THE APPLICATION OF TAPPING TECHNIQUES IN COMPOSITIONS FOR THE SOLO ELECTRIC BASS

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ABSTRACT

This thesis is an investigation into the application of tapping techniques in compositions for the solo electric bass. Through the detailed analysis of seven compositions, an understanding of the technical merit of tapping, when applied to solo electric bass composition, will come to light. The compositions contain multiple examples that show how tapping provides unique solutions to the execution of particular musical material, including; contrapuntal forms, large range discrepancies, high velocity monophonic lines, and many others. The intent of this paper is to provide a resource in which knowledge regarding the limitations and possibilities of the technique can be obtained and empower composers in applying them to their own compositions.

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INTRODUCTION:

The intention of this thesis is to show ways in which tapping can be effective when applied to solo electric bass compositions. The electric bass is traditionally used for playing bass lines in the lower register. In recent times it has also evolved into a solo instrument. In solo performance, the ability to simultaneously execute multiple elements of music (melody, harmony and rhythm), or alternatively create the illusion of doing so, can be invaluable to the performer. For this tripartite manner of performance, tapping can be very useful.

It will be shown through the detailed analysis of its use in the compositions contained in this thesis, how the application of tapping can enable the electric bassist to execute musical elements once thought reserved for instruments like the guitar or piano. This thesis is intended to be a resource to aid in the comprehension of the capabilities and limits of tapping techniques and their function when applied to the solo electric bass. In this way, any composer with the urge to write music for the solo electric bass, or any bassist with the desire to perform said repertoire, can be empowered with the knowledge and tools encapsulated within this paper.

CHAPTER 1: Introduction to Tapping and Other Techniques

Introduction to Tapping

Tapping encompasses a plethora of invaluable techniques that are employed on stringed instruments to reduce the number of steps necessary for sound production, thus increasing the efficiency of the kinesthetic to sound-output relationship. Traditional sound production methods such as bowing, plucking, and strumming require two separate actions—one fretting hand to depress the string at the desired pitch and the other to cause the string to vibrate. Tapping only requires one action. The same hand, be it the left or the right, is used to both depress the string at the desired pitch and hammer down on it, causing the string to vibrate[1]. Both hands, now free from their once interdependent relationship, are able to autonomously produce notes, doubling the potential sound-output of the instrument. Given these benefits, it becomes obvious that tapping can be incredibly useful for executing numerous examples of musical material on the electric bass, including contrapuntal compositions, particular chord voicings, high velocity monophonic lines and a host of others. However, to capitalize on this technique, instruments should be designed and set up in particular ways that make them more conducive to tapping.

Historical Use of Tapping

In 1933, Roy Smeck, a virtuoso ukelele player, used tapping to play Anton Rubinstein's "Melody in F" in a performance in the movie *That Goes Double*[2]. He used the technique by strumming and holding chord shapes with the left hand (LH), while the right hand (RH)

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[1] Jordan, Stanley. "Getting Started with the Touch Technique." *Guitar Player Magazine*, July 1984. http://www.stanleyjordan.com/Technique/starting.html.

[2] Smeck, Roy. *That Goes Double*. Warner Bros., 1933. Rubinstein, Anton. *Melody in F.*

would continue with tapping pitches higher up on the fretboard. The right hand (RH) would then pull-off to the left hand (LH) chord shape. This was a very limited form of tapping that required constant pull-offs to be audible, a result of being played on an acoustic instrument. The electric pickup and amplification would soon change this, allowing more dynamic resolution and increased versatility with the technique.

In the middle of the twentieth century, Harry DeArmond, the inventor of the first commercially available guitar pickup, used tapping to showcase how effective his pickups were at capturing even the most minute vibrations of the strings[3] [4]. In 1952, Jimmie Webster, a pupil of DeArmond, wrote *The Touch System for Electric and Amplified Spanish Guitar*, an instructional book on two-hand tapping[5]. In 1959, Webster released *Webster's Unabridged, Jimmie Webster's Stereo Guitar*, an album that used tapping to play solo arrangements of jazz standards[6].

In 1955, the first instrument dedicated to tapping, known as the "Duo-Lectar" was built by Dave and Joe Bunker[7]. The instrument was composed of two necks, one with bass strings and another with guitar strings. It also featured a felt dampener (see page 5 and 6 for explanation) that would later be incorporated into other tapping instruments.

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[3] Schneider, John. "Electronics." In *The Contemporary Guitar*, 245. Lanham, MD: Rowman and Littlefield, 2015. There is no exact date given for when DeArmond began using the technique.

[4] Wright, Michael. Guild Solidbody Guitars to *Guitar Stories: The Histories of Cool Guitars*, 70. Vol. 2. N.p.: Vintage Guitar Books, 2000. There is no exact date given for when DeArmond began using the technique.

[5] Cappelli, Frank. "Guitar Timeline." In *The Guitar: An Illustrated Step-by-step Instructional Guide*, 107. Pittsburgh, PA: Eldorado Ink, 2007. See the year 1952 in text.

[6] Webster, Jimmie. *Webster's Unabridged, Jimmie Webster's Stereo Guitar*. RCA Victor LPM-1942, 1959, LP. Recorded December 30, 1958.

[7] Bunker, Dave. "The History of the Touch Guitar™ Dual Neck." Dave Bunker Guitars. http://davebunkerguitars.com/touch_history.html.

In 1974, Emmett Chapman began producing the first single neck instrument dedicated to tapping, known as the "Stick", or "Chapman Stick"[8]. It was a 10-string instrument that was divided into a melody side (5 strings) and a bass side (5 strings) with the lowest pitched strings in the middle. The most popular tuning was a matched reciprocal tuning that ascended in P4^{ths} on the melody strings and descended in P5^{ths} on the bass strings (Melody: E, A, D, G, C. Bass: C, G, D, A, E)[9].

While advancements continued with instruments dedicated to tapping, the technique would continue to be used in conjunction with picking to play challenging monophonic lines, a notable recording being Eddie Van Halen's "Eruption" in 1978[10]. However, guitarist Stanley Jordan used the technique with both hands to play polyphonic arrangements of jazz standards and original compositions in his 1985 album *Magic Touch*. This included a solo arrangement of "Round Midnight" that displayed the polyphonic potential of the technique[11].

Victor Wooten was one of the first notable electric bassists to begin using the technique. His debut solo album, *A Show of Hands* used it extensively in his arrangement of "Overjoyed"[12] and many of the other tracks. Michael Manring also began to implement the technique, a notable example being his version of Stanley Turrentine's "Sugar"[13].

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[8] Chapman, Emmett. "A Brief History of the Stick." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/history/stick/.

[9] Chapman, Emmett. "Stick Tunings. 10-String Matched Reciprocal." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/instruments/tunings/10/mr/.

[10] Van Halen, Eddie. *Van Halen*. Warner Bros. Records 3075-2, 1990, compact disc. Recorded 1978. See "Eruption" track 2.

[11] Jordan, Stanley. *Magic Touch*. Blue Note CDP *7 4*6092 2, 1998, compact disc. Recorded 1985.

[12] Wooten, Victor. *A Show of Hands*. Vix Records 79794-2, 1996, compact disc. See "Overjoyed" track 7.

[13] Manring, Michael. *Bass Day 1998*. 1998. N.p.: Hudson Music, 2002. DVD. See Manring's solo electric bass version of "Sugar".

Low Action and the Bass Used for this Thesis

Stanley Jordan suggests that the strings should be as close as possible to the frets, without touching them[14]. Setting up a stringed instrument so that the strings are close to the fingerboard (fretboard), known as low action, is important for tapping. This reduces the amount of pressure necessary to depress the strings, giving the player more dynamic control and speed in tapping.

The electric bass used to record the compositions in this thesis not only has very low action, but it also has 6-strings and 24 frets, opposed to the standard 4-strings and sometimes lower number of frets, and is tuned in P4^{ths} from bottom to top (B, E, A, D, G, C). This extended range offers a host of additional harmonic, melodic and percussive possibilities to the compositions in this thesis. However, it should be noted that all of the technical concepts within them can be applied to the standard 4-string electric bass even though they can only be played in their entirety on the 6-string.

Dampening Systems

The dampening of previously played strings, or strings that are sympathetically vibrating, is an important aspect of performance on many stringed instruments[15]. Usually, both hands split this responsibility, although the left is more often used. However, in the case of tapping, this is often infeasible and a special dampening device is required. The Chapman

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[14] Jordan, Stanley. "Getting Started with the Touch Technique." *Guitar Player Magazine*, July 1984. http://www.stanleyjordan.com/Technique/starting.html.

[15] Lee, Nelson, and Julian O. Smith III. "Virtual String Synthesis." In *The Science of String Instruments*, edited by Thomas Rossing, 435. New York, NY: Spring Science + Business Media, 2010.

Stick and the NS stick[16] use or have used velvet, fur, and velcro dampening systems[17]. Victor Wooten uses hair bands, placed around the neck, to dampen his strings[18]. For the compositions in this thesis, a fretwrap was used[19].

Use of Vibrato to Sustain Tapped Notes

Vibrato is often subtly used to sustain tapped notes throughout the compositions[20]. However, this is often not indicated in the scores and should generally be applied whenever a note or group of notes need to be sustained for a long enough duration in which the note would decay at an undesirable rate. The use of vibrato, when not indicated by the score is up to the interpretation of the performer.

Musical Notation and Tablature to Notate the Compositions

The compositions in this thesis have been notated into both musical notation as well as tablature to make them more conducive to an analysis of the technique. The tablature is strictly there as a point of reference to indicate hand and finger position. Expression, dynamics, indicators of technique and all other extraneous information have been omitted from the tablature and reserved for the musical notation to keep it free from clutter and confusion. Since the focus of this thesis is on technique, the best way to examine its use is for the notation

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16 Stick Enterprises, Inc. "Instruments NS/Stick Damper and Nut." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/instruments/ns/damper.html.

17 Stick Enterprises, Inc. "History: Timeline of Stick Developments." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/history/timeline/.

18 Wooden, Alex. "Performer's Interview with Victor Wooten.". Performer Magazine. Last modified April 2, 2013. http://performermag.com/performers-interview-with-victor-wooten/. Wooten discusses his use of a hair band to dampen the strings on his bass.

19 Baldemor, Jay, ed. *Fretwraps*. N.p.: Gruv Gear, n.d. http://www.gruvgear.com/fretwraps.

20 Glise, Anthony. "Finger Vibrato." In *Classical Guitar Pedagogy*, 106. N.p.: Mel Bay, 1997.

to clearly show where each note is to be played, since the six string electric bass often has 4 or 5 different locations for many of them. Providing these designations without tablature (e.g. using text to indicate 1st position, 10th position notes etc) quickly becomes incomprehensible and exceedingly difficult to visualize, especially when polyphonic textures are being used (see Appendix J for a comparison).

Dry-Tapping and Wet-Tapping

The compositions in this thesis use an array of different approaches and kinds of tapping, therefore different terminology is used to differentiate them. One characteristic of tapping is that it has a percussive timbre, caused by the hammering of the finger onto the fretboard. Sometimes, this is an undesirable trait that doesn't suit the tone or style of the composition, creating a problem for the composer.

A way of circumventing this is to combine the use of hammer-ons, pull-offs and slides with tapping. In the same way that they are employed on string instruments to create a slurred articulation, following a bowed or plucked note, they can also be used after a tapped note for the same effect[21]. To be clear, hammer-ons and pull-offs are in and of themselves a form of tapping, however they are unique in that they borrow the kinetic energy established by the initial tapped or plucked note and redistribute it to subsequent notes.

This method gives the notes a softer and more rounded attack, opposed to the sharp and percussive attack of the initial tapped note. To differentiate between notes produced by an initial tap, and those produced by a hammer-on, pull-off, or a slide, "dry-tap" will be used for initial taps and "wet-tap" for the rest. Wet-taps are more difficult to execute and require more

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[21] Turetzky, Bertram. "Pizzicato." In *The Contemporary Contrabass*, edited by Alain Hénon, 6-7. Berkeley, CA: University of California Press, 1974. See section regarding "Slurred Pizzicato".

planning and attention to detail. Many of the composition analyses will highlight the complex series of steps often involved with maintaining wet-taps.

Parachordal and Orthochordal Finger Placement

When tapping, musicians usually have their hands and fingers positioned in one of two ways. Either they have their fingers positioned parallel to the strings[22], or they have them positioned perpendicular to the strings[23]. The former will be referred to as "parachordal finger placement" and the later as "orthochordal finger placement". Orthochordal finger placement is much more effective for tapping conjunct melodies, whereas parachordal is conducive for particular rhythmic patterns and other idiosyncratic uses (see Figure 1.1). Most of the compositions in this thesis use the former, however there have been occasional instances where parachordal finger placement was used.

Figure 1.1: Comparison of parachordal and orthochordal finger placement.

Parachordal Finger Placement:

Orthochordal Finger Placement:

[22] "Dave Bunker - Duo-Lectar." Video file, 2:51. YouTube. Performance on 1960. Performed by Dave Bunker. Posted by Graham Tichy, February 29, 2008. https://www.youtube.com/watch?v=EAstqXR4QTc. Video clip of Dave Bunker tapping on his invention, the Duo-Lectar, on the Jubilee TV Network in 1960. Notice how his right hand fingers are positioned parallel to the strings.

[23] Chapman, Emmett. "The Evolution of a Musical Art." *Electronic Musician Magazine*, May 1987. http://www.stick.com/articles/evolution/. See section titled "The Playing Technique" where Chapman discusses the perpendicular positioning of the fingers to the strings.

Two-Hand Tapping

Two-hand tapping specifically requires both hands to be simultaneously engaged in the technique[24]. This term is used in guitar nomenclature to differentiate between the use of tapping in conjunction with picking in the right hand (RH), and tapping with both hands without the use of a pick.

Right Hand (RH) Fretting

A tapping technique that requires the right hand (RH) to fret a pitch with one finger while plucking or strumming it with another (see Figure 1.2) is referred to as "RH fretting" for the purpose of this thesis. Similar versions of this technique, using the left hand (LH) as opposed to the RH, have been used in upright bass music[25]. One of the compositions,"Etude No.1" was written as a way of exploring the possibilities of this technique[26].

Figure 1.2: Photo showing right hand (RH) fretting.

[24] Capuzzo, Guy. "Two-Hand Tapping." In *Guitar Technique Builders Series: Tapping: Take Your Playing to a New Level!*, 22. Guitar Technique Builders Series. N.p.: Alfred Publishing, 1995.

[25] Turetzky, Bertram. *The Contemporary Contrabass*. Berkeley, CA: University of California Press, 1974. See page 10 on "Left Hand Pizzicato"

[26] See Appendix D - "Etude No.1"

Slap Bass

"Slap bass", also referred to as "slap" or "slapping", is a technique used on both double or electric bass that involves hitting the string so that it strikes against the fingerboard (fretboard). It is made up of a variety of pitched and non-pitched percussive techniques[27]. The following terms describe particular techniques within the broader category of slap bass.

- **Slapping**: when the RH thumb is used to slap the string over the fretboard[28].
- **Popping**: when fingers from the RH are used to pull the string away from the bass and then releasing them so that they smack against the fretboard[29]. This is also known as "Bartok Pizzicato" in classical nomenclature[30].
- **LH Slap:** when the LH is squeezed in such a way that the fingers slap against the strings[31], creating a non-pitched percussive sound, however the strings are not supposed to hit the fretboard[32].

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[27] "Slap Bass." In *Concise Oxford English Dictionary: Main Edition*, edited by Oxford Dictionaries, Angus Stevenson, and Maurice Waite. 12th ed.

[28] Clayton, Stuart. "Slapping Bassics." In *Ultimate Slap Bass*, 16. N.p.: Bassline Publishing, 2006. See description on how to slap.

[29] Clayton, Stuart. "Adding the 'Pop.'" In *Ultimate Slap Bass*, 24. N.p.: Bassline Publishing, 2006. See description on how to pop.

[30] Kjelland, James. "The World of Pizzicato." In *Orchestral Bowing: Style and Function*, 60. Spi ed. N.p.: Alfred Music, 2004.

[31] Note: the strings for LH Slap shouldn't contact the frets, contrary to the definition give for "slap bass" in the Oxford Dictionary. See footnote #27.

[32] Clayton, Stuart. "Left Hand Slaps and Sixteenth Note Lines." In *Ultimate Slap Bass*, 61. N.p.: Bassline Publishing, 2006. See description on how to LH slap.

