REIMAGINING THE FRETBOARD

A New Approach to Harmonic Development on the Guitar Using Upper Structure Triads

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Abstract

This study will examine an advanced view of harmony, both in theory and in application to the physical realities of the guitar. Guitarists generally approach chords with a *bottom-up* view, building them up from the root. This creates an harmonic environment where voicings are weighted towards the lower end of the chords' structures. Upper extensions are treated as separate entities added on if possible. I will present a *top-down* approach to harmony where the emphasis and priority of the chord will be placed in the upper register of its structure. I will use the jazz standard *Blue in Green*, an analysis of its melody, *upper structure triads*, and ideas developed by Stefon Harris to create a new harmonic vocabulary for the guitar. For each chord I explore I will chart out a new set of voicings on the fretboard. These will include full chords (5-6 notes), mini chords (3-4 notes), and dyads. I will provide examples of how these voicings can be used in *Blue in Green* both to create chord-melody arrangements and to apply to comping situations. I hope to create a new chordal vocabulary for myself that is more deeply connected to the melodies I am harmonizing and which offers a richer and more colorful palette of tonalities. I am documenting the exploration in this thesis to help other guitarists interested in expanding their own approach to harmony.

Introduction

This thesis is an exploration of harmony. The goal will be to expand the depth and color palette possible beyond the chordal vocabulary present in today's jazz guitar lexicon. I will accomplish this by creating a new series of chord shapes derived not only from the chord progression of a jazz standard, but also from an analysis of its melody. In this way, the chords will embrace and accentuate the melodic content, as they will be unified into an intertwined relationship within the harmony being expressed.

This exploration is built on the physical differences between the piano and the guitar. After examining how piano players are able to conceptualize harmony and the relationship between chords and melody, I will integrate their way of thinking onto the fretboard. I will then take this one step further and apply the concepts and methods of vibraphonist Stefon Harris to create additional movement and harmonic possibilities within these new shapes.

Background

Before an exploration of different ways of approaching harmony on the guitar is possible, it is necessary to begin with a basic understanding of the traditional school of thought. Harmony is the natural byproduct of simultaneously hearing multiple notes. It is what happens when the brain is introduced to more than one pitched sound at the same time. These harmonies can exist due to multiple instruments each playing a single note, such as a trumpet section where each player has their own pitch, or it can happen when a chordal instrument plays more than one note simultaneously.

In the study of tonal music, we seek to organize the vast amount of harmonies that can be created by the near-limitless combinations of pitches. We form chords by stacking different intervals on top of an individual root note until a desired harmony is constructed. We use the same method for analyzing and performing these chords. I refer to this as bottom-up chord construction. This is when we see the chord as growing from the root up through the rest of the necessary notes. It places the weight of the chord, and gives the highest priority, to the lower region of the harmony. When thinking about major and minor chords, this is adequate. However, when we begin playing in the jazz idiom with fully extended harmonies, this can cause problems. For instance, when presented with a C13,#11,9 we are being asked to play a chord that contains seven notes (R-3-5-b7-9-#11-13). This is not possible on an instrument with only six strings. Just as important, due to the physical limitations of the guitar, we often won't even be able to omit one note to play the other six. Bottom-up thinking causes the guitarist to attempt this chord by starting with the lower pitches and grabbing the upper extensions, if possible. These extensions are viewed - quite literally - as *extensions*. They are not seen as integral parts of the chord, and therefore the color and depth of the harmony they provide gets lost in exchange for the common and familiar lower structure notes.

For the purposes of this exploration, we will suspend the assumption that *bottom-up* is the "correct" way of thinking, and in its place we will utilize a *top-down* approach. We will not view from the root moving upwards, but rather from the upper structure of the chord moving downwards. We will organize the upper structure of each chord we examine into a triad, and we will refer to this as the *upper structure triad*. This will be further explained and explored later in the thesis.

