in each group. For example, main beat subdivisions of five (khanda) in groups of three creates a 5:3 cross-rhythm.



Groupings can be made using the same the basic numbers as the *gati:* 3,4,5,6,7. Making any cross-rhythm possible that is a combination of those numbers. Furthermore, two different *jathi* could be used at the same time over the main beat, creating a three-part cross-rhythm.

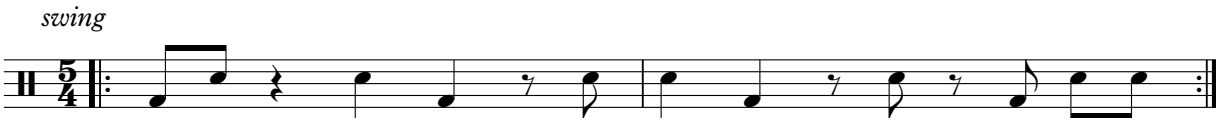
2.5 The music of Steve Coleman

One of the reasons I became interested in studying the fundamentals of African rhythm was the music of Steve Coleman. After initially trying to simply emulate some of his ideas I realized that they came from a deep understanding of old musical traditions and that the ideas I was trying to emulate were based on certain fundamental building blocks that I needed to understand better.

2.5.1 Drum Chants

A *drum chant* is composed drum set part. It is a repeating rhythmic figure built mainly with two sounds, a low and a high sound, meant to be played by the bass and snare drums of a drum kit. It's core structure is this two-note drum melody but it can involve other sounds, such as cymbals or toms.

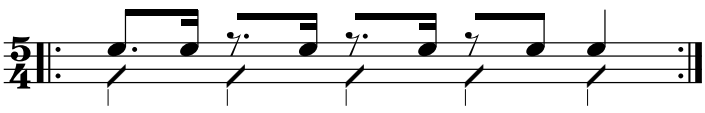
This is an idea that was introduced to Steve Coleman by the drummer/composer Dough Hammond and it's greatly exemplified by Hammond's composition "Perspicuity" where there are no other elements but a melody and a series of drum chants. Here's the first drum chant from "Perspicuity":



2.5.2 Cultural Markers

The idea behind *cultural markers* is that in any given culture, certain musical figures, particularly rhythmic figures, are so widely used that they are deeply internalized by anyone growing up in that culture. This figures or *markers* then become a sort of sonic symbols that can be recognized without having to be rationalized.

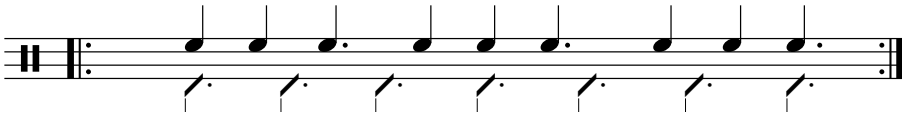
This *cultural markers* are usually short figures that can be used as building blocks for larger rhythms, such as drum chants or clave-like patterns of different lengths. For example, a duple-pulse clave the figure on its second main beat duplicated, resulting in a five beat cycle:



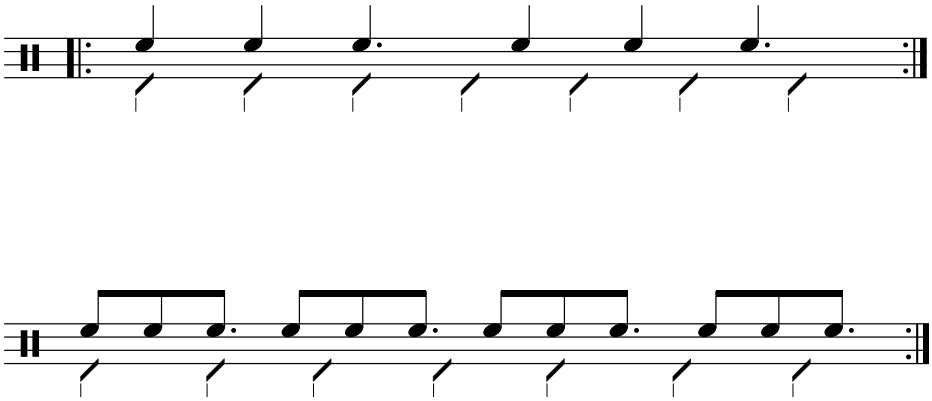
2.5.3 Weights

Weights are essentially additive rhythms superimposed over an isochronous beat. This creates a different kind of cross-rhythm where one of the contradicting rhythms has an asymmetrical configuration.

If for example we take a rhythmic cell constructed with the configuration SSL or 2+2+3 (7 pulses) and put it over a beat of triple-pulse subdivision, the cell will occur 3 times before aligning with the main beat. In turn, 7 main beats will pass before this alignment. This is a cross-rhythm with a ratio of 3:7



The same rhythm over a duple-pulse beat will occur 2 times (at the 8th note level) or 4 times (at the 16th note level) while 7 main beats occur. This is a cross-rhythm with the ratio 2:7 or 4:7.



Varying rhythmic phrases can be constructed following the contour of a short-long sequence.

2.5.4 Nested Loops

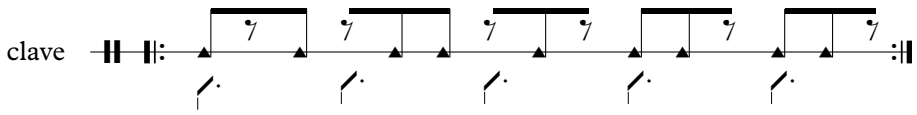
Over the years, Coleman has explored the idea of having rhythms of different lengths cycle together against either a duple or triple-pulse beat. Inspired by the ratios between the orbiting rates of celestial objects, many of his composition feature different instruments in an ensemble that play rhythmic cycles of different length; creating complex cross-rhythmic relationships and longer cycles where the alignment or *conjunction* of all elements marks the beginning and end of the cycle.

These rhythmic layers can be drum chants, extended clave patterns, figures based on short-long combinations and even harmonic progressions.

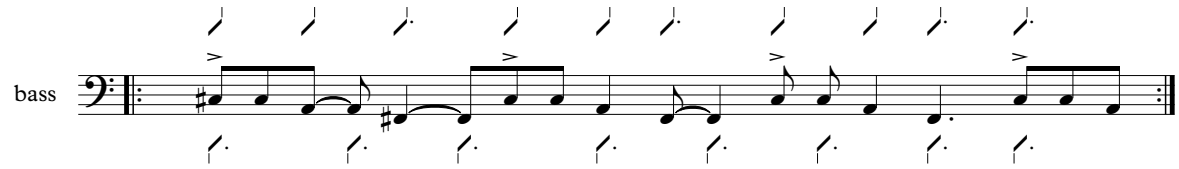
The relationships between the specific rhythms, where they oppose and where they coincide can create a dynamic contour and a sense of form as effective as melodies and harmonic progressions.