- **Double-thumping:** when the RH thumb is used similar to a pick in that it strikes down on a string with the fleshy side, before the neck, and then strikes it again coming up with the nail side[33].
- **Thumb Pop:** when the RH thumb pulls the string away from the bass and then releases it so that it smacks against the fretboard has been referred to as a "thumb pop" for the purpose of this thesis. This is also known as "Bartok Pizzicato" in classical nomenclature[34].
- **Slap Strum:** when the RH thumb is used to play two or more notes simultaneously, on adjacent strings, with a slapped sound. The thumb does a mix of slapping and strumming technique to hit the notes. This is referred to as a "slap strum" for the purpose of this thesis.

Crack Bass

"Crack bass" is a type of percussive bass technique[35] that mimics the sound of a kick drum and a snare[36]. The simulated kick drum sound is produced by the R1 (right hand, first finger) tapping the B-string where it meets the edge of the neck, where it meets the body, after the last fret. The simulated snare sound is produced by the R4 (right hand, fourth finger) smack-

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[33] Wooten, Victor. *Victor Wooten: Groove Workshop*. 2008. N.p.: Hudson Music, 2008. DVD. See Q&A section where Wooten discusses double-thumping technique.

[34] See footnote #30.

[35] "Victor Wooten Reenacting the Earthquake in Haiti." Video file, 20:14. YouTube. Performance in Los Angeles, United States on 2013. Performed and composed by Victor Wooten. Posted by Jonathan Moyer, February 5, 2013. https://www.youtube.com/watch?v=5NerjNLskk8. See 6:18-10:00mins. Wooten uses an assortment of percussive bass techniques.

[36] Cohen, Josh. ""Crack Bass" Technique Demystified." *The Music of Josh Cohen* (blog). Entry posted July 21, 2014. http://themusicofjoshcohen.tumblr.com/post/92464609644/crack-bass-technique-demystified.

ing the B-string where the pickup meets the ramp[37]. This technique is used in "Slap Crackle Pop", discussed in Chapter 5.

Fingerstyle, Strumming and Barring

"Fingerstyle" is the common word used to describe the traditional plucking technique, involving the index and middle finger to alternate back and forth[38]. "Strumming", in this thesis, means that any combination of the RH fingers or thumb are used to sweep up or down the strings. Many times, the four fingers are used in an opening and closing fashion to strum up or down, identical to the way Les Claypool would strum the electric bass[39]. "Barring" is a positional technique in which a LH finger is used to depress 2 or more strings on the same fret. This is common in guitar playing with barre chords[40].

Classical Guitar Style Plucking

The notation of RH fingering for 4 or 5 finger plucking for classical guitar[41] has been borrowed for the solo six-string electric bass compositions used in this thesis. The letters used come from the Spanish names for the various digits (see Figure 1.3).

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[37] Erskine, Damian. "Bass Ramps: The How and Why." No Treble. Last modified April 3, 2013. http://www.notreble.com/buzz/2013/04/03/bass-ramps-the-how-and-why/.Explanation on ramps.

[38] Snyder, Jerry. "Right Hand Playing Technique." In *Bass Today: A Beginning Electric and Acoustic Bass Method*, 4. N.p.: Alfred Publishing Co., Inc., 2006. See explanation of "fingerstyle".

[39] Claypool, Les. *Primus: Animals Should Not Try to Act Like People*. 2003. N.p.: Interscope Records, 2003. DVD. See "John the Fisherman" music video. Les Claypool uses a four-finger strumming technique, involving the opening and closing of his RH.

[40] "Scott Morris Video Lesson - Barring Technique." Lecture presented at Guitar Salon International Showroom, Santa Monica, CA. Video file, 11:33. YouTube. Posted by Guitar Salon International, October 7, 2014. https://www.youtube.com/watch?v=utguuFcvClw. Guitarist Scott Morris explains the barring technique as applied to the classical guitar.

[41] See Stidham Music. "Learn Standard Notation The Easy Way: A Guitarists Guide." *Stidham Music* (blog). Entry posted October 21, 2013. http://stidhammusic.com/2013/10/21/

Figure 1.3: Photo showing the corresponding digits of the RH in classical guitar plucking notation.

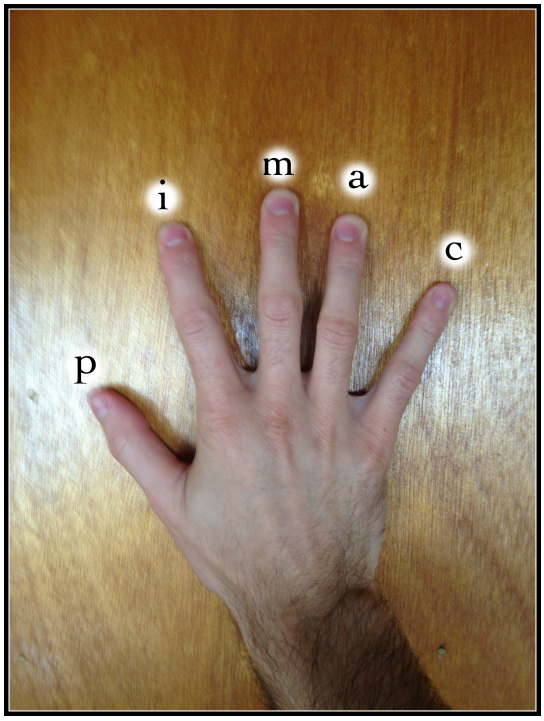
p - pulgar (thumb)

i - indice (index finger)

m - medio (middle finger)

a - anular (ring finger)

c - chico (little or pinky finger)



Natural and Artificial Harmonics

Natural harmonics are produced by dividing the open string along different partials in the overtone series by lightly touching the string with the LH, plucking it with the RH, and quickly releasing the LH, allowing the string to resonate[42]. Artificial harmonics are essentially based on the same principal, however the role of the LH is given to the RH thumb and one of the RH fingers is used to pluck the string. The LH is used to fret the string at a selected point, shortening the length of the string, therefore raising the pitch of all the partials (see Appendix

[42] Pastorius, Jaco. *Weather Report: Live at Montreux 1976*. By Jaco Pastorius. 1976. Montreux, Switzerland: Eagle Rock Ent, 2007. DVD. See Pastorius's performance of "Portrait of Tracy". This is an example of natural harmonics.

H for rules governing its notation)[43]. However, it should be noted that the term "artificial harmonics" implies a different sound production method for bowed string instruments[44].

Compositional Issues with Tapping Techniques

A negative symptom associated with two-hand tapping, and common when using the technique to improvise, is when each hand attempts to play a different note on the same string, therefore cancelling out the lower note. Many of the compositions in this thesis contain large stretches, seemingly counterintuitive shifts, and other unusual solutions that are implemented to avoid this undesired result that will be referred to as "string-cancellation" for this thesis.

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[43] "Bailey's Bar and Grill Tutorial - Artificial Harmonics." Video file, 09:45. YouTube. Performance. Performed by Steve Bailey. Posted by Framus & Warwick, August 8, 2011. https://www.youtube.com/watch?v=T6Fcs2ZCwRw

[44] "Artificial Harmonics." In *Grove's Dictionary of Music and Musicians*, edited by J.A. Fuller Maitland. Vol. 2.

CHAPTER 2: "Alejandra"

Overview

"Alejandra" is a composition that uses several tapping techniques to emulate the sound of a lead guitar, electric bass and a chordal instrument being played simultaneously. The style is representative of an R&B ballad, similar to Marvin Gaye's "Let's Get it On" in that the chord progression in the first 4 bars of every A section is identical (I, I^{6}_{3}, IV, V, or V^{sus})[45]. The timing of those chords is also the same (♩. ♪ ♩ | ♩. ♪ ♩).The A^{4} section simulates the sound of a lead guitar improvising over a rhythm section by dividing each part with tapping.

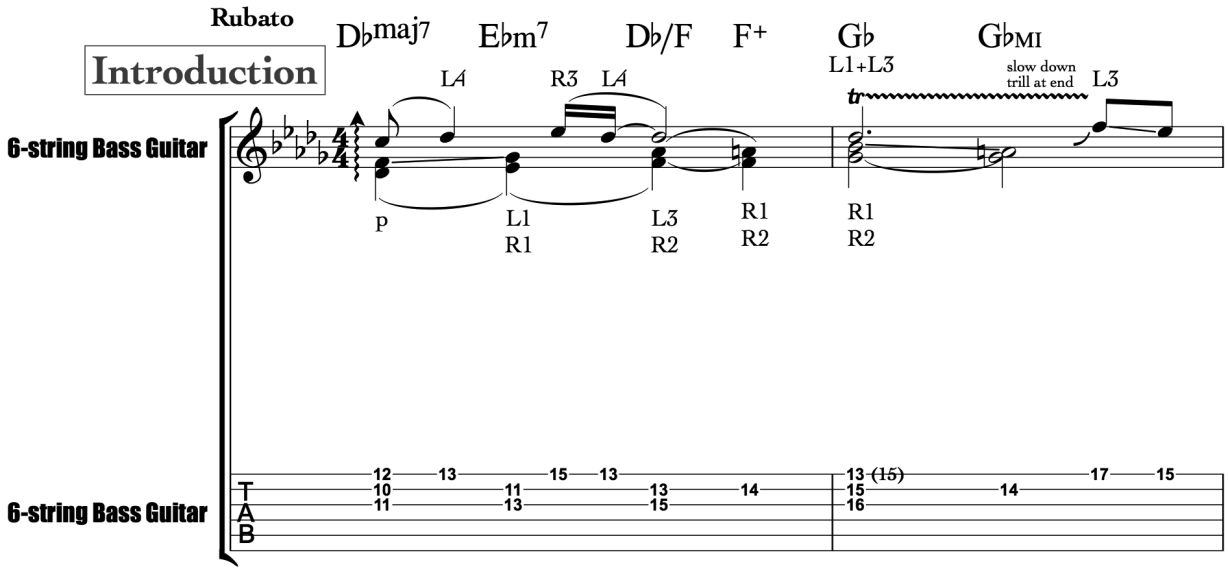
Analysis

The introduction of "Alejandra" uses the combination of two-hand tapping, strumming, plucking and RH fretting to play three and sometimes four part counterpoint. In the first bar (see Figure 2.1), the first chord is strummed by the RH thumb, while the rest are wet-tapped in a legato fashion. This ensures that each voice is smooth rather than having a percussive and abrasive beginning to the measure. The second measure (see Figure 2.1) introduces a more percussive approach by dry-tapping the first chord (Gb), however it follows this by having the remainder of the movement use trills or slides to give it a smooth or slurred articulation. The RH is especially worth taking note of because it sustains the Gb with the 2nd finger of the RH (R2) at the beginning of the measure while the Bb that was tapped by the 1st finger of the RH (R1) slides down to an A. The ability to incorporate the sustaining of one voice while

[45] Gaye, Marvin. *Let's Get it On*. Motown 314530885-2, 1998, compact disc. Recorded 1973. See "Let's Get it On" track 1.

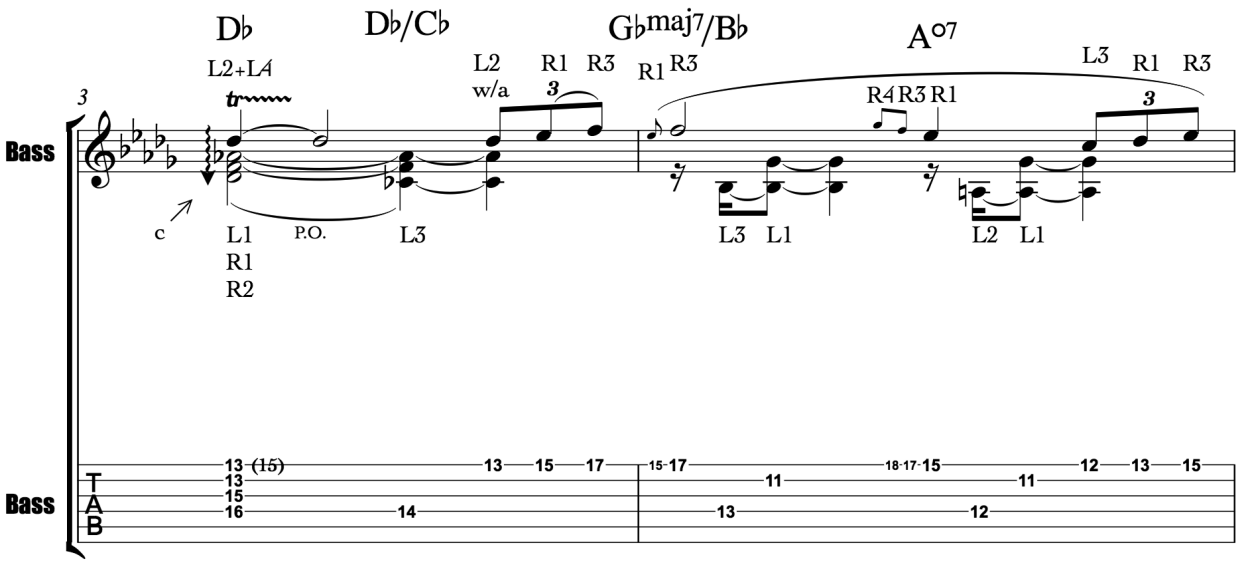
changing a second voice via a slide is useful for executing oblique motion within a contrapuntal piece, especially when the other hand is already being used to play other voices.

Figure 2.1: Bars 1 and 2 of "Alejandra": A combination of two-hand tapping and strumming to achieve a smooth legato passage of three part counterpoint.



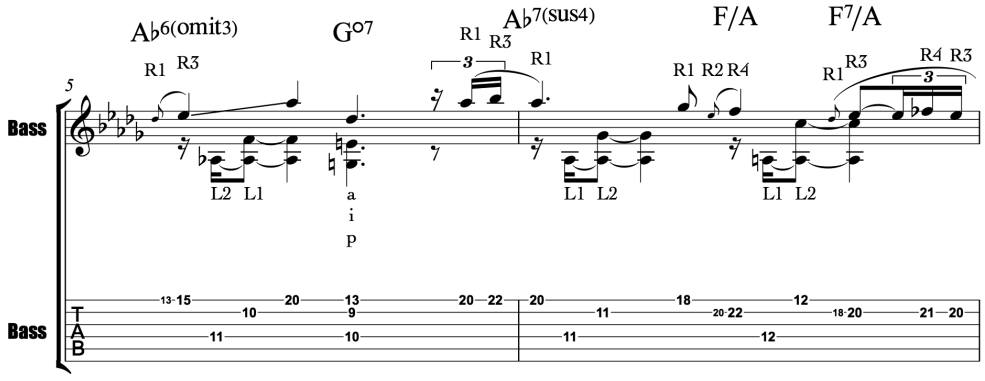
Bar 3 of the introduction (see Figure 2.2) uses RH fretting in conjunction with a strum from the same hand to execute the passage. The sustained pitches at the beginning of bar 3 form a Db major triad with another Db on the top that is trilling back and forth with an Eb. As the high Db finishes its trill and is sustaining a Db, the low Db pull-offs to a Cb to make the harmony into a Db/Cb chord. To execute that segment, it was necessary to fret with both hands while using the R4 to strum from the top voice down. This technique of both fretting and strumming with the same hand allowed for both the trill in the upper voice and the pull-off to a lower pitch in the lower voice to occur uninhibited.

Figure 2.2: Bars 3 and 4 of "Alejandra": Use of RH fretting and strumming to achieve specific vocal movement.



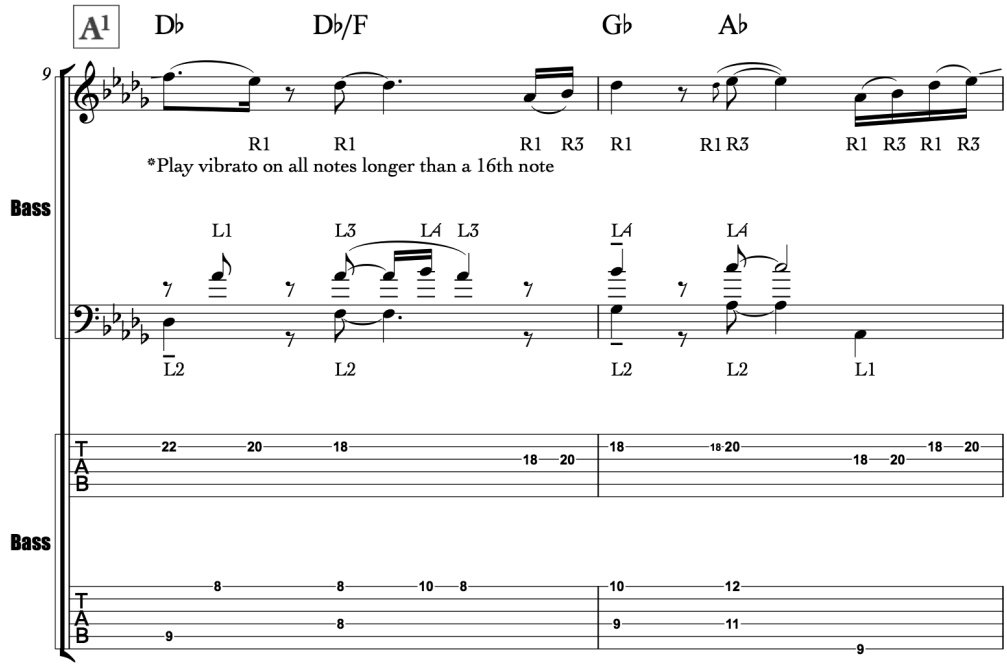
Bar 5 uses plucking on the beat three instead of tapping to maintain a smooth articulation. (see Figure 2.3). If tapped, they would have had to be dry-tapped, creating a percussive tone that wouldn't fit the gentle introduction. Knowing how to combine tapping with other techniques to enrich a composition while also maintaining its musical continuity is crucial.