The Guitar Approach

The design of the guitar and the way it is physically built to create music is disjointed and really quite bizarre. Some have as many as seven different places that a guitarist can play the E note above middle C. Due to the tuning of the strings, moving a sequence of notes up or down an octave will yield a different shape on the fretboard and thus require a different series of fingers in order to perform. The horizontal and vertical lines formed by the strings and frets offer no immediate visual guidance to guitar players the way the white and black keys do for planists. This forces guitar players to think differently from plano players, and to rely on a more geometric-based approach to learning their instrument. Chords and scales are learned as shapes. This makes it very difficult for guitarists to understand the relationships between the chords they are playing and the melodies they are meant to harmonize. Look through almost any guitar method book, and you will find chords and scales being expressed as visual patterns, intended merely to be memorized. This way of thinking is not wrong, and I would even argue that it is a necessary part of guitar education due to the physical nature of the instrument. But if we are going to think this way, we should at least be aware of its limitations; it's *not* the only way. One of its pitfalls is that a guitar student can memorize a chord shape without ever seeing what is happening inside that harmony, why it is constructed that way, and how it relates to the melodic content. We can better understand this limitation when we compare this guitar approach with the *piano* approach.

The Piano Approach

Piano players have the ability to use both of their hands interdependently. This may seem like a trite point, but is actually one of the most important differences between the physical nature of the piano and the guitar in regards to how the players conceive and express harmony. While

guitar players view a chord as a singular entity - with *upper extensions* that they struggle to incorporate - piano players have the ability to play the lower structure of a chord in their left hand and an entirely different triad, the *upper structure triad*, in their right hand. It is the relationship between those two different tonalities that creates the desired harmony, thus embracing the *upper extensions* and the melodic content into the chord.

The Parameters

We must set some parameters to guide our harmonic exploration on the fretboard due to the vast possibilities that can not all be examined within this thesis. We will be using the jazz standard *Blue in Green* as our model. There are far too many different types of chords to cover, so we will focus solely on those in this ballad. This will give us the chance to analyze the harmony and melody of the tune, apply *top-down* thinking in a variety of ways, and to create multiple etudes demonstrating the versatility of this way of constructing chords.

In order to analyze the tune, we must create a clear definition of an *upper structure triad* to utilize in our exploration. There are many different definitions of an *upper structure triad*. Some say they must contain at least one tension note, others say it must be made up entirely of tension notes. In Mark Levine's, 'The Jazz Piano Book,' he defines an *upper structure triad* as any triad superimposed over a tritone (109). We are not concerned as to whether or not a tritone sits beneath it, or about how many tension notes it contains. Our goal is to develop a new chordal vocabulary: one whose shapes are derived from, and embrace, the melody. Therefore, we will state that an *upper structure triad* is one that contains the melodic content and which is then superimposed over the basic chord structure. In this way, the upper structure of our chords will be inseparable from the melody. We will view the *upper structure triad* as the one that a

pianist could be playing in their right hand when harmonizing the melody note, while their left hand would be playing the standard chord. While there are many option for this - major, minor, diminished, augmented, sus2, or sus4 - for the purpose of simplicity, this exploration will be limited to major triads.

The final parameter will be Stefon Harris' quadrad method. A quadrad is a four note grouping that contains a triad plus one added note for tension. He uses this idea as a means of creating movement within the upper structure of a chord (Harris). Once we have analyzed *Blue in Green*, extracted the *upper structure triads* we wish to use, and constructed the harmonies onto the fretboard, we will come back to the *quadrad* to help us dig deeper into this concept by giving us more movement and freedom within the upper structure of each chord.

Blue in Green Analysis

To begin, let's examine the lead sheet for *Blue in Green* ("The Real Book" 51).



BLUE IN GREEN

MILES DAVIS AND BILL EVANS

In measure one, we see a G-7 with an E note in the melody. The E note functions as the 13 of this chord. The G-7 as notated does not contain the melodic content. The E note, which is an *upper extension* of the chord, is being viewed as disconnected from the harmony. In order to properly harmonize and accentuate the color of the melody, we must understand and utilize its relationship with the chord over which it is being played.