As an example, here is a fragment of the composition “Law of Balance” by Steve Coleman. We have the parts for drum set, bass and clave. The main beat has a triple-pulse subdivision.

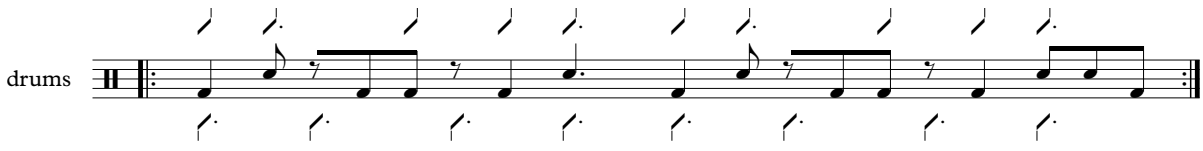
The clave part is based on the standard pattern, with a double attack on beat four that is repeated for an extra beat. This pattern spans over five main beats.



The bass part is constructed with the short-long sequence SSL SSL SSLL. It has a cell of SSL that repeats three times and an extra long beat. It spans over eight main beats.



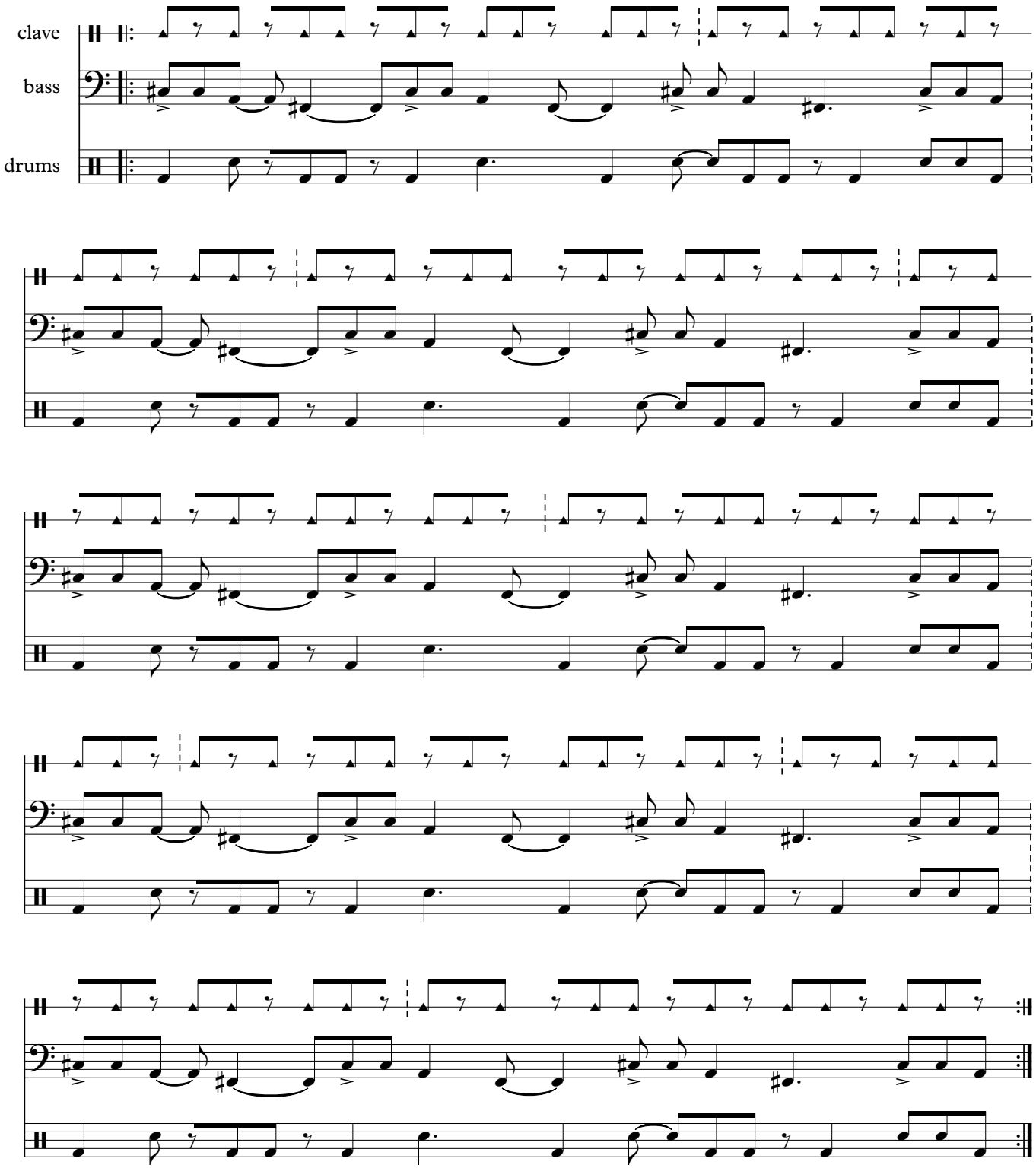
Finally, the drum part is a chant constructed with a different short-long sequence of the same length as the one in the bass. The sequence is SLS SL SLS SL. It is based on a SLS SL cell that is repeated.



All three parts have a contrapuntal relation between each other and a shifting texture that spans for as long as 40 beats.

Law of Balance

Steve Coleman



3. Compositions

3.1 “Traces”

“Traces” is the first attempt at using in a composition some of the concepts mentioned previously. On it I explore the idea of a 6:4 cross-rhythm where the melody is more or less clearly phrased on 6/4 (6 beats of duple-pulse) while the rhythm section uses figures that derive from cross-rhythmic devices that imply 12/8 (4 beats of triple-pulse). The form of the piece has two main parts: A one-chord “vamp” section and a melodic theme that is in turn comprised of two parts of contrasting character.

The vamp section presents the main rhythmic elements in the rhythm section while one or more melodic instruments can choose to fill-in improvisationally. The composed rhythmic elements are an ostinato bass line and a drum chant which is more of a percussion part rather than a dreamiest part. In the melodic section a pick-up for the theme functions as a cue for moving into the next part.