Figure 2.3: Bars 5 and 6 of "Alejandra": Use of plucking in conjunction with two-hand tapping to maintain a smooth articulation to the passage.



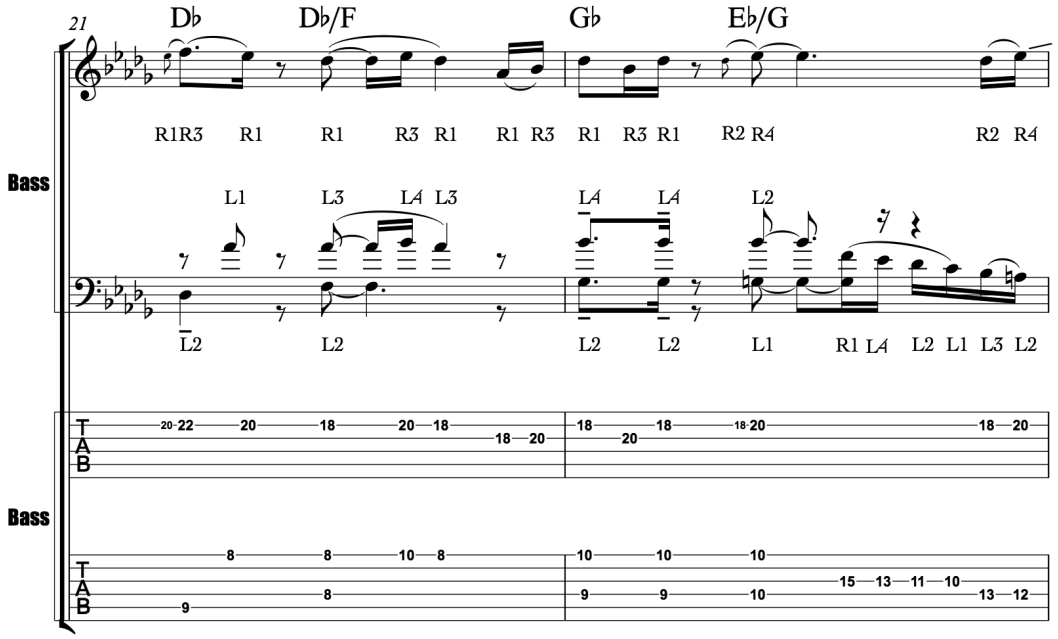
A1 introduces an arranging approach, using two-hand tapping, which is repeated throughout the piece (see Figure 2.4). A unique solution is used to imply the simultaneous sound of chords, a bass line and a melody that circumvents the unique range difficulties associated with the six-string electric bass, a low pitched string instrument. The LH is used to tap roots to the chords in the mid to lower register of the lower pitched strings, while at the same time tapping other chord tones on the higher pitched strings. In the case of Figure 2.4, the C-string was used for other chord tones. With this method, the D and G-strings are available for the RH to tap a melody in the higher register, unimpeded by the accompaniment part being played in the LH.

Figure 2.4: Bars 9 and 10 of "Alejandra": Tapping a melody with the RH on the D and G-strings in the upper register, while using the E and A-strings to tap root notes and the C-string to tap other chord tones with the LH.



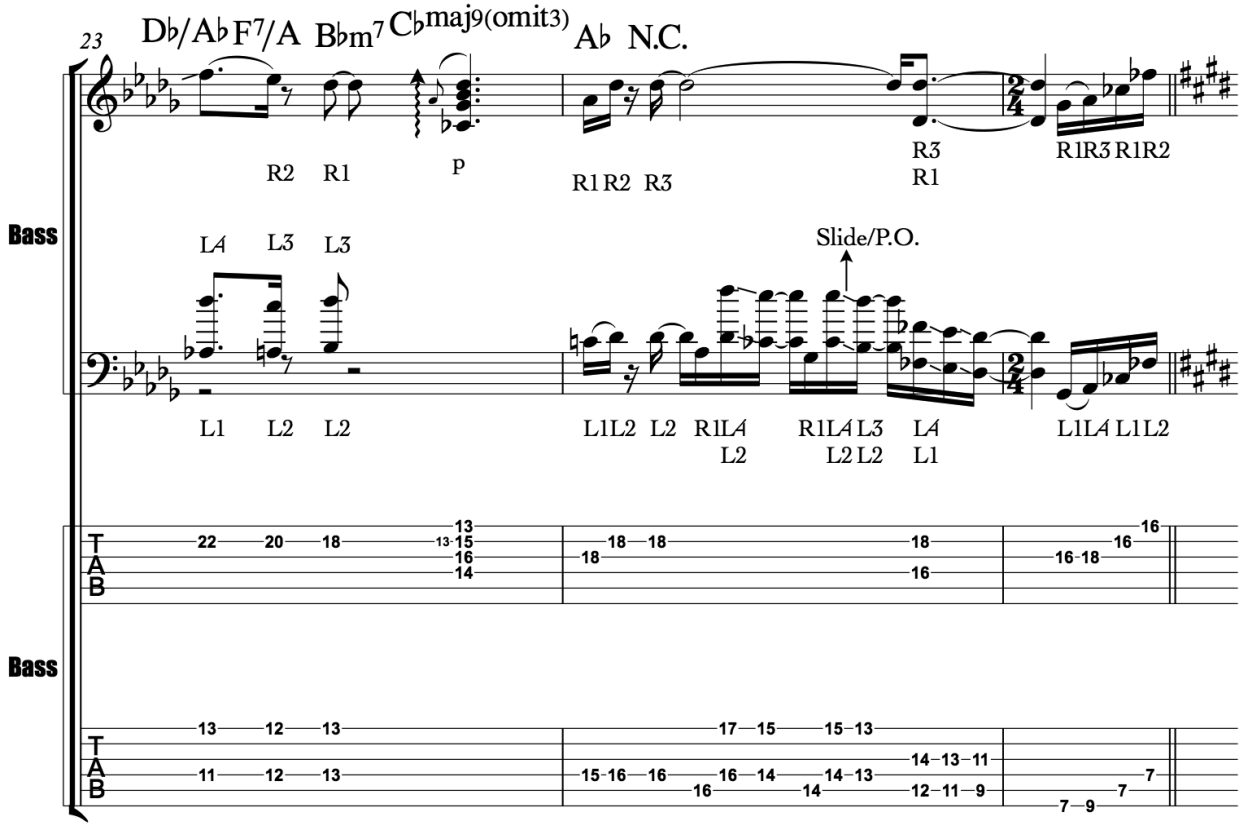
In bar 22, starting on the "and" of beat two, (see Figure 2.5), tapping is used to play a melody note, Eb, that is harmonized underneath, while also playing part of a descending counter line. While the first finger of the LH (L1) is depressing the G (A-string, 10th fret) and the second finger (L2) is depressing the Bb (C-string, 10th fret), both notes belonging to the Eb/G chord, the RH is depressing and sustaining the melody note, Eb, with the R4 (G-string, 20th fret). The RH prevents the LH from having access to the F on the 10th fret of the G-string , while the other F on the 15th fret of the D-string is unreachable for the LH. Therefore, the solution is for the R1 to tap the F on the 15th fret of the D-string which pulls-off to the Eb on the 13th fret, fretted by the L4, all while sustaining the Eb on the G-string. When composing/arranging for the solo electric bass–using tapping, there are many instances that require one hand to play two roles to avoid string cancelling (see bar 22 of Figure 2.5).

Figure 2.5: Bars 21 and 22 of "Alejandra": Both hands tapping together on the same line to maintain other sustained voices in either hand.



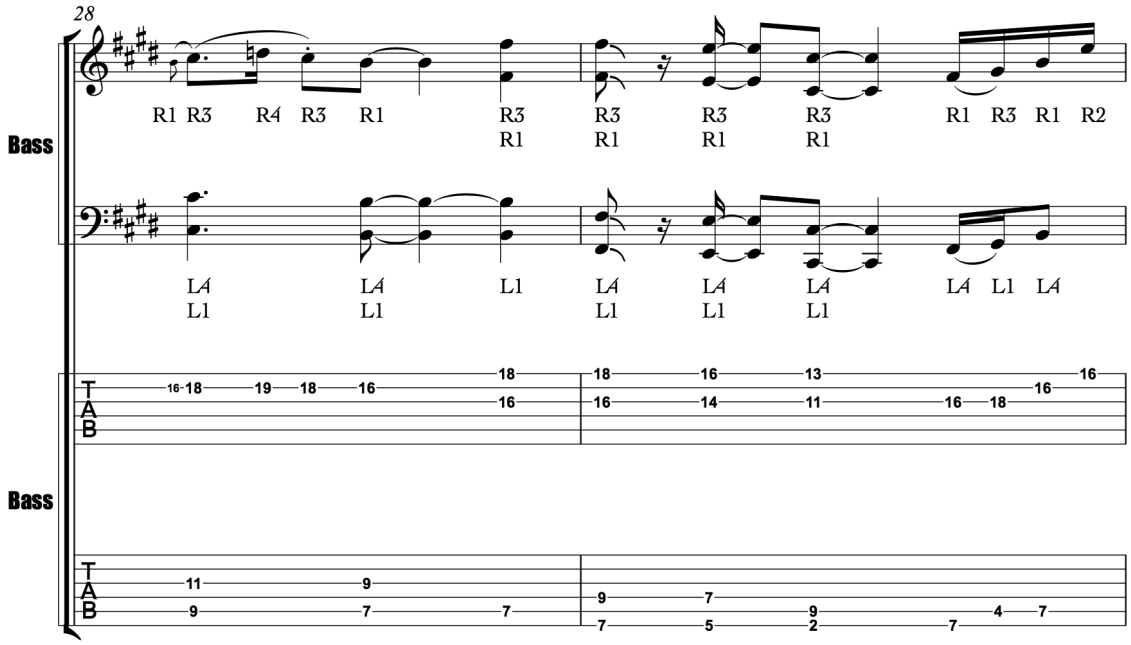
In bar 24, the RH plays two roles by sustaining a Db, the top melodic note of a cadence on the G-string, with the R3, while playing the lower pitches, Ab and Gb, of the accompaniment part with the R1 on the E-string (see Figure 2.6). The LH plays the same Db melodic note, one octave lower, but changes to an accompaniment part less than a beat later that consists of major and minor 10th double stops, tapped on the A and C-strings, that slide down to each other. The LH would not have been able to play the accompaniment part on its own, so it was necessary for both hands to work together as opposed to having fully isolated roles.

Figure 2.6: Bars 23–25 of "Alejandra": RH sustaining a melodic note while also tapping part of the accompaniment, predominantly played by the LH.



Bar 29 of the B section (see Figure 2.7) uses tapping to play part of a melodic line in octaves, a total of four separate octaves of the same pitch. This is achieved by having the RH tap the notes F#, E and C# consecutively, in octaves with the R1 on the D-string and the R3 on the C-string, while the LH taps the same pitches (two octaves lower) with the L1 on the B-string and the L*4* on the A-string. This method is conducive to the six-string, 24-fret electric bass, as opposed to smaller range basses, because it provides a total of 13 different locations where this can occur. However, this is not a rule and there could be many times where the composition itself, and how it lays out on the instrument could call for a different method.

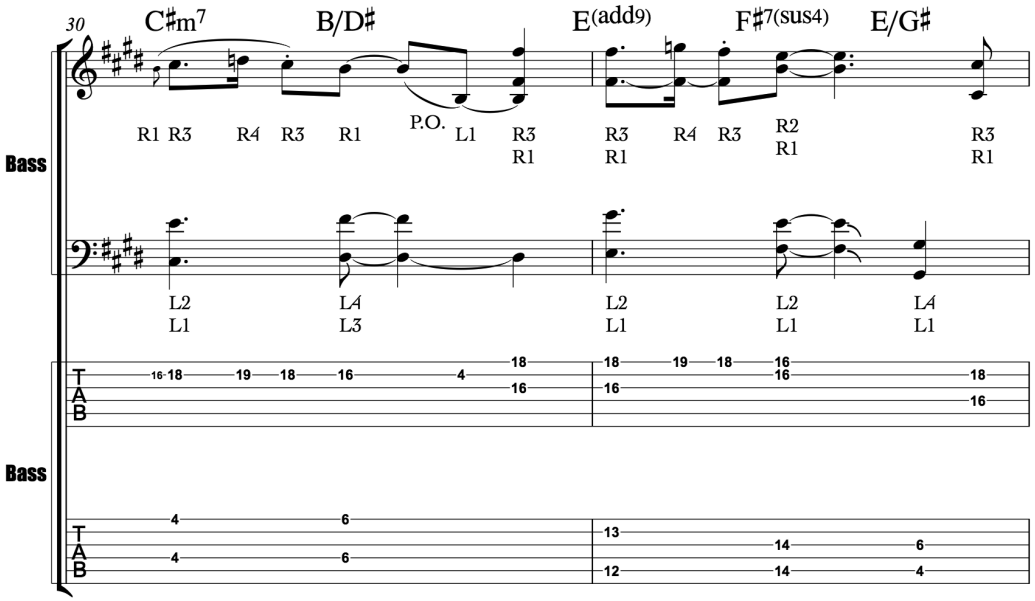
Figure 2.7: Bars 28 and 29 of "Alejandra": Tapping a line with the same pitches in four separate octaves.



Bar 30 of the B section (see Figure 2.8) has a unique solution for maintaining chordal tones in the accompaniment part to support the melody. On the "and" of beat two, the melody

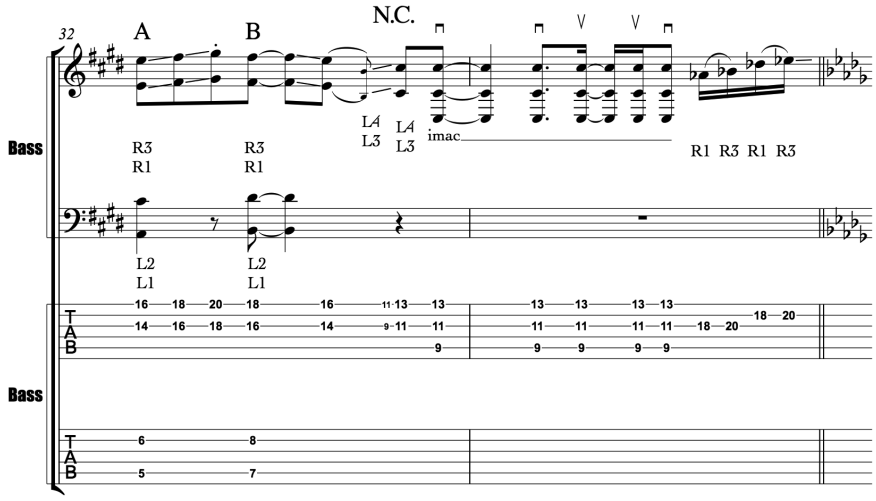
note, B (G-string, 6th fret), tapped by the RH, completes the B/D# chord, while the other tones D# and F# (A and C-strings) are tapped by the LH. However, on beat four the melody note changes to an F#, played in octaves on the D and C-strings. This would have left only the sustained D# (A-string), tapped by the LH, as the accompaniment, leaving an incomplete B/D# chord. However, the solution provided is for the B, the melody note on the 16th fret of the G-string (tapped by the RH), to pull-off, on the "and" of beat three, to the B on the 4th fret of the G-string (fingered by the L1). This fools the listener into hearing the melody note as sustaining up until the change to an F# on beat 4, while clandestinely reintroducing the B to complete the B/D# chord and maintain the harmonic continuity of the sonority under the F# melody note.

Figure 2.8: Bars 30 and 31 of "Alejandra": A way of maintaining chordal tones in spite of string cancellation issues.