The standard way to play this chord is to voice out the 1-b3-b7 of the G- chord, with an E note sitting on top. Not only would this create no relationship tying together the notes from the lower structure with the melody note, but it will create a tritone between the 3rd of the chord, Bb, and the E. The disconnect between the harmony and the melody, and the intervalic tension separating them, will not embrace that melody note and make it feel as though it is part of the tonality. Rather, it is going to make it sound further isolated. It is not wrong within music theory to play it this way. In fact, it may be the most common way to approach this chord in the guitar community.

Let's suspend our assumption that *bottom-up* chord construction is the only way to function and examine what happens when we shift our thinking to the top of this chord. Our parameters tell us that we can only use major triads for this exploration, and there are only three major triads that contain an E note.

> E Major: E-G#-B C Major: C-E-G A Major: A-C#-E

Of these three, the C major triad is the only one which exists within the G- tonality. The C is the 11, the E is the 13, and the G is the root. Now we have an *upper structure triad* that contains not only the melodic content, but also another *upper extension* as well as the root note. If we play this idea on the piano, it looks like this:



The left hand of the pianist plays the 1-b3-b7 of the G-7 chord, while the right hand plays a C Major triad. By having two hands playing two different chords simultaneously, they are effectively creating what we will call a G-13(11). This is a G-7 chord that also contains the 13 and the 11. And by constructing it this way, the E note is now an integral part of the chord, an indispensable color within this new tonality. It is being embraced by the triad that encompasses it, rather than viewed as a separate entity that needs to be forced into a voicing.

Applying this type of thinking to the primary melody note of each chord, we get the fully extended harmonies that follow:

Measure	2	3	3	4	4	5
Upper StructureTriad	F Major	F Major	Eb Major	Bb Major	D Major	C Major
Lower Structure Chord	A7	D-7	Db7	C-7	F7	BbMaj7
Full Chord Name	A7b13#9	D-7	Db13#11(9)	C-11(9)	F13b9	BbMaj13#11(9)

Measure	6	7	8	9	10
Upper StructureTriad	F Major	C Major	C Major	G Major	F Major
Lower Structure Chord	A7	D-7	E7	A-7	D-7
Full Chord Name	A7b13#9	D-11(9)	E7b13#9	A-11(9)	D-7

We can now write out the entire tune using these piano voicings.



Developing 5-6 Note Voicings

We begin applying these chords to the fretboard with the fully extended harmonies and trying to find shapes on the fretboard that contain all six notes from each chord listed above. We will do this by voicing the *upper structure triad* on the highest pitched three strings (G, B, and E) while putting the root, 3rd, and 7th of the chord on the lower pitched three strings (E, A, and D). This will not always be possible. When we are physically not able to reach all of the notes, we will always give priority to the *upper structure triad*. If we must drop a note from the voicing to make it work on the fretboard, we will always drop either the root, 3rd, or 7th. After giving priority to the *upper structure triad*, if we are only able to reach one of the notes from the root, 3rd, and 7th, we will use the 5th of the chord as an option to give us at least a five note voicing.

In this first diagram for G-13(11), we can see the C Major triad on the highest pitched three strings. The notes of the *upper structure triad* are notated with solid black dots to help us visualize them within the chord shape. On the 4th and 5th strings, are two smaller black dots surrounded by a white circle and then a black circle. These are used to show where the root, 3rd, 5th, and 7th of the chord sit within the diagram.



For this chord, I am not able to reach the G note on the 15th fret of the 6th strings, as all of my fingers are needed to reach the other five notes. However, we are able to hit the 3rd, the 7th, and the *upper structure triad*. Notice that when we are required to sacrifice a note, priority went to the notes in the *upper structure triad*. This is *top-down* chord construction. If this chord is played with a bassist covering the G note root, we will have a fully-extended harmony.