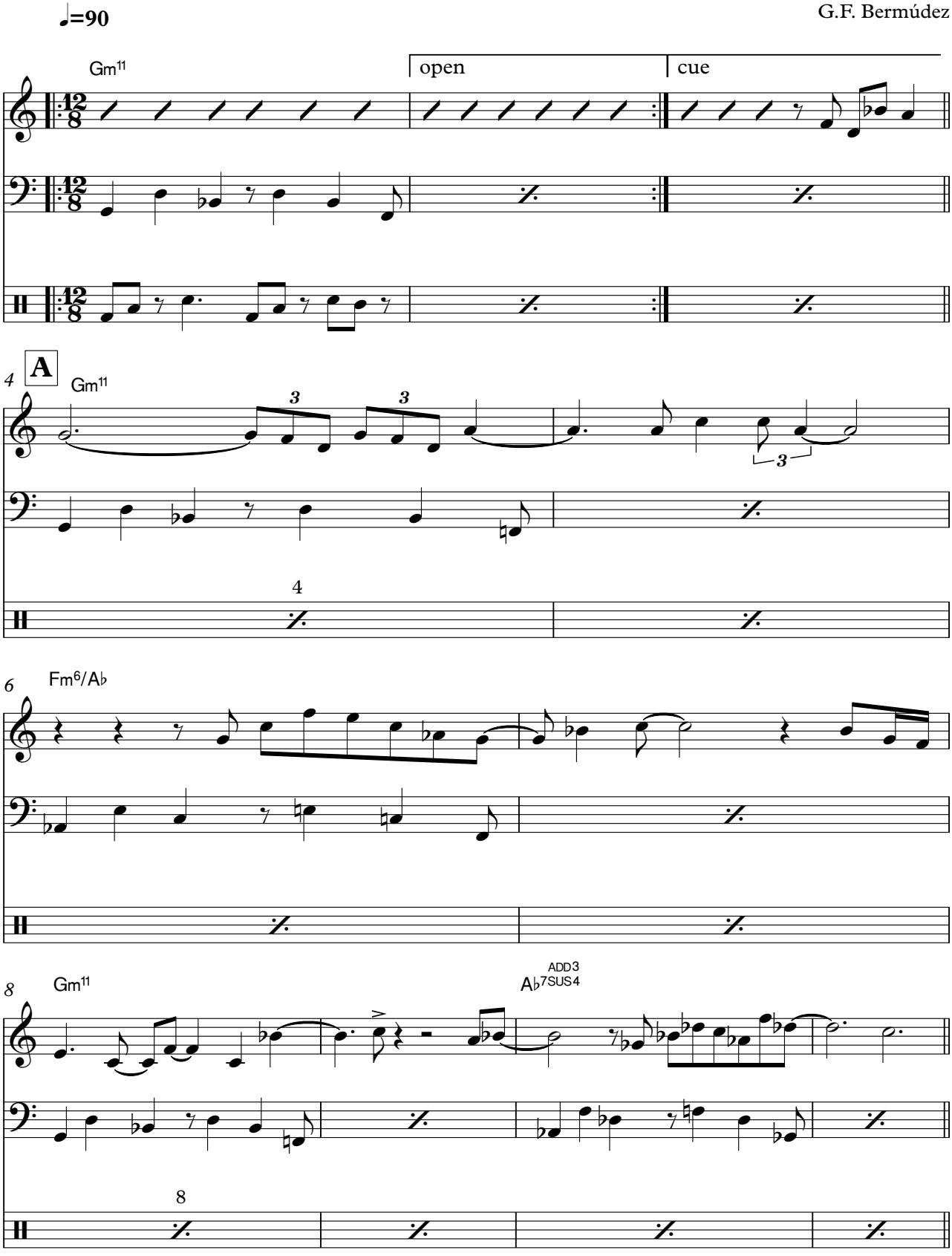
The ostinato bass line is constructed by the two 3:2 cross-rhythm variants one after the other. The possibilities of articulation of the instrument allow for the last note to have less weight than the other attacks making this figure essentially a 5-attack asymmetrical pattern with a pick-up note before the first attack. This is the main figure that functions as the “timeline” for the rhythmic cycle.

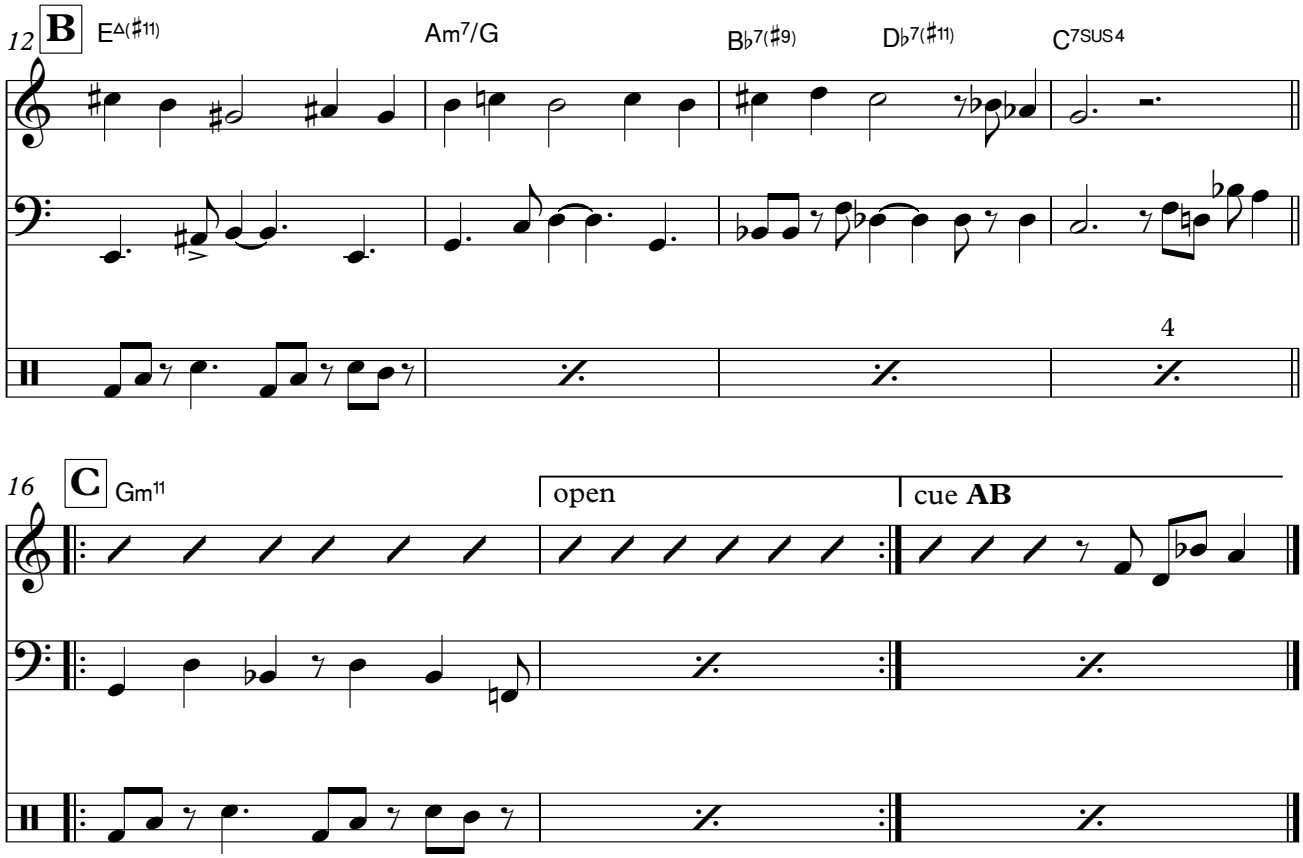
I constructed the drum chant as a counterpoint to the bass figure, trying to find a balance between coinciding and opposing attacks. This pattern is meant to remain constant throughout the entire piece, however an improvisational treatment of all parts is desired, meaning that it doesn't have to be played exactly as written all the time. The same is true for any written material.