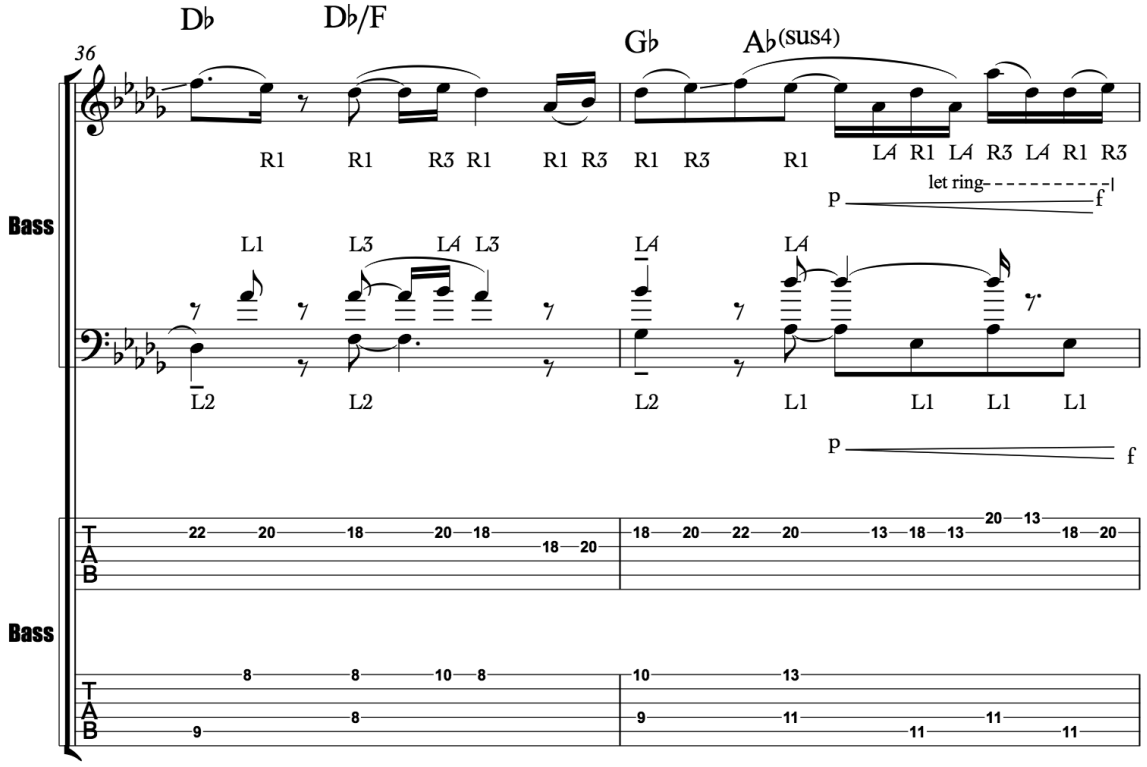
Bar 32 of the B section contains an interesting transition from two-hand tapping into strumming (see Figure 2.9). The beginning of the bar has the RH tapping and sliding a melody in octaves on the D and C-strings with the R1 and R3, while the LH taps major 10th double stops on the E and G-strings that imply the chords A major going to a B major chord. The interesting part of the transition is when the melody notes E, in octaves, played by the R1 and R3, pull-off to the grace notes, B, in octaves, being fretted by the L3 and L4, which slide up a major 2nd to the C#. Then, on the and of 4, C#, in three different octaves, is strummed by the RH fingers and fretted by the L1, L3 and L4. This presents an effective way of transitioning to a strummed technique of the same pitch in three octaves while also maintaining a slurred and smooth articulation to the melody. If the solution were instead to tap the grace notes, B in octaves (A-string, 14th fret, and G-string, 16th fret) with the RH, the attack would have been accented instead of slurred, leaving the C#s in an ineffective position, impractical for strumming.

Figure 2.9: Bars 32 and 33 of "Alejandra": A way of transitioning from tapping to strumming that maintains a smooth and slurred articulation to the line.



Bar 37 contains an instance where the LH is depressing chordal tones on two adjacent strings, the G and C-strings, barred with the L*A*, while the RH taps other pitches on those strings that continually pull-off to the notes that are barred by the L*A* (see Figure 2.10). While this is happening, the L1 provides more movement in the lower register by tapping back and forth between the root and the 5th of the Ab(Sus4) chord on the A and E-strings. This is an easy way to get "more bang for your buck" that was used by some of the earliest proponents of tapping, like Roy Smeck on the Ukelele[46].

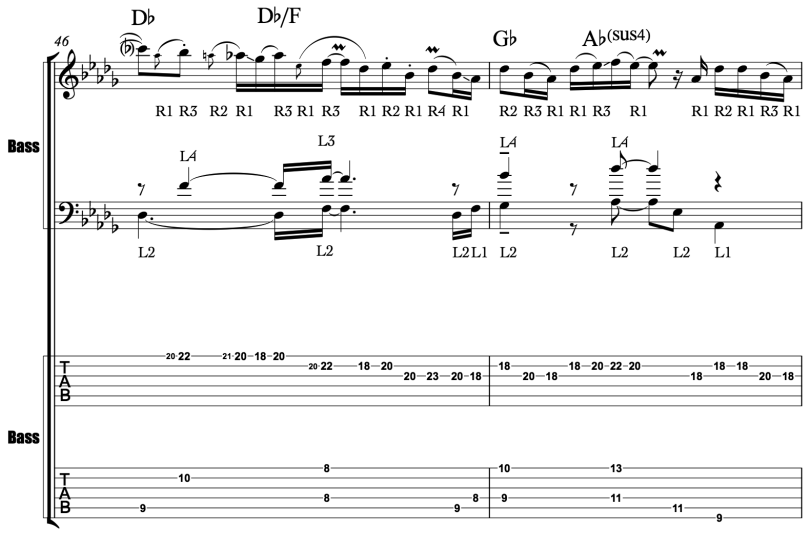
Figure 2.10: Bars 36 and 37 of "Alejandra": Sustained chord tones with the LH while tapping other notes and pulling-off to the sustained chord tones with the RH.



[46] Smeck, Roy. *That Goes Double*. Warner Bros., 1933. Rubinstein, Anton. *Melody in F.* Smeck uses the tapping technique on a ukelele. He strums a chord voicing that is fretted in the LH and then goes on by tapping melody notes on higher frets on the same strings. He then pulls-off to the chord notes being fretted by the LH after each tapped note in the RH.

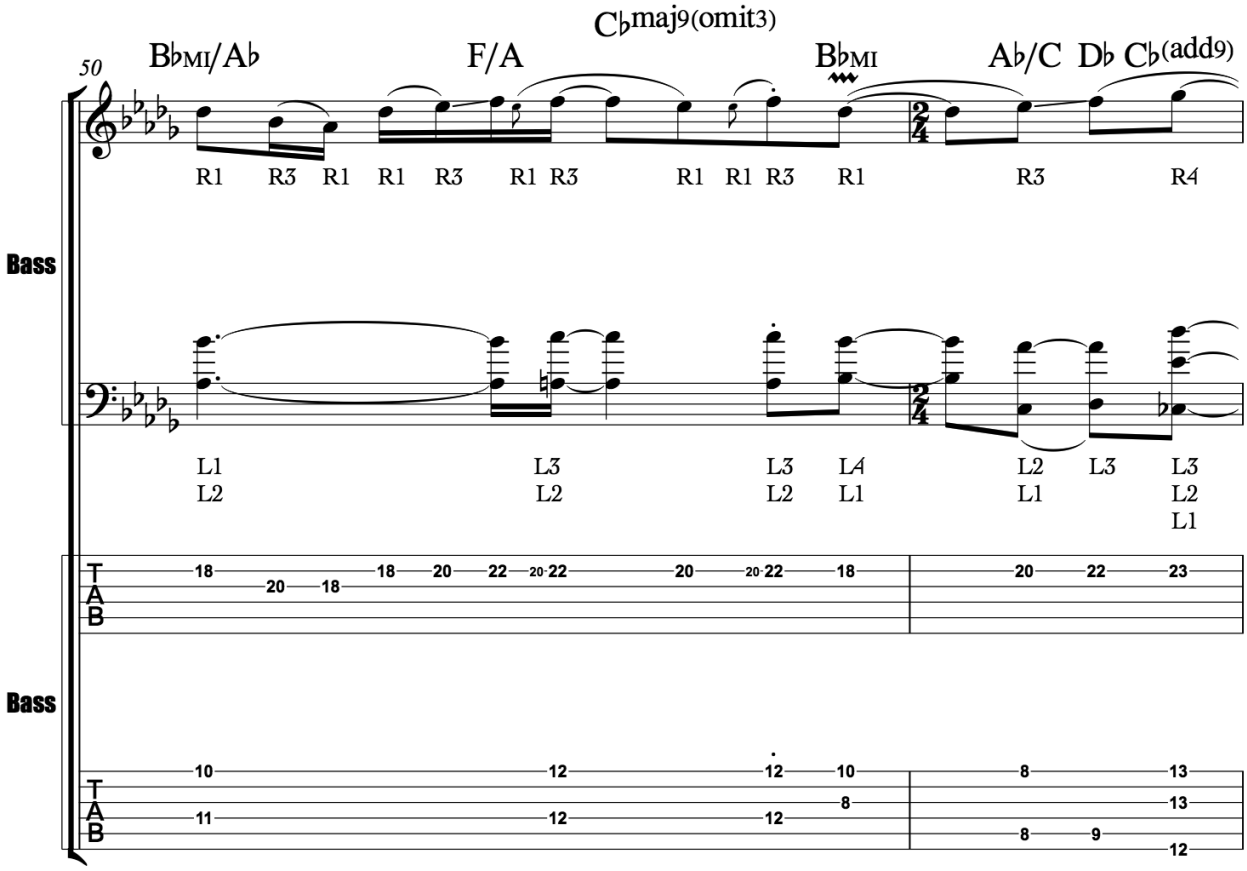
Bar 46 has a tapped melody in the RH that uses a seemingly unintelligible fingering to maintain a slurred and legato articulation to the line (see Figure 2.11). This occurs on the second 16th note of the beat three, where instead of using a more intuitive location for the Db that requires less hand movement (D-string, 22nd fret), an awkward stretch is used to allow a pull-off from the F (G-string, 22nd fret), tapped by the R3, to the Db (G-string, 18th fret), using the R1. This in turn effects the positioning of the rest of the line. Beat four of bar 47 (see Figure 2.11) is an instance where the same pitch (Db) and fret location is tapped initially by the R2 and then again with the R1. This technique of doubling, tripling, or quadrupling a pitch on one fret location with multiple fingers is a faster and more efficient way of playing repeated pitches instead of using the same finger. In this instance it is more efficient to alternate between fingers than having to play three consecutive 16th notes with the R1.

Figure 2.11: Bars 46 and 47 of "Alejandra": These two bars employ seemingly unintelligible fingerings to maintain a slurred articulation to a line. They also show an example of repeated notes using multiple fingers.



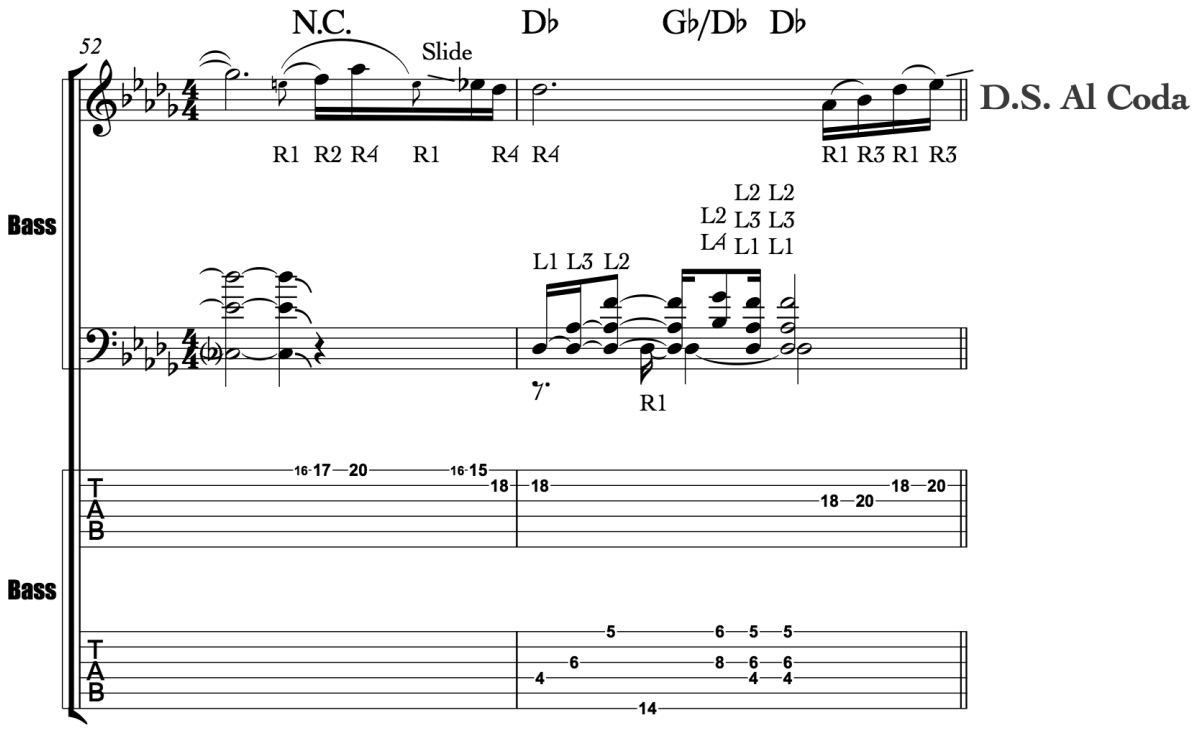
The pickup to bar 51 and the rest of the measure (see Figure 2.12) uses a unique solution to support a melody with counter lines that follow the harmonic motion in a way that doesn't compromise the slurred articulation of the melody. The melody is played with a combination of hammer-ons and slides that ascend on the G-string (Db, Eb, F, and Gb). With the RH already set on its course, the LH begins with an octave of a Bb (D-String, 8th fret and C-string, 10th fret) which shifts to a lower octave of C (E-string, 8th fret) and an Ab (C-string, 8th fret), implying contrary motion with a dry-taps that are hidden under the wet-tap of the RH melody note. The LH continues with oblique motion when the lower voice rises to a Db (E-string, 9th fret) while the upper voice (Ab) is sustained. Finally the LH culminates the phrase by dry-tapping a 3-part chord, thus turning the 3-part counterpoint into 4 part, with the Gb melody note being wet-tapped by the RH. The result, even though the LH part is dry-tapped most of the time, is of a RH slurred ascending melody that has gentle and unimposing accompaniment underneath. This scenario would be much different if for instance the Ab at the top of the lower staff was tapped by the RH (D-string, 18th fret). This would have broken up the slur (hammer-on) between the Db and the Eb in the upper voice because the R1 would have had to shift up a string to depress the Ab.

Figure 2.12: Bars 50 and 51 of "Alejandra": Counterintuitive solution to providing accompanying counterlines, while maintaining the overall impression of a slurred articulation.



Bar 53 provides a unique way of adding depth to the arrangement in the bottom of the tonal spectrum (see Figure 2.13). While the RH sustains a Db, the melody note, with the R4 (G-string, 18th fret), it also performs a secondary function by tapping a Db, two octaves lower (B-string, 14th fret). The purpose of this is to have a sustained pedal tone which would have been inaccessible for the LH. The LH begins the measure with the same pedal tone, however it is unable to pedal the Db and sustain it again when it moves on to the next task, tapping a double stop (Bb and Gb). The LH later resolves back to a Db major chord, tapped on the A, D and C strings, while the sustained Db (B-string, 14th fret) is held by the RH.