Here is how the rest of the previously notated piano voicings will look on the fretboard.



The first D-7 voicing is a very common shape already used by many guitarists. Notice that we have an F Major triad on the highest three strings. The 3rd, 5th, and 7th of D-7 are already present in the *upper structure triad*, so it would be redundant to voice them again. Since the 3rd and 7th are less important here, we can put the root underneath the *upper structure triad*. We then could have repeated the 3rd, 5th, or 7th to complete the 5-note voicing, but due to the physical limitations of the guitar, the 5 was the only logical choice. Even though this is a common shape for a minor7 chord on the guitar, the *top-down* thinking is still being utilized here.

These voicings can be put together to create a chord-melody arrangement of this tune.



Developing 4-Note Voicings

These five and six note voicings constructed around the *upper structure triads* offer us a very pianistic sound to this chord melody. The harmonies being expressed are colorful, vibrant, and reminiscent of how Bill Evans played this tune. This type of playing is ideal for ballads, rubato, solo guitar, and duets with a bass player. However, we want to create as much versatility as possible within this new harmonic framework. So the next step will be to minimize these chords into smaller and more manageable 4-note voicings that offer the same sparkling harmonic colors without the density of the larger 5-6 note voicings.

Because we are focusing on *top-down* chord construction, we will begin with the *upper structure triad*. The three notes from the triad are required. Which means that we only have to find one more note to add underneath. This idea of playing a triad over a different root note is common in modern jazz guitar. These are called slash chords. Steve Kahn references *superimposed triads* in 'Contemporary Chord Khancepts' and gives us a chart where he presents every possible major and minor triad stacked over a G root note, showing how they can be used (10).

This same idea can be used to develop our 4-note voicing vocabulary. However, unlike traditional slash chords, we will not automatically appoint the root note of the harmony as the fourth note in our voicings to be placed beneath the *upper structure triad*. It is the rub and friction between the *upper structure triad* and the notes in the middle of the chord's construction (the 3rd and the 7th) that help create the color of the tonalities we seek. Since any bassist will likely provide the root note of each chord anyway, this allows us to focus on utilizing the 3rd and 7th as the fourth note for each voicing. There may be times when a root or a 5th is necessary, but they will be considered secondary options, following the 3rd and the 7th.

First start with the *upper structure triad*. Then find a 3rd or a 7th that can be added underneath. If either the 3rd or the 7th is already present in the *upper structure triad*, don't use it again as the fourth note, rather use the pitch that is missing. If both are found in the *upper structure triad*, or if one is already present and the other is out of reach, then we try the 5th of the chord. If the 5th is found in the *upper structure triad*, or if we can't physically reach it, then we utilize the root. Here are what the 4-note voicing shapes will look like to harmonize the melody for *Blue in Green*.



Both D-7 and C-11(9) have two different shapes listed above. This is because both are used to harmonize two different melody notes at different times throughout *Blue in Green*. Notice that while the *upper structure triad* gets inverted, it is still always on top of the voicing. The triad can be inverted as needed, but we will always place the fourth note underneath it. This is a unique feature of *top-down* chord construction. Because the *upper structure triad* is given priority, and because it holds the melody note inside the tonality of the chord, we always want it to sit on top of our voicings. In *bottom-up* chord construction, this idea does not exist. There, once a 4-note voicing is found, we go through its inversions in the classical sense, by shuffling all of the notes equally. This is a big part of today's modern jazz guitar harmonic language. Ben Monder and

Lage Lund both utilize this type of chord construction when developing their chordal vocabularies. In their instruction videos, they each show how they take a basic 4-note chord voicing and move it through all of its inversions to shift it around the fretboard and create new sounds (Monder, "My Music Masterclass"; Lund, "Jazz Guitar Chordal Vocabulary"). They view each of the notes as having equal priority, and when they invert their chords, they move all four notes freely up and down within the voicings. They both use this to wonderful effect in their playing. However when using *top-down* chord construction, we only invert the *upper structure triad* when we want to harmonize a different melody note in the highest voice. The fourth, non-triad note will always be placed in the lowest voice. This allows us to maintain the harmonic richness and clarity created when the melodic content is integrated into the *upper structure triad*.