During the first part of the theme the rhythmic figure of the bass part remains the same but the notes adapt according to the changing harmony. In the second part of the theme the bass figures become less active in the second half of the cycle, countering the faster harmonic rhythm. The same melodic cue used to enter the theme is now used in the bass to return to the vamp section.

Traces

G.F. Bermúdez




12
B
E△(♯11)
Am7/G
B♭7(♯9)
D♭7(♯11)
C7SUS4
4

16
C
Gm11
open
cue AB

3.2 **“Carbon Footprints”**

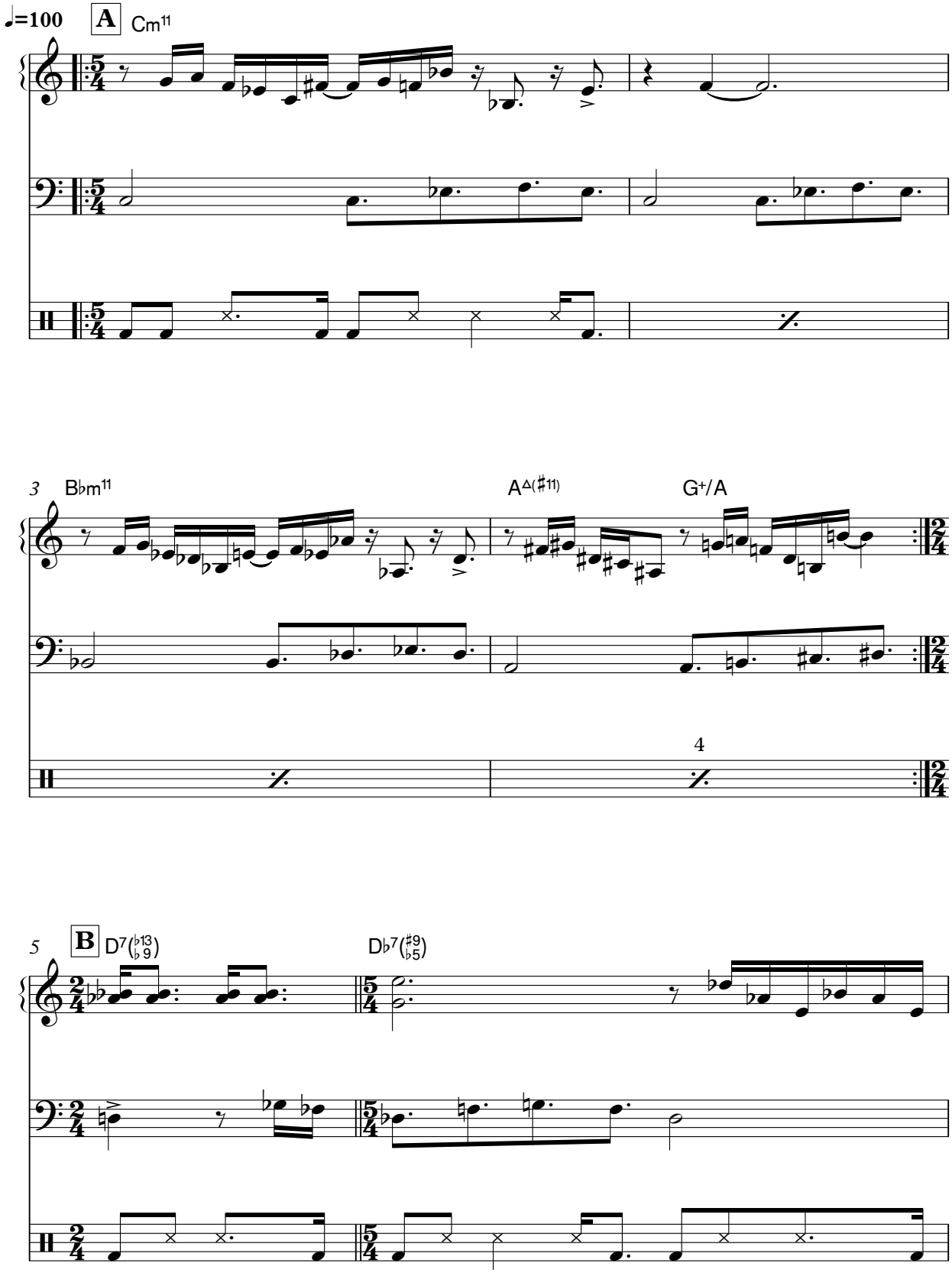
The rhythmic structure of this composition is based on the general idea of “switching the clave”. The basic rhythmic cell is not a clave in itself but it is inspired in it in the sense that it is a two-cell rhythmic pattern alternating between on-beat and off-beat characters. It is a five beat pattern in duple-pulse with a 4:3 cross rhythm over the last three beats, essentially dividing the cycle in 2-3 beats. This figure is played by the bass.