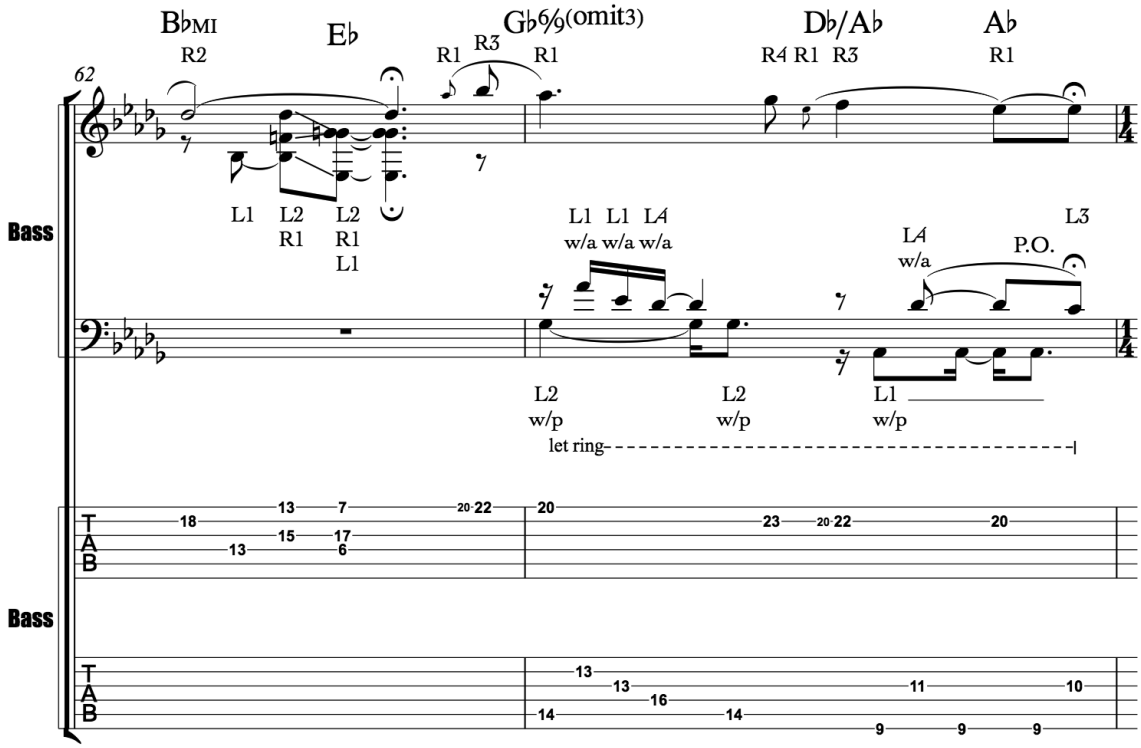
Figure 2.13: Bars 52 and 53 of "Alejandra": Solution that requires the RH to tap and sustain a low pedal tone while also sustaining a high pitched melodic note.



Bar 62 displays a unique way of tapping in each hand (see Figure 2.14). The RH, already sustaining a Db (G-string, 18th fret) with the R2, goes on by tapping an F (D-string, 15th fret) with the R1 which slides up a tone to a G (D-string, 17th fret), resulting in oblique motion. This is important because the LH can offer no assistance as its concurrent role is to tap a minor 10th double stop that slides down to a major 10th double stop, implying a Bbmi moving to an Eb7 chord. The result is a smooth sliding transition between the two chords, with the G, the 3rd of the Eb7 chord, being doubled in unison via the C-string and the D-string. Using the LH to play a slurred accompaniment, consisting of major and minor 10th

double stops on the same two sets of strings, leaving the RH to play melodies on remaining strings, is an important part of the tapping toolbox.

Figure 2.14: Bars 62 and 63 of "Alejandra": Sliding double stops in the LH, while the RH sustains one voice while sliding another. Sustaining tapped notes with the RH while plucking LH fretted notes with the other fingers of the RH.



Bar 63 is an example of tapping and sustaining notes in the RH while also using other fingers or the thumb to pluck other notes being fretted by the LH (see Figure 2.14). The purpose of this is to have a softer and less obtrusive attack on the plucked notes and sometimes to create sustained ringing of notes, using barring, that would have been difficult or impossible with tapping. In the first part of the measure, the R1 pulls-off to and sustains an Ab (C-string, 20th fret) while at the same time plucking, with the RH thumb, a Gb that is fretted with the

L2 (E-string, 14th fret). Following this, while the Ab, top voice, is being sustained, the R3 (also known as "a" in classical guitar notation) is used to pluck more descending pitches from a $Gb^{6/9}$ chord on the G, D and A-strings. On the second half of the measure, the same kind of process occurs again, this time with different tapped RH melody notes and a plucked accompaniment part that goes from a Db/Ab to an Ab chord.

CHAPTER 3: "Out of the Bassment"

Overview

"Out of the Bassment" is a contrapuntal R&B composition that simulates the sound of an electric guitar and bass simultaneously playing together. Tapping enables the concurrent playing of two or three lines, with often contrasting ornamentation and articulation, to be divided between the hands. The compositional process of this piece started with the ostinato bass line and later followed with melodic ideas that were carefully constructed to be tapped by the RH, while the other tapped the bass line. Intermittent chords were added later, whenever possible, by tapping the guide tones (the 3rd and 7th of a chord) with either hand, filling out the sound spectrum and creating the illusion of an ensemble performance. The B section of the piece is reminiscent of the horn soli in Stevie Wonder's "Sir Duke"[47], with its doubling of a single melodic line in octaves. However, "Out of the Bassment" periodically breaks away from the doubling (in the B section) to tap a chord (implied with guide tones) with either hand.

Analysis

The introduction of "Out of the Bassment" sets the stage for the rest of the composition with an ostinato bass line over the first implied chord (Dmaj7), which is then transposed down a tone for the second (Cmaj7)(see Figure 3.1). The bass line is initially played with traditional plucking, but in bar 9 when the once implied chords are explicitly stated by way of a chordal pattern, tapped by the RH, the LH begins tapping the bass line (see Figure 3.2). This allows the two parts to be played simultaneously.

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[47] Wonder, Stevie. *Songs in the Key of Life*. Motown HD00602537004720, 2012, flac. Recorded 1976. See "Sir Duke" track 5.

Figure 3.1: Bars 1–8 of "Out of the Bassment": Ostinato bass line.

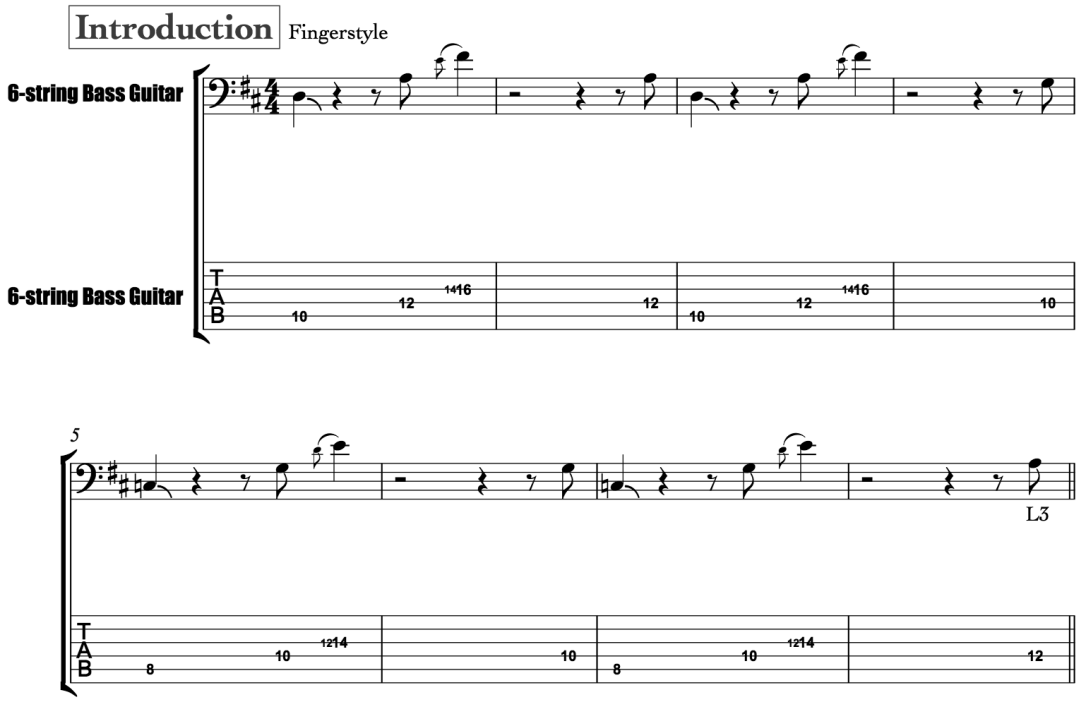
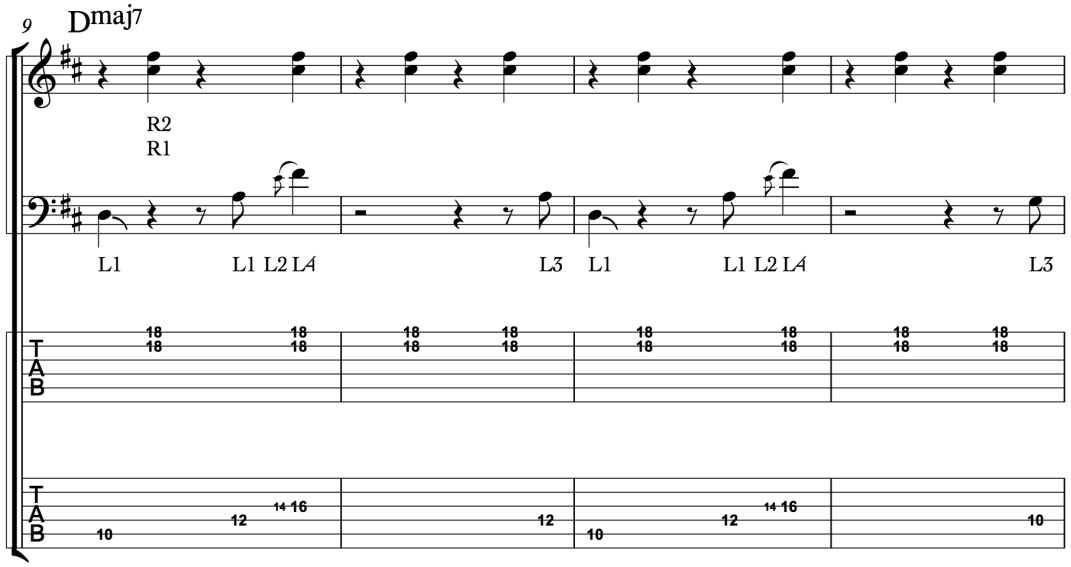
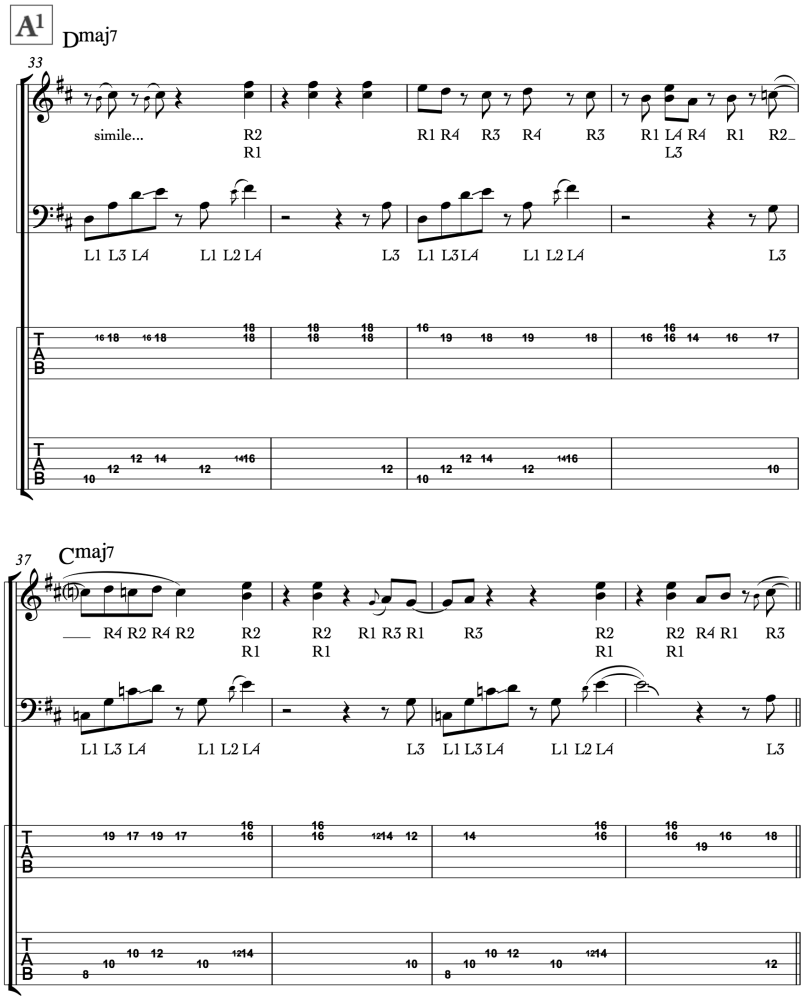


Figure 3.2: Bars 9–12 of "Out of the Bassment": RH tapped chords (guide tones) are introduced and the LH begins tapping, instead of plucking, the bass line.



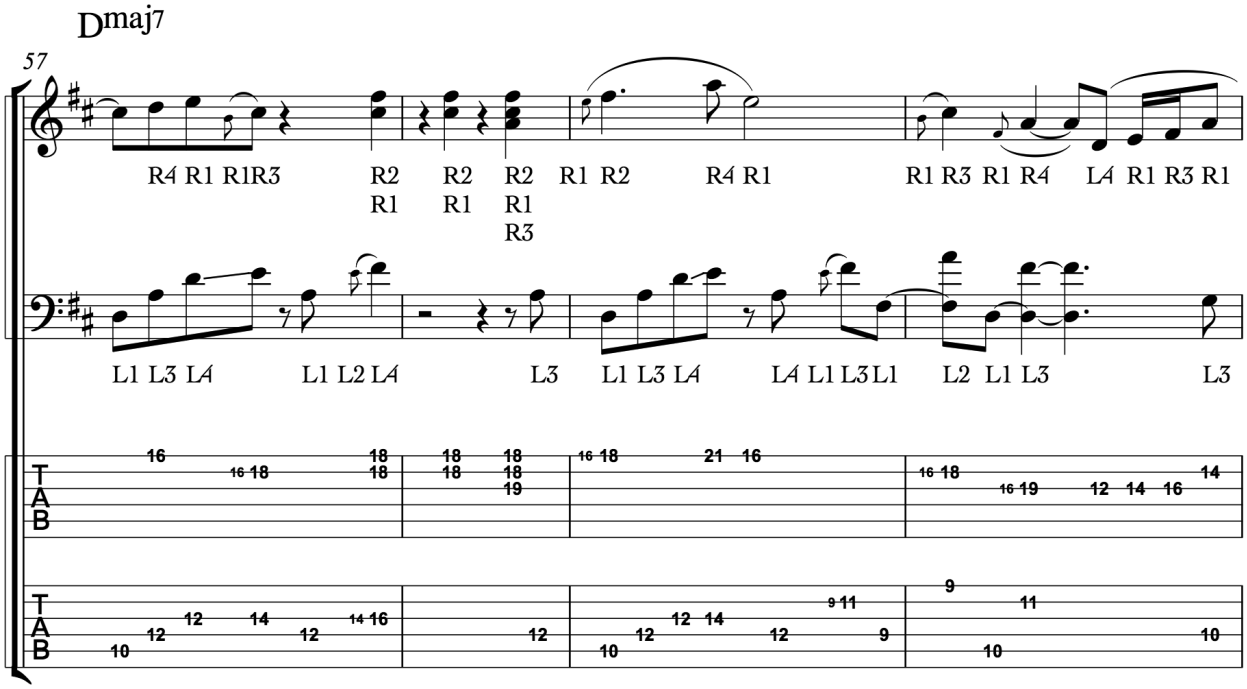
In the A[1] section, the melody is introduced and tapped using the RH while the ostinato bass line is continued with the LH (see Figure 3.3). However, the RH also intermittently plays the chordal pattern, established in the introduction, whenever there is space in the melody. Also, it should be noted that both the LH and RH use grace notes that are hammered-on to target pitches to create a smooth and expressive quality to different parts of the line (see Figure 3.3).

Figure 3.3: Bars 33-40 of "Out of the Bassment": RH taps the melody along with intermittent chords whenever possible. The LH continues with the ostinato bass line.