Let's apply these shapes to Blue in Green to create a chord-melody.



The application of these 4-note voicings goes beyond chord-melody arrangements. Because they are small and compact, they can be moved easily to create wonderful voice leading while comping behind a soloist. Here is a short etude using different inversions of our 4-note chords. There is no rhythmic idea at play here, however in a real comping situation, we could take these ideas and express them rhythmically in order to create very colorful movement within the harmonic structure of the tune.



Stefon Harris and the Quadrad

Vibraphonist Stefon Harris takes this idea even further. As he points out, not only does the *upper structure triad* beautifully harmonize the melody by relating it into the chord as an integral part of the structure, but it also becomes what he refers to as the *melodic tonic*. In other words,

the melody will now function around the *upper structure triad* as though that *triad* itself were the tonic chord. So if we look at G-13(11) again - which is a G-7 with a C major triad superimposed on top - the notes of the C triad will function melodically as Do, Mi, and So. These three notes harmonically act as the root, 11, and 13. But when composing and improvising single note melodies over this chord, they will not behave that way.

The C, E, and G notes of the *upper structure triad* will sound lush and colorful against the G-13(11), but they will also be the most stable. In order to create melodies in this context, we need other notes that will offer tension and create movement around the *melodic tonic* triad. When we add our first tension note to the *triad* we end up with a series of four notes. Three of these are from the *upper structure triad* and the fourth is added against it to create melodic movement. Harris refers to these four notes as a *quadrad*.

Here are the quadrads that coincide with each chord in Blue in Green.

Chord	G-13(11)	A7b13#9	D-7	Db13#11(9)	C-11(9)	F13b9	BbMaj13#11(9)	D-11(9)	E7b13#9	A-11(9)
Quadrad	C Triad	F Triad	F Triad	Eb Triad	Bb Triad	D Triad	C Triad	C Triad	C Triad	G Triad
	+ F	+ C#	+ G	+ F	+ Eb	+ Eb	+ D	+ F	+ G#	+ C

Just as we can use these *quadrads* to create movement within the melodic content of an improvisation or composition, we can also use them for the same effect within the chords and voicings behind the melodies (Harris).

Developing 3-Note Voicings

To extract 3-note voicings from the *quadrad*, one note must be omitted. This can be done in a number of ways, however the one we will look at in this thesis is removing the note just underneath the top voice. I am selecting this note because it means there will always be a gap between the two highest voices. The voicings derived this way will never yield a half-step or a whole-step between these two notes. This will serve to help make the top voice standout and prevents the melody from getting obscured by having too tight of an interval directly underneath it.

The *quadrad* for G-13(11) is a C Major triad + F (Harris). The closed position of these notes can be inverted in four different ways.

C-E-F-G E-F-G-C F-G-C-E G-C-E-F

Dropping the second highest note of each gives us these four groupings.

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C-E-G E-F-C F-G-E G-C-F
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We can now use these groupings to develop a new set of smaller voicings that imply the color given to us by the *upper structure triad*, but in a more ambiguous way. We are no longer playing the full triad and simply adding a note underneath it. Now we are hinting at it by playing two to three notes from the *upper structure triad* with an added note that may or may not show up at all, and can be present anywhere in the voicing.

Let's apply this to *Blue in Green* as a means to harmonize the melody.



Here's an harmonic etude that can be used for comping through the changes with these 3-note ideas. The focus is on smooth voice leading through each harmonic movement. Because we are utilizing the *upper structure triads* to develop these shapes, the ear will still be able to hear the melodic color and contour of the original composition, even though the actual melody is no

longer being played. For the full effect, try to sing the melody - or have someone play it - while you comp through the voicings in this etude.