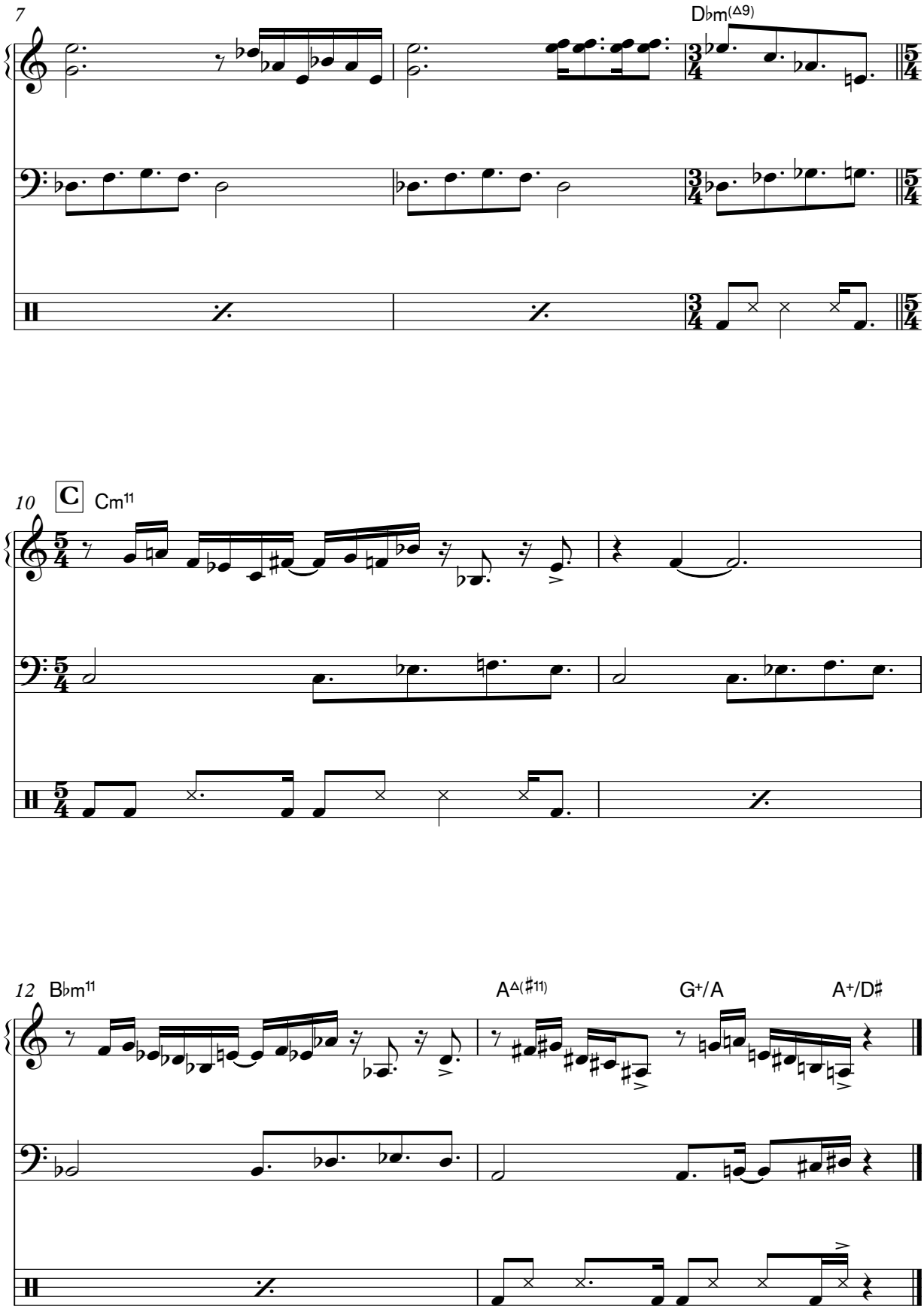
The melodic rhythm throughout the piece follows the characteristic of the bass pattern, with its on-beat and off-beat sections. On both sections the melody is less active on the off-beat side of the pattern, leaving space for the cross-rhythm to be heard.
The drum chant follows the bass pattern throughout but it’s essentially a single-celled pattern that outlines the on-beats under the cross-rhythm.

The form of the piece is a regular **AABA** with 4 cycles per section. The “switching” occurs going into the **B** section, where a 2-beat ‘interlude’ allows the beginning of the next phrase to start on the 3-beat/off-beat part of the rhythmic cell. After three cycles there is an extra 3-beat phrase where the melody states the 4:3 cross-rhythm in rhythmic unison with the bass before returning to the last **A** section which has a modified ending.

Carbon Footprints

G.F. Bermúdez

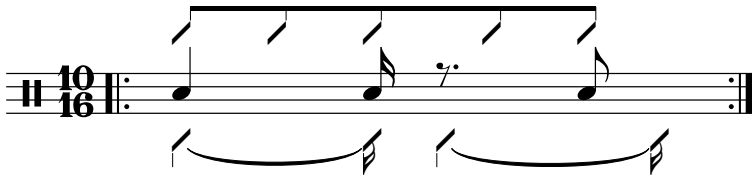



7
D♭m(△9)
10
C
Cm11
12
B♭m11
A△(♯11)
G+/A
A+/D♯

3.3 “Khandombe”

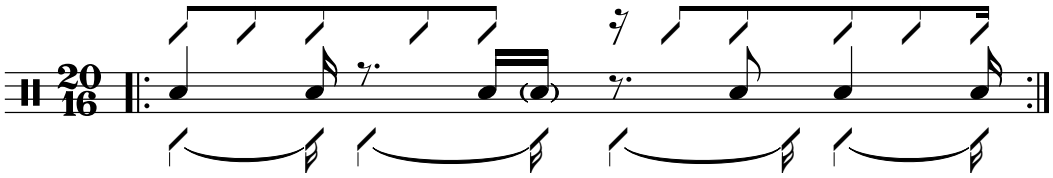
For this composition I wanted to combine the clave concept with a subdivision of the beat different than duple or triple: 5 pulses per beat, “khanda” in Carnatic music.

My approach to this was to first find a quintuple-pulse correlative of the 3:2 cross-rhythm. For this I took a 5:2 cross-rhythm and set the strokes on every other beat of the the secondary beat cycle:

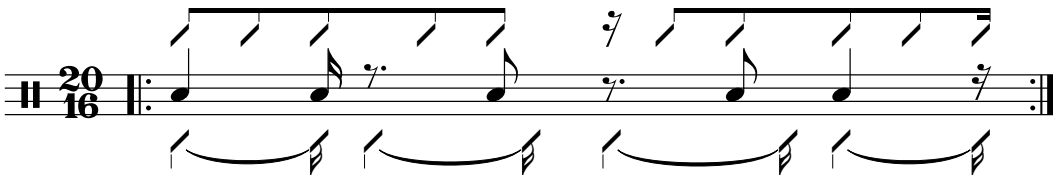


I call this cell “khanda tresillo”.