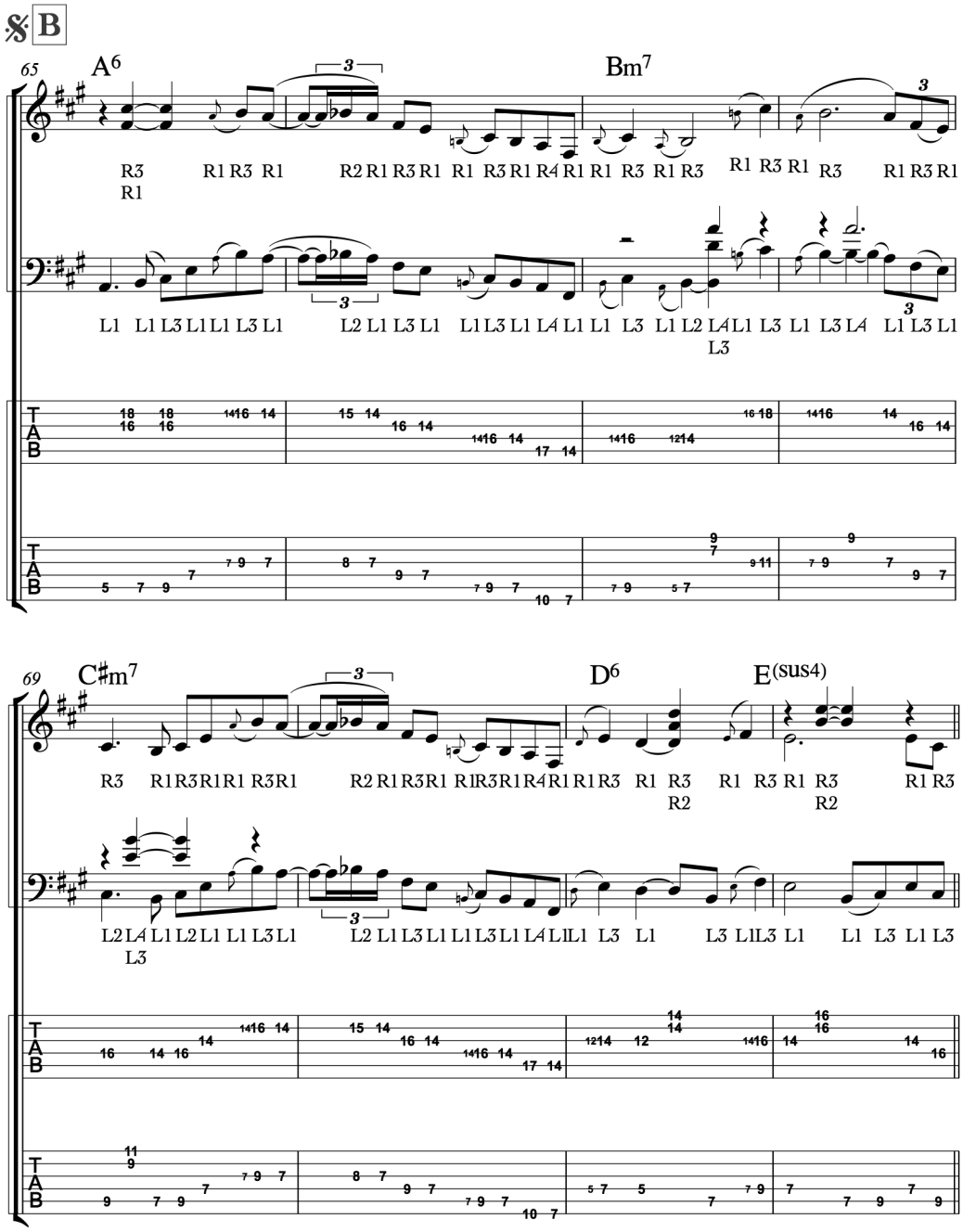
Throughout the composition there are instances in which the LH has to tap part of an upper line that the RH has been playing, or vice versa. Often times, this is to avoid the hands from crossing over each other, or to achieve a combination of notes that would have otherwise been impossible. One example of this is in bar 60 (see Figure 3.4).

Figure 3.4: Bars 57-60 of "Out of the Bassment": LH taps part of RH part to prevent the hands from overlapping in the 4th bar.



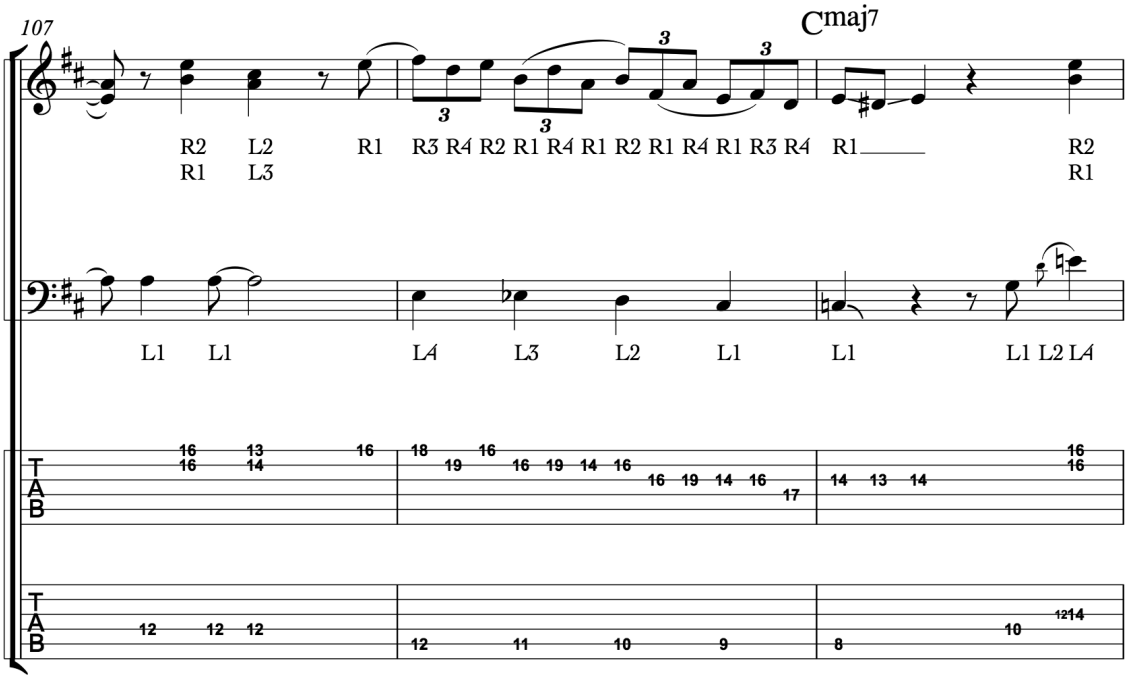
The B section (see Figure 3.5) features a melody that is tapped by both hands, one octave apart, with considerable ornamentation by way of grace notes that are hammered-on or pulled-off. It also features chords (usually implied with guide tones) that are tapped by either hand in place of part of the melody, simultaneously with the melody, or between parts of the melody.

Figure 3.5: Bars 65-72 of "Out of the Bassment": LH and RH tap a melody 1 octave apart while tapping periodic chords. Grace notes that are pulled-off or hammered-on to target pitches create an abundance of ornamentation.



Often times, an unintuitive and complex fingering (fret position or finger choice) is used to allow pull-offs and hammer-ons to create an overall legato articulation to the line. This often makes the line more difficult to play (see Figure 3.6).

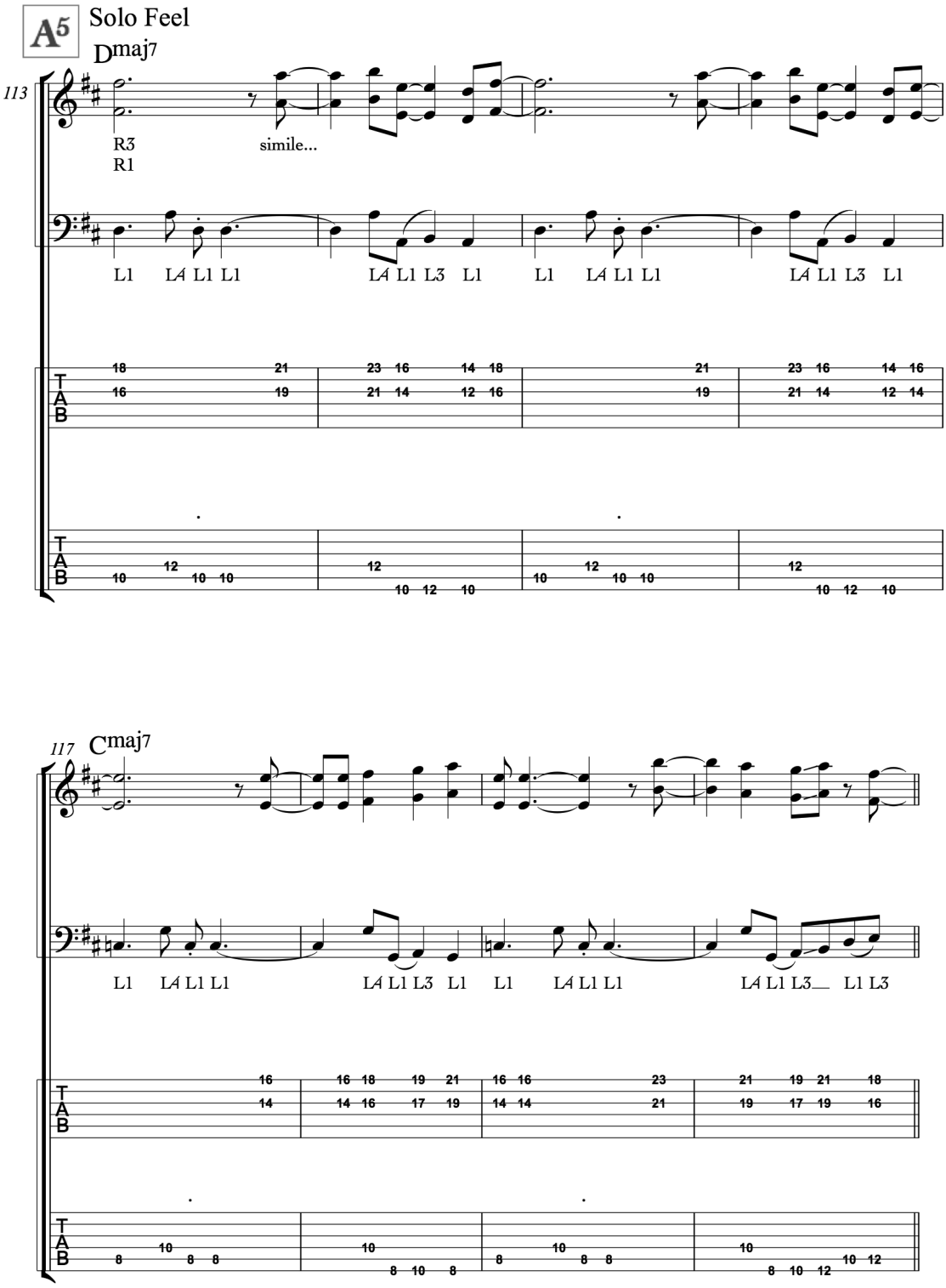
Figure 3.6: Bars 107-109 of "Out of the Bassment": RH taps an unintuitive and complex fingering to create a smooth and legato line.



At the beginning of A[5], the RH taps a melody in octaves, borrowing from the style made famous by Wes Montgomery, while the LH taps a bass line (see Figure 3.7)[48].

[48] Montgomery, Wes. *The Wes Montgomery Trio*. Recorded October 6, 1959. Original Jazz Classics 00025218603423, 2006, compact disc. See "Round Midnight" track 1. Jazz guitarist Wes Montgomery is often recognized for his unique way of playing melodies in octaves. He would do this by strumming 3 strings with his RH thumb, the outer two strings containing the octaves while the middle string is muted with the LH.

Figure 3.7: Bars 113-120 of "Out of the Bassment": RH taps melody in octaves while the LH taps a bass line.



CHAPTER 4: "Tappin' Away"

Overview

"Tappin' Away" emulates the jazz swing sound of the 1940s, with its use of jazz harmony, a walking bass line in certain sections, and the vocabulary used in the melody lines. Similar to the way in which jazz standards like "The Way You Look Tonight"[49], "Night and Day"[50] and "On Green Dolphin Street"[51] modulate up a minor 3rd from the A section to the B section, "Tappin' Away" modulates from A-major in the A sections to C-major, in the B sections. Having the A sections in the key of A-major allowed the open strings, E, A, and D to be used. This helped maintain the harmony between shifts in the fingerstyle sections, as well as facilitate the transitions from fingerstyle to two-hand tapping.

The tapping technique is used sparingly in the introduction, A^1 and B^1 sections, however it is used extensively in A^3 to simulate the sound of a guitarist improvising while a bassist plays a walking line. The compositional process behind A^3 involved playing the chord progression on the bass while singing various lines. When particular sung lines were chosen, based on their aesthetic appeal, they were assigned to be tapped with the RH. Afterwards, a walking bass line was meticulously constructed to be tapped by the LH in a way that avoided strings that were already being tapped by the RH.

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[49] Sinatra, Frank. *Sinatra Reprise: The Very Good Years*. Reprise Records 9 26501-2, 1991, compact disc. Recorded January 27, 1964. See "The Way You Look Tonight" track 5.

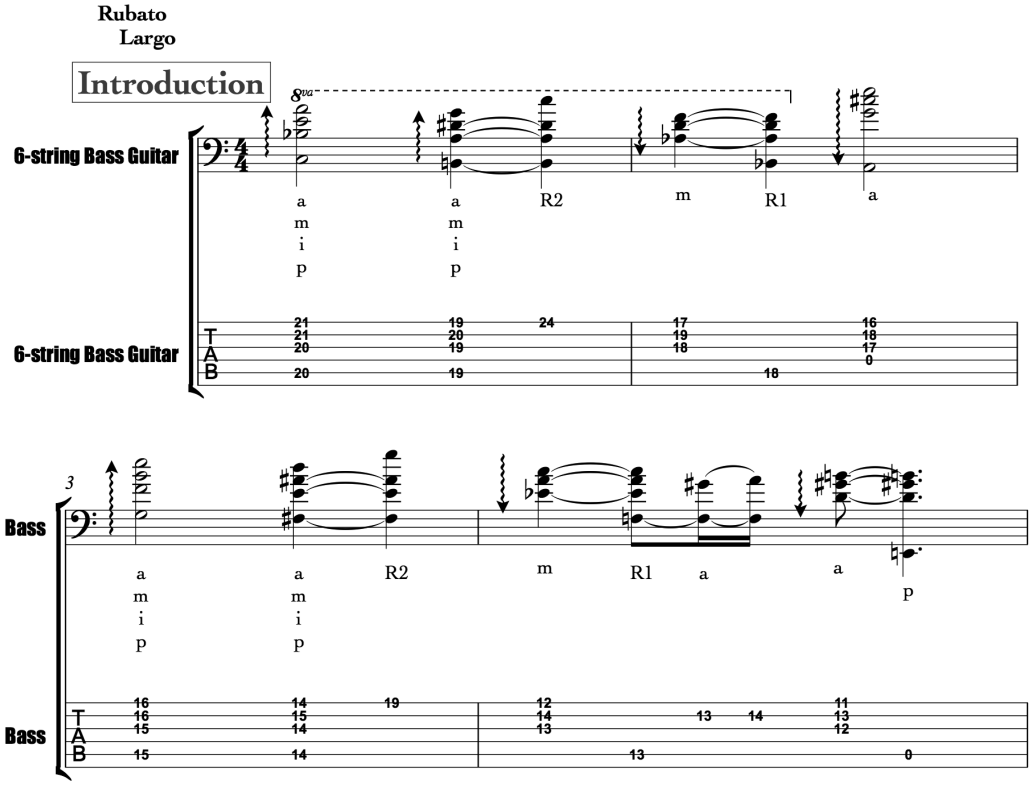
[50] Sinatra, Frank. *Sinatra and Strings*. Reprise Records 9 46970-2, 1998, compact disc. Recorded November 20, 1961. See "Night and Day" track 2.

[51] Benson, George. *Big Boss Band*. Wounded Bird Records WOU2629, 2008, compact disc. Recorded 1990. See "On Green Dolphin Street" track 4.

Analysis

The introduction to "Tappin' Away" contains a series of plucked chords (see bars 1 and 3 in Figure 4.1) which sometimes have added extensions, or upper melodic pitches, that are tapped on the high C-string with the RH, similar to the method of Roy Smeck[52]. Also, within the same figure, bars 2 and 4 contain instances in which a chord is raked on the upper strings, followed by a bass note (the root), which is tapped by the RH on the low E-string.

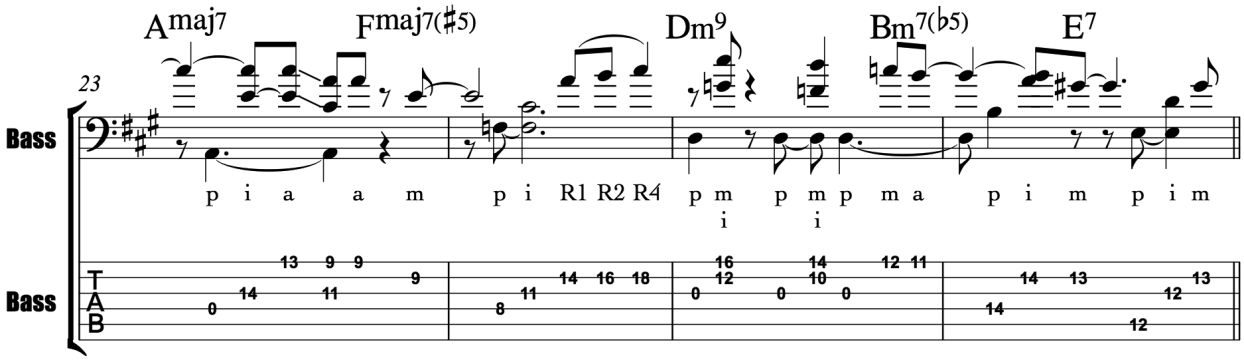
Figure 4.1: Bars 1-4 of "Tappin' Away": Chords are plucked and then an upper extension, melodic in function, is tapped by the RH in bars 1 and 3. Also in bars 2 and 4, following a raked chord, the RH continues with tapping the root in the bass register.