Developing 2-Note Voicings

The final step in this exploration revolves around using the *quadrad* to develop a vocabulary of dyads that imply the chord even more ambiguously than their 3-note counterparts. Dyads are when two notes are played at the same time. They are spacious and leave much to the imagination. Building a series of dyads from the *quadrad* is a perfect way to express the harmony with only two notes, as they will be derived from the *upper structure triad*. This gives

each pair a sense of deep connection with the quality of its fully extended chord while continuing to embrace the melodic content.

Going back to the full *quadrad* for G-13(11) we have these four inversions.

C-E-F-G E-F-G-C F-G-C-E G-C-E-F

Rather than simply omitting the second to highest note, we now drop the lowest note as well. This gives us four sets of possible dyad combinations for G-13(11).



Let's apply these dyads to the tune to harmonize the melody.



While the harmony is being stated more ambiguously, the color of each tonality is still present as we move through the dyads. If we played this harmonization of the melody with a bassist who was moving through the root notes of the chord progression, there would be an almost impressionistic statement of the harmonic structure. We could also add the root note of the chord underneath each of these dyads ourselves when performing without a bass player. Because we are only playing two notes at a time, we still have enough fingers left over to find the root if we care to. This would yield an open and spacious, yet complete conveyance of the harmony and the melody.

Leaving the melody behind, and using these dyads to comp, offers a minimalist option. This implies the harmony for the soloist, yet is so simplified it will never get in the way of what the lead player wants. Here is an harmonic etude as an example of this type of comping.



Just like the dyad-based chord-melody arrangement previously shown, the color of each chord is still present. Even though we're working with dyads, we are not only able to hear the chord progression, but it's being stated in a much more colorful and rich way than if we were just using 3rds and 7ths to express the harmony. If playing solo or in a duo with a singer or a horn player, but without a bassist, we could again add the root note of each chord underneath these dyads to give a more obvious harmonic statement.

Conclusion and Final Thoughts

The purpose of this thesis was to explore a new way of developing harmony on the fretboard. The goal was to take the idea of upper structure chord construction that seems so easy and obvious to piano players - who have two separate hands and can therefore see two different chords at the same time and how they work together - and to translate that into a concept that can be utilized by guitarists.

When the *bottom-up* way of thinking is a guitarist's only approach, it can potentially lead to a sense of disconnect between the harmony and the melody, frustration over bland chord voicings, challenges creating voice leading, and an overall homogenous chordal vocabulary lacking in tonal diversity. This thesis is in no way an argument that *bottom-up* thinking is incorrect. There are guitar players who have transcended the limitations of that way of thinking and learned to freely navigate the lower and upper structures of harmony with their chords and their single-note melodic phrases.

This exploration is meant to expedite, and even systematize, the transcendence those guitarists have accomplished over their decades of playing. I hope to add a new choice to the methods for

how we develop our harmonic vocabulary to the jazz guitar field. This new choice, which I call *top-down chord construction*, offers an approach that begins with each chord and how the melody notes relate to it. From there we apply *top-down* thinking to prioritize the notes most necessary within the harmony, which we will then use to create our geometric shapes and patterns on the fretboard. This thesis set out not to replace the old way, but to add a powerful and viable option to create and express harmony.

While the versatility of this harmonic approach has been demonstrated, the exploration is not complete. There is no end in sight to the number of variations and harmonies that can be discovered and developed. Nor does there seem to be a limit to the ways they can be applied to our harmonic and melodic playing, composing, or arranging. For instance, we can use these ideas to help us voice out chords for a horn section arrangement. This concept is not limited to the guitar. We can create harmony with any combination of instruments and voices, and we can use the ideas presented here to govern any of those situations. While I can not cover the staggering and unknowable number of chords, variations, and applications of this concept within the boundaries of this thesis, I have documented the process for how I began my exploration and have shown how other guitarists can begin their own journey of discovering the harmonic possibilities found by utilizing the *top-down chord construction*.

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