Once we have it we can use its displaced form to complete a standard pattern:



Or we can choose to use a 5-stroke clave pattern:



The bass part and chord rhythms outline the first half of the clave pattern (one cell of khanda tresillo) while the drum part has more of a backbeat pattern that helps to keep the khanda “feel” more present. I found it necessary to have this kind of subdivision be more explicit because how unfamiliarity it can sound in this context, without it the ear tries to approximate it to something

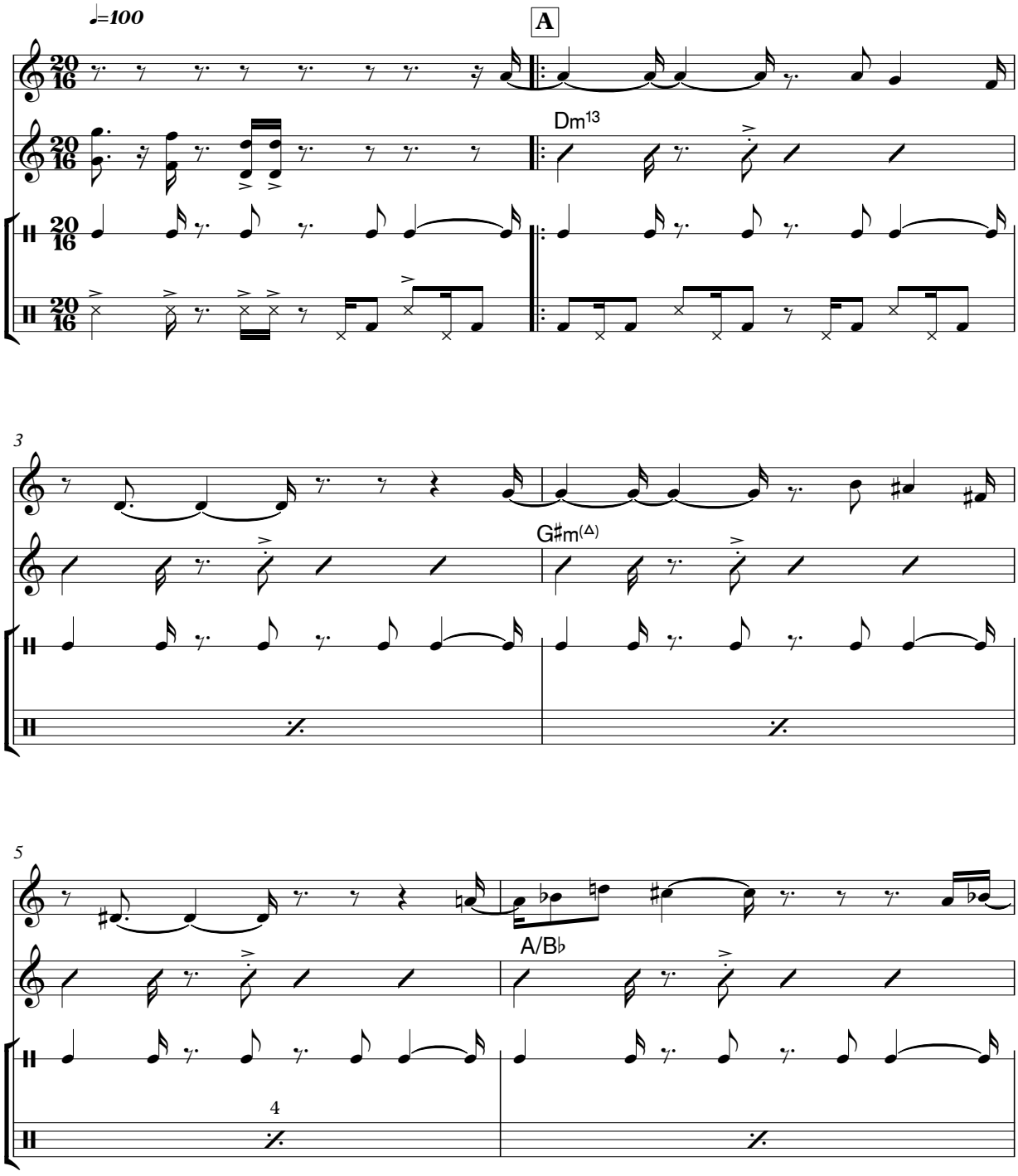
more familiar like duple or triple. But as a result of the same approximation the resulting groove seems to work, like something familiar but surprising at the same time.

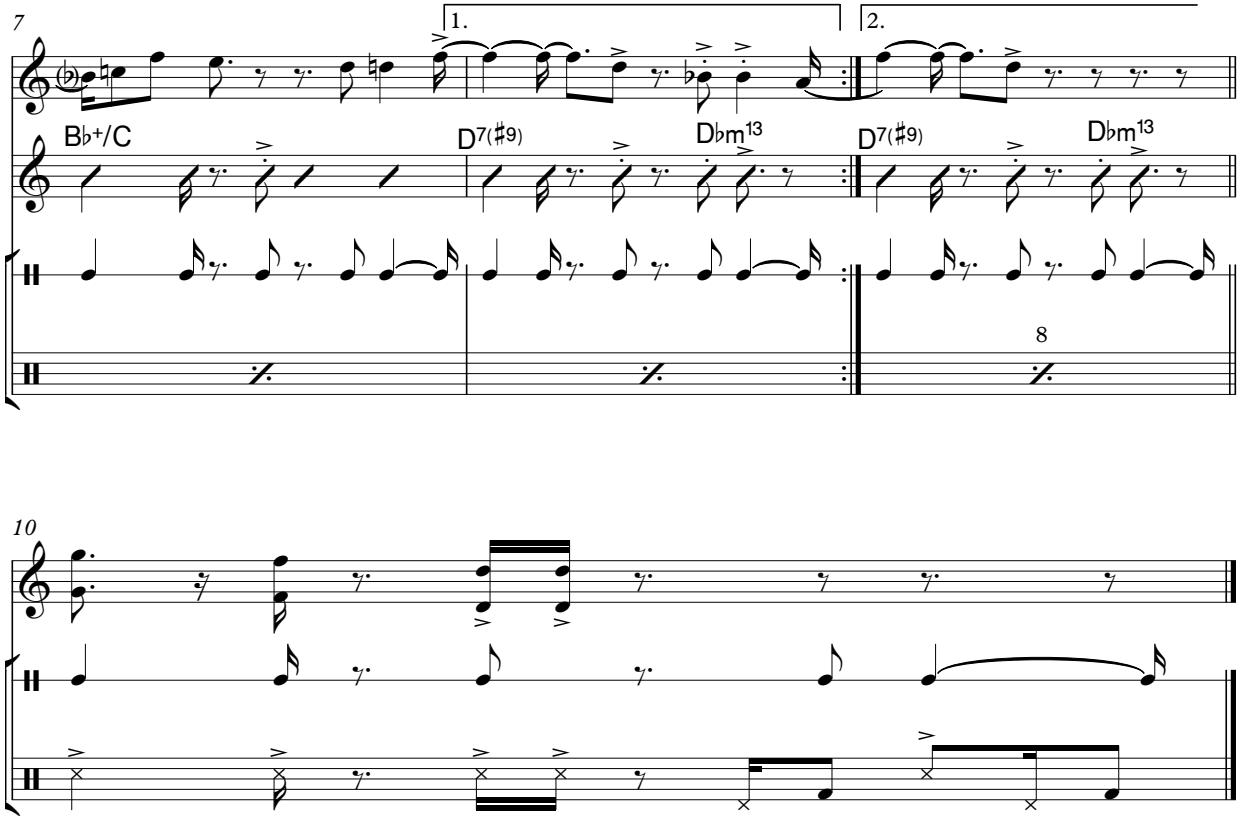
The melody follows the clave with off-beats and on-beats on the 3 and 2 sides respectively. There is a tutti kick on the tresillo cell that bookends the main section; which is comprised of 7 cycles repeated twice.