[52] Smeck, Roy. *That Goes Double*. Warner Bros., 1933. Rubinstein, Anton. *Melody in F.* Smeck uses the tapping technique on a ukelele. He strums a chord voicing that is fretted in the LH and continues by tapping melody notes on higher frets on the same strings. He then pulls-off to the chord notes being fretted by the LH after each tapped note in the RH.

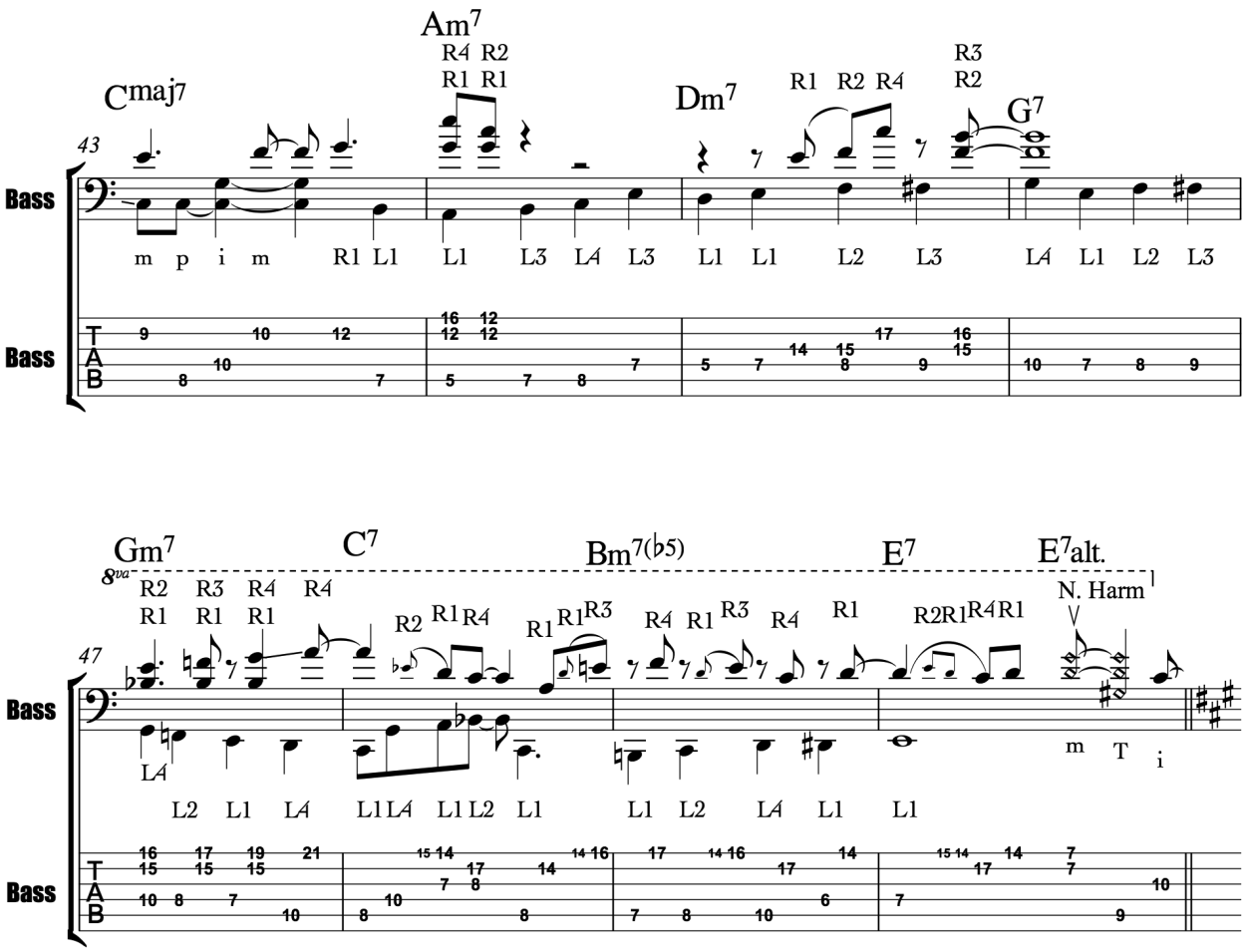
Within the A1 section, there is an instance that first occurs in bar 24 (see Figure 4.2), including an 8th note pickup, that allows the root and sharp 5th of an Fmaj7(#5) to be sustained through the course of the measure on the A and D-strings, while the RH taps three slurred and legato melodic pitches (A, B and C#) on the G-string. It should also be mentioned that a melodic major7th (E) is sustained from the pickup to bar 24 on the G-String, but is canceled out when the RH taps the proceeding melodic pitches (A, B, and C#) on the same string, starting on beat three.

Figure 4.2: Bars 23-26 "Tappin' Away": Chordal pitches are sustained in the LH while the RH hand taps melodic pitches on the G-string.



In the last 8 bars of the B1 section, the RH taps the melody on the upper strings, sometimes adding chordal pitches underneath to harmonize, while the LH taps a walking bass line. This emulates the sound of jazz swing, when a guitarist plays a melody while a bassist plays a walking line (see the pickup to bar 44 in Figure 4.3).

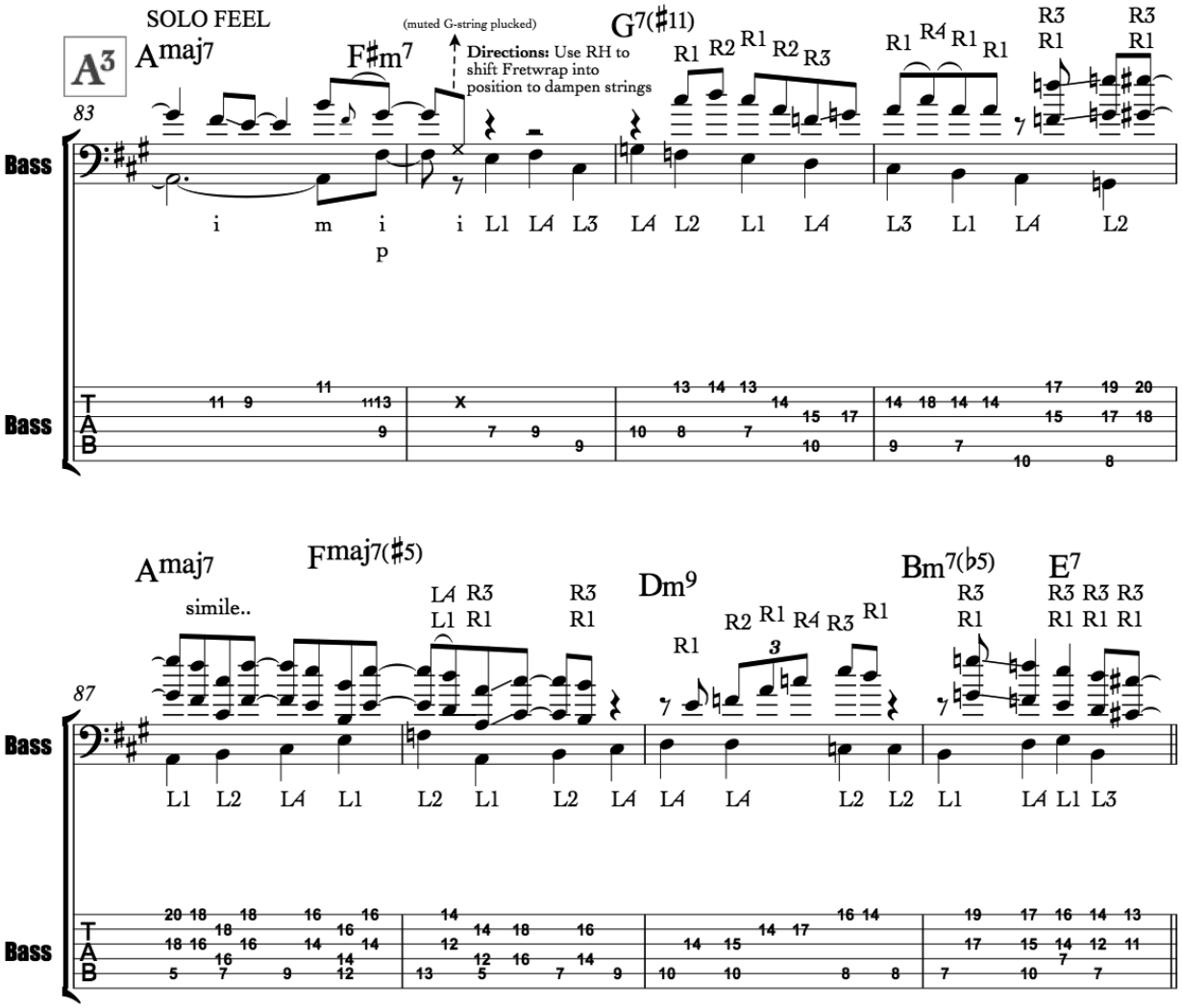
Figure 4.3: Bars 43-50 of "Tappin' Away": The melody, plus occasional chordal pitches harmonizing underneath, is tapped by the RH while the LH taps a walking bass line.



A[3] is a section that simulates the sound of a jazz guitarist improvising against a walking bass line. Similar to the results achieved by the guitarist Martin Taylor [53], the RH is used to tap a melody in octaves (see bars 86, 87, 88 and 90 of Figure 4.4), incorporating slides to smoothen out the passage, against a walking bass line that is tapped by the LH. Also it should be noted that in bar 88 (see Figure 4.4) the LH taps part of the RH line by way of a pull-off to prevent the two hands from overlapping.

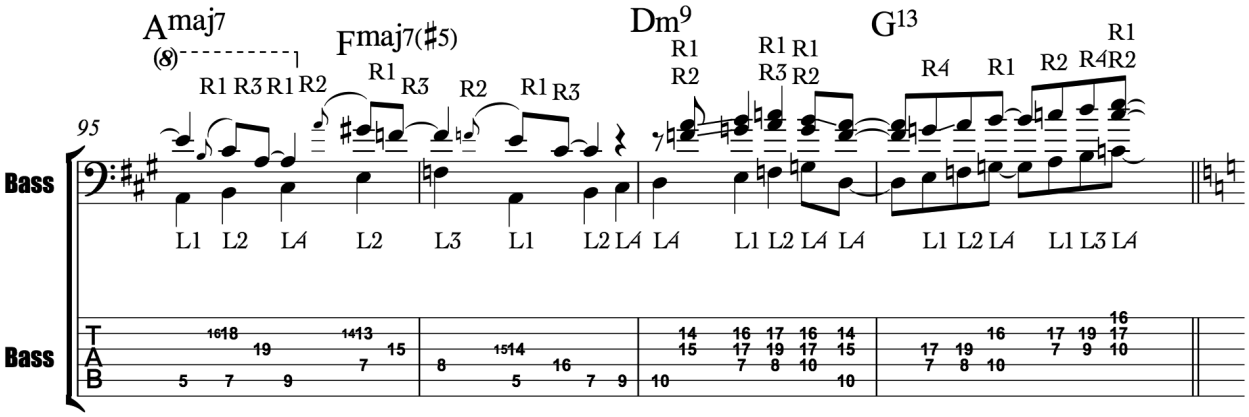
[53] Taylor, Martin. *Martin Taylor in Concert*. 1997. Pittsburgh, The United States: Vestapool, 2003. DVD. See "I Got Rhythm" track 2.

Figure 4.4: Bars 83-90 of "Tappin' Away": The melody is tapped in octaves in the RH in bars 86- 88 and 90 while the LH taps a walking bass line. The LH temporarily taps part of the RH melody in bar 88, by way of a pull-off, to avoid overlapping of the hands.



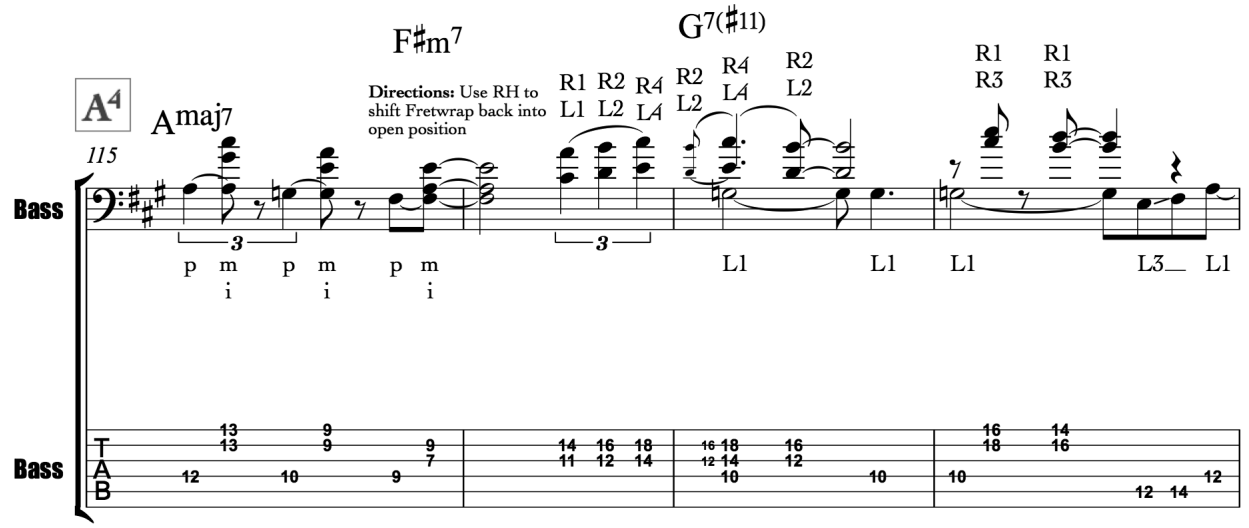
Later on in A3, the RH and LH tap a line together in diatonic 10ths, sometimes with the addition of a diatonic 12th (see Figure 4.5). The execution of slurred conjunct passages, harmonized with diatonic intervals, is considerably more feasible with tapping than with plucking techniques.

Figure 4.5: Bars 95-98 of "Tappin' Away": The RH and LH tap a line in diatonic 10^{ths}, with the occasional addition of a diatonic 12th, in bars 97 and 98.



Bars 116 and 117 of A^4 (see Figure 4.6), use both hands to tap a slurred ascending line, harmonized in diatonic 6^{ths} and moving horizontally in diatonic 2^{nds}, while at the same time having the LH tap and sustain a G at the beginning of the measure. This passage would be difficult, if not impossible, to execute with traditional plucking methods.