The title is a word play on “Khanda" and “Candombe”, an Afro-Uruguayan rhythm that is based on on duple-pulse clave..

Khandombe

G.F. Bermúdez




7
1.
2.
B♭+/C
D7(♯9)
D♭m13
D7(♯9)
D♭m13
8
10

3.4 “Forty Two“

This composition is perhaps the most ambitious of the lot in the fact that in it I used the concept of nested cycles of different lengths. It’s based on cycles of 6 and 7 beats over duple-pulse beat.

I started off with a drum chant that spans 6 main beats and a bass line based on a SSL 8th note pattern which has a melodic profile that makes it 14 beats long. This provides the form for the first section which has a 14:6 ratio and a total length of 42 beats.

The most unusual device I tried here was the fact that the harmonic rhythm follows the 6 beat drum chant and opposes the bassline. The harmonies are basically triads in 6 beat cycles that function as upper structures over the shifting bassline. There are two pairs of triads that divide the 6 beats period into 2 + 4 beats, forming a 12 beat cell **“a”**; and a single triad in a 6 beat cell **“b”**. Since this 6 beat cycle repeats 7 times the form for this section ends up being an asymmetrical ‘**aaba’**.

The chordal instruments are provided a rhythmic cell that relates to the first half of the drum part; and the melody follows the 14 beat cycle of the bassline while adapting to the changing harmonies.

In the next section the roles are somewhat reversed and now the bass plays a slower paced, 6 beat line while the drums play a chant based on a 3:7 cross-rhythm with an SSL sequence. The harmony is static, while the melody is based on three cycles of seven beats, with some contact points with the bassline.There is a three note motif in the 1st and 3rd cycles of the melody that will be used in the next section. This section is played twice.

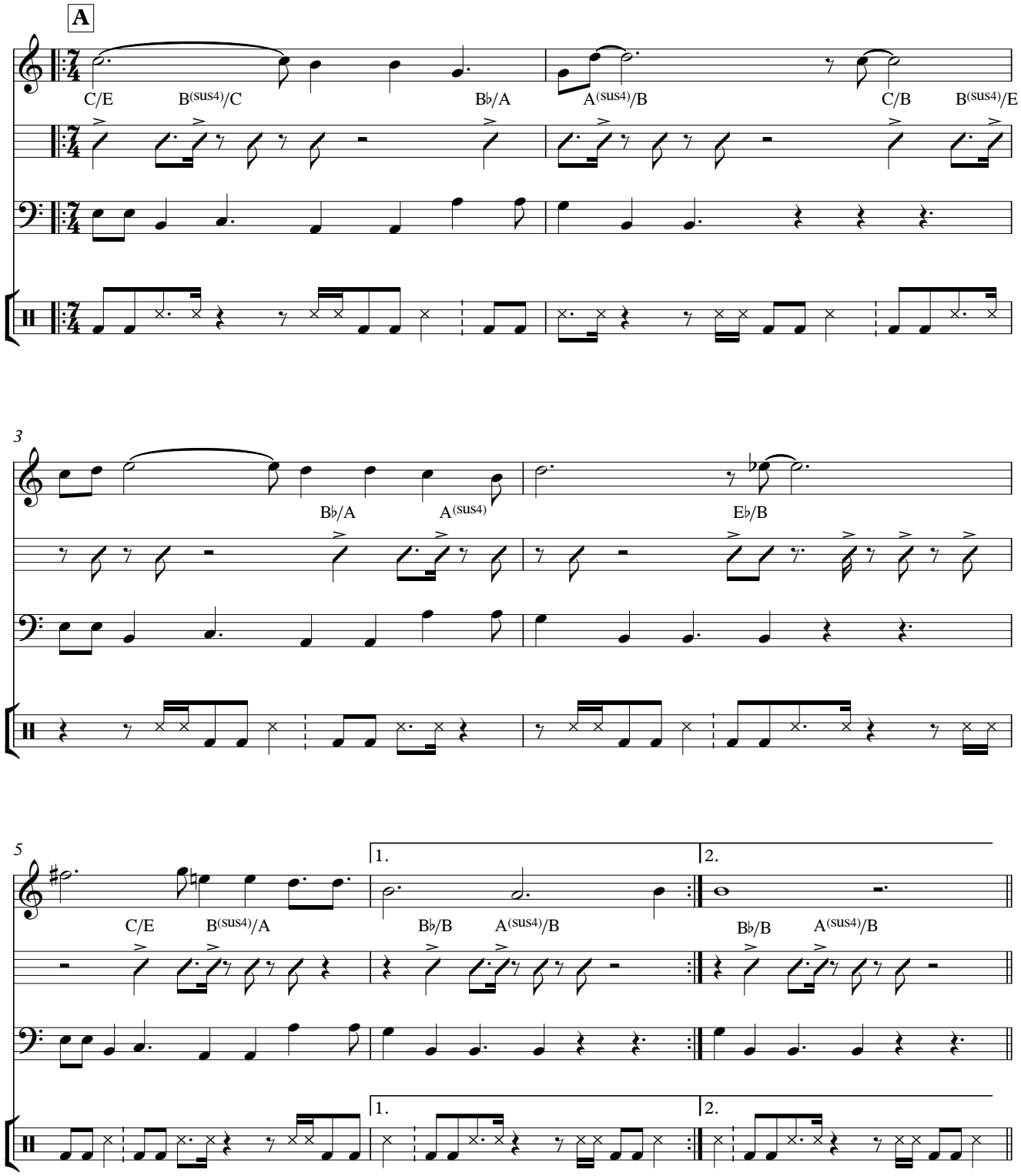
The last section serves as coda and solo break. It has a faster paced 8th note cycle that repeats the motif from last section three times, at twice the speed; followed by a drum fill of the same length. Here the duple pulse becomes obscured and it sounds more like a 3:7 cross-rhythm in triple-pulse.

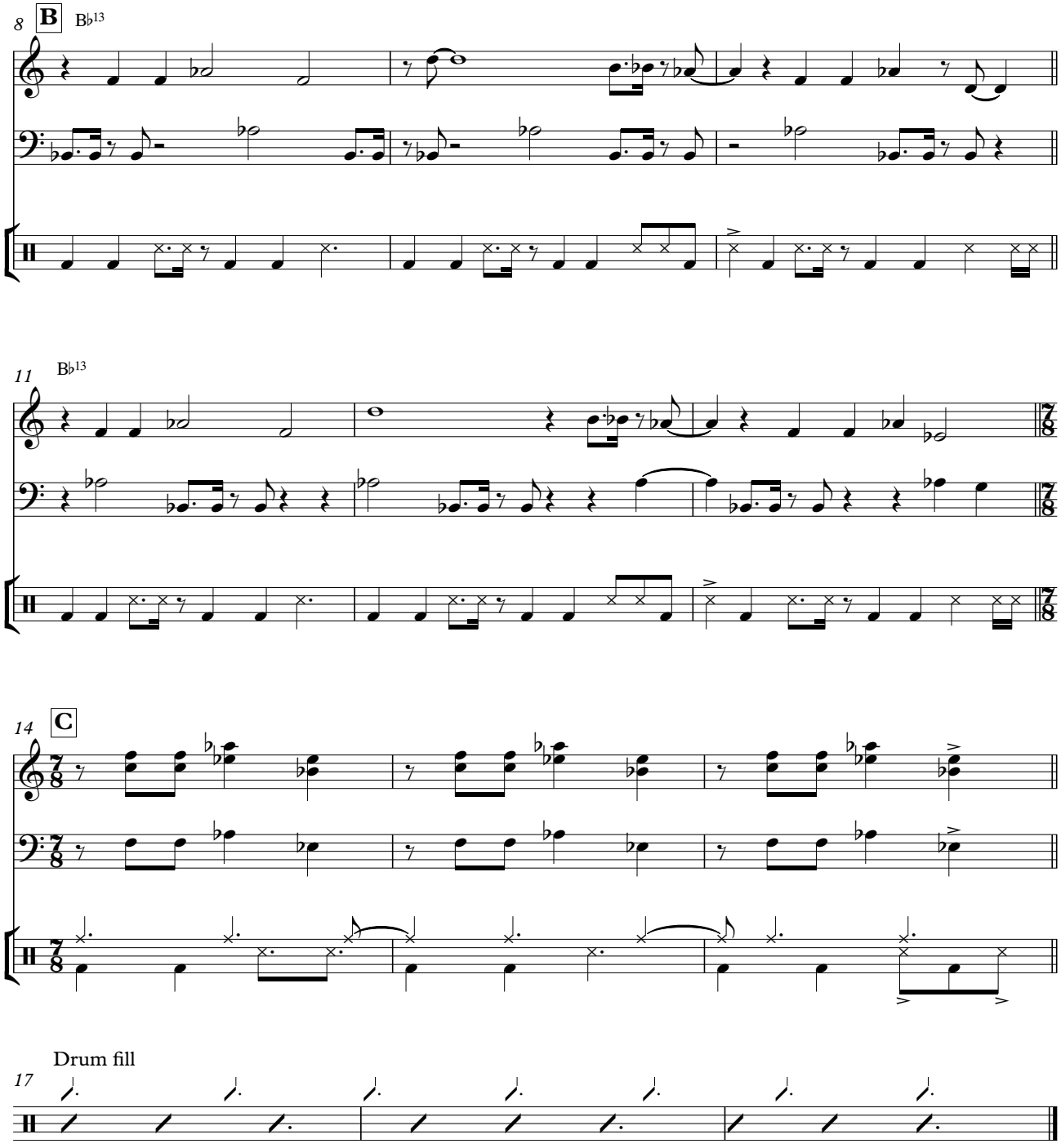
The ratios of the cycles of each section decrease systematically, as following: 14:6 ; 7:3 and 7:1,5 (or 7:3 in double time).

Forty Two

♩=136

G.F. Bermúdez




8
B
B♭13
11
B♭13
14
C
Drum fill
17

4. Conclusions

Although I am satisfied with the concrete result of this research; the group of compositions. I feel that the time and effort I have spent studying this topics and internalizing these polyrhythms has had a much greater impact on me as a musician as a whole; a transformation of the way I perceive and conceive the music I've been involved with for many years.

The ability to feel and recognize the relation between two or more simultaneous musical layers and interact with them is a great asset for an improvising musician. And even though a deep study of this subjects may and will take many years, I have come to the realization that it is really the process that matters most. But of course it can be denied how rewarding it is the noticeable progress when one can perform something that only a few weeks prior seemed undoable.

There is however a small problem I have found when pursuing such a musical direction. Namely in regards to collaborating with other musicians.
To put in words some of the concepts discussed in this report can be a mouthful sometimes and also, western notation is not really fit for certain rhythmic structures. In mi opinion, the best way to communicate this kind of concepts (and perhaps all musical ideas) is through demonstration and repetition. In this way, rhythmic figures or polyrhythms that on paper can seen unnecessarily complex can be deeply internalized and become great additions to a musician's vocabulary. However, this process takes time and effort; and it can be difficult to find musicians that are willing to invest such an endeavor.

In spite of that, I feel that I haven't scratched but the surface of a deep see of possibilities and it seems like following down this path will have occupied for years to come.

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