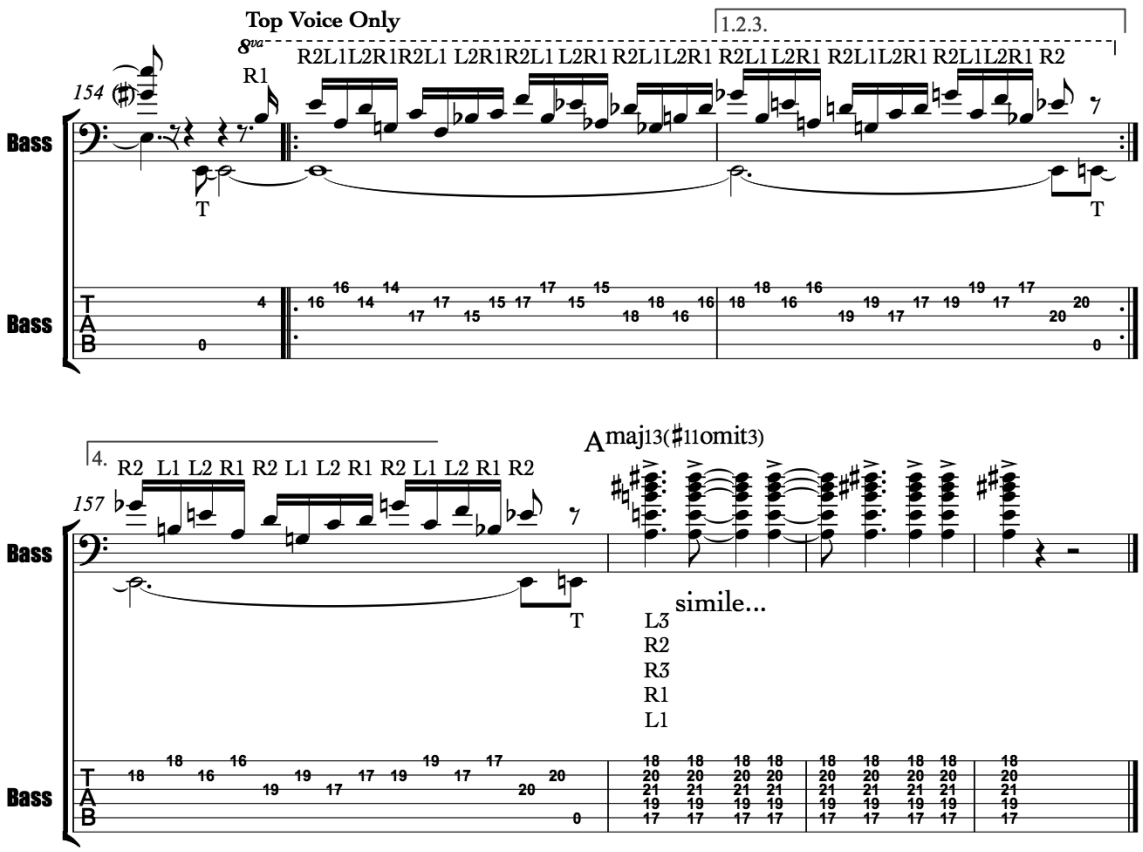
Figure 4.6: Bars 115-118 of "Tappin' Away": The RH and LH tap a slurred line in diatonic 6^{ths}**,** while also sustaining a G in bars 116 and 117.



Finally, bars 155–157 (see Figure 4.7) contain an example of both hands tapping together to play a monophonic line, as opposed two or more lines. Using a parachordal finger placement, the R1, R2, L1 and L2 work together to tap an eight note pattern, consisting of P4th intervals, that ascends chromatically. Tapping facilitates the player in achieving a high velocity line like this.

Also, in the final bar, tapping is used to play a particular voicing of an Amaj$^{13(\#11)(omit3)}$ chord that would be impossible to play with a plucking technique.

Figure 4.7: Bars 154–159 of "Tappin' Away": The RH and LH tap a single line together. Also, tapping is used to play a particular voicing of an Amaj$^{13(\#11)(omit3)}$ chord that would be impossible to play with a plucking technique.



CHAPTER 5: "Etude No.1"

Overview

"Etude No.1" is a study that focuses on the "RH fretting" technique (discussed in Chapter 1). The piece was inspired by the music of Claude Debussy and slightly resembles "Reverie", with its dreamy modulations in the harmony, played with the LH, while the RH plays an overarching melody floating on top. Plucking is predominantly used to arpeggiate chords (plucked on the A, D and C-strings) that modulate throughout the piece, excluding the D section and parts of the B section. The thumb, middle, and pinky fingers (p,m, and c) are used for plucking, while the R1 is used to fret melodies that are plucked by the ring finger (a). The subsequent analysis shows how critical RH fretting is for playing the musical material contained in the piece.

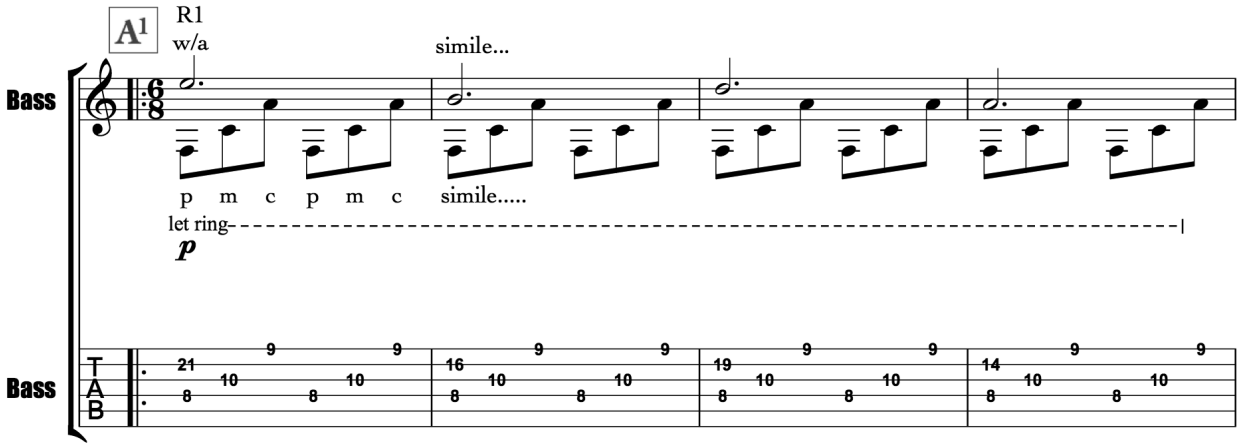
Analysis

The first four bars of the A^1 section (see Figure 5.1) introduce RH fretting with a melody played on the G-string, along with an ostinato chordal pattern. The arpeggiated chord is an F major triad voiced root, 5^{th}, 10^{th}, on the A, D and C-strings. The technique is appealing in that is offers the same range capabilities as two-hand tapping, while at the same time having a softer and more rounded attack. Another way of achieving this is with alternate tunings, partial capos, and the Spider Capo[54]. However, RH fretting offers similar results in standard

[54] "Lord of the Rings Medley." Video file, 5:37. YouTube. Performance on May 26, 2014. Performed by Zander Zon. Composed by Howard Shore. Posted by Zander Zon, May 26, 2014. https://youtu.be/xtVkxXOu_Mo. Many guitarists and bassists have used alternate tunings, partial capos, or a device called the Spider Capo to overcome particular range to fingering position limitations of standard tuning. One example of this is the Spider Capo that world renowned solo bassist, Zander Zon uses.

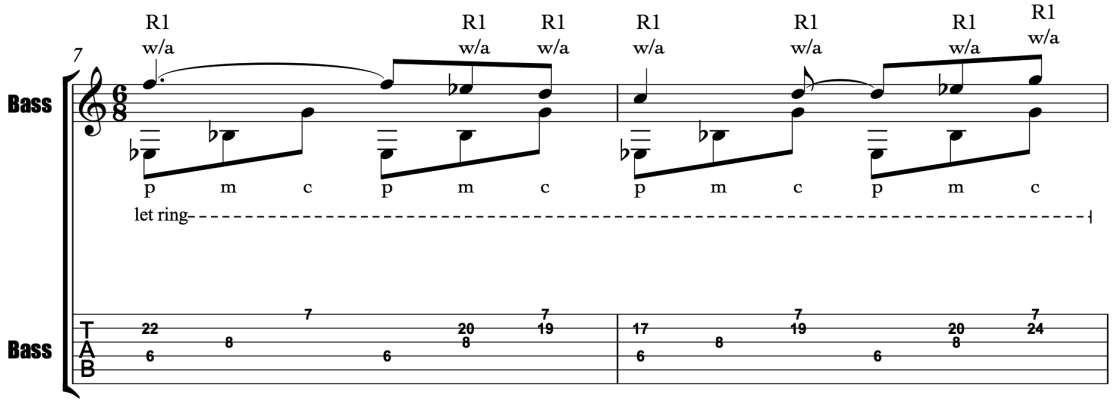
tuning, making it more versatile when being used in conjunction with other techniques and in compositions that rely on standard tuning.

Figure 5.1: Bars 1-4 of "Etude No.1": The p, m, and c of the RH pluck an arpeggiated ostinato F major triad on the A, D and C-strings while the R1, being plucked by the ring finger (a), plays a melody on the G-string.



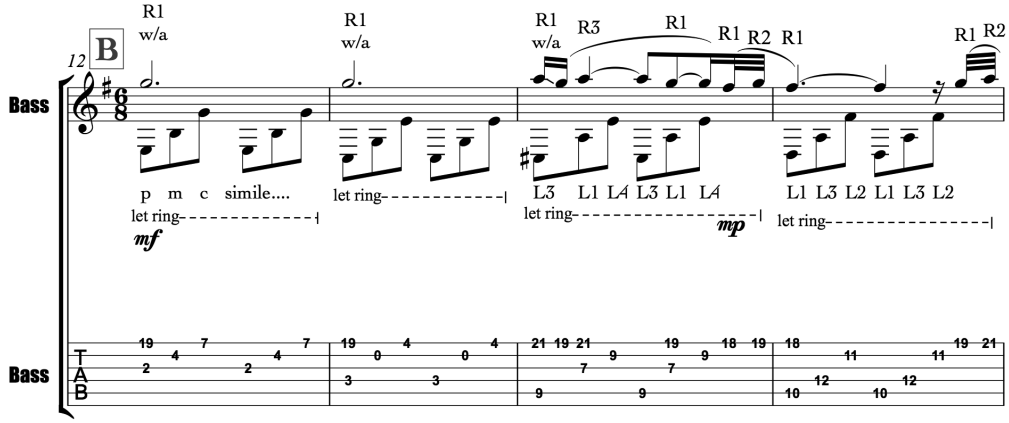
Bar 7 and 8 use successions of RH fretted notes, which are plucked simultaneously against the plucked chordal pattern being fretted by the LH (see Figure 5.2). The superimposition of the melody over the chordal pattern creates a succession of 3 double stops that start on the 5th beat of the first bar and end on the 1st of the second. Maintaining control and speed with this aspect of the technique can be difficult, however its acquisition is important because it allows for the continuity of the accompanying arpeggiated pattern, unimpeded by the three consecutive 8th notes in the melody.

Figure 5.2: Bars 7 and 8 of "Etude No.1": A succession of RH fretted notes that are simultaneously played against a chordal pattern (fretted by the LH) that is plucked by the RH, using the thumb, middle and pinky fingers (p, m, c).



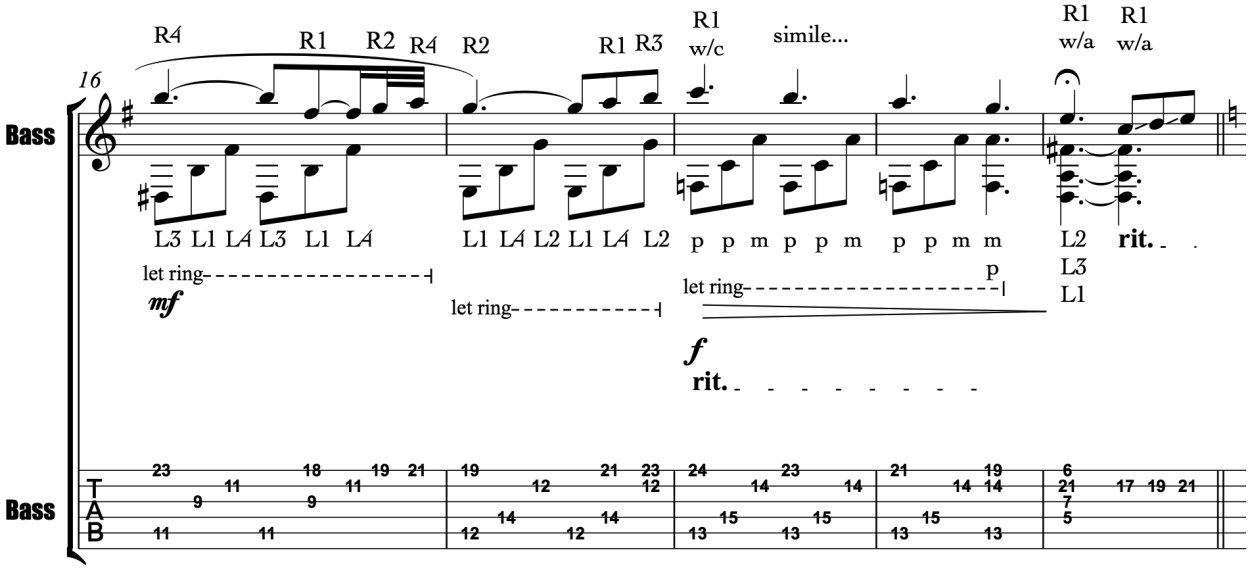
Bar 14 begins the phrase with a RH fretted A, plucked by the ring finger, while the LH accompaniment and remaining notes in the melody (upper voice) are tapped (see Figure 5.3). This allows for the initial melody note to have a soft and rounded attack, as opposed to a dry-tap.

Figure 5.3: Bars 12-15 of "Etude No.1": The phrase begins with a RH fretted note to avoid the percussive attack of a dry-tapped note.



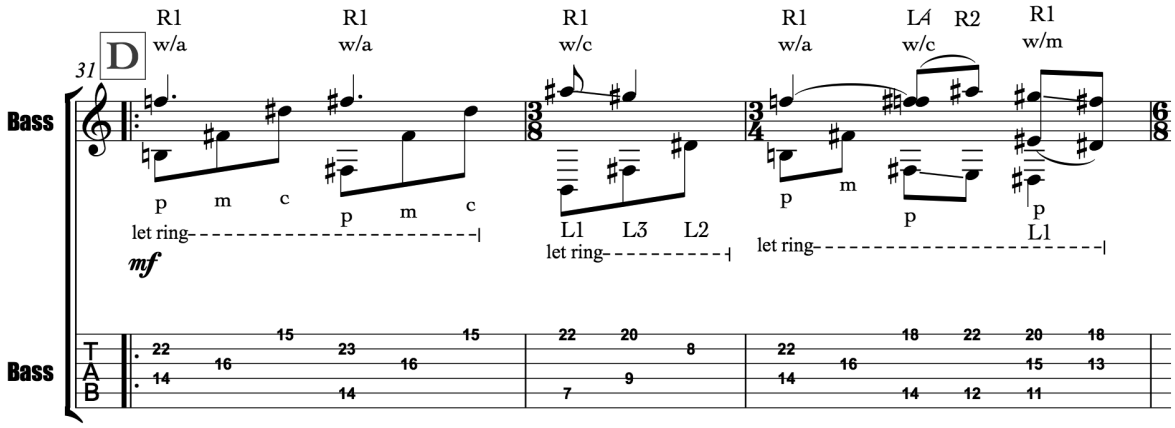
Tapping in the LH, along with a RH fretted note, plucked by the ring finger, is used to produce the sound of a D major chord being played with a percussive attack, along with a melody note (the 9th), played with a softer, more rounded attack (see bar 20 in Figure 32). The result of this approach is a melody note that stands out in both articulation and timbre from the chord.

Figure 5.4: Bars 16-20 of "Etude No.1": A dry tapped chord with the melody note (the 9th) RH fretted and plucked.



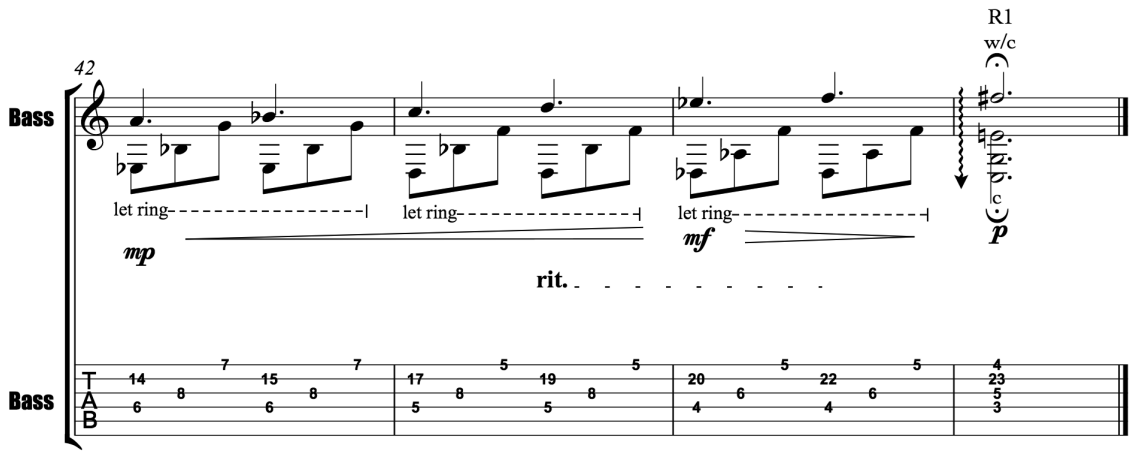
Beat three of bar 33 (see Figure 5.5) is an example where three separate methods of sound production are simultaneously used. The top voice is fretted with the R1 and plucked by the middle finger, the middle voice is plucked by the RH thumb, and the bottom voice is tapped by the L1. Following this, the bottom voice sustains, while the middle voice pulls-off down a tone and the top voice slides down a tone. This is a difficult maneuver, but it achieves a particular vocal movement and articulation that required the above steps.

Figure 5.5: Bars 31-33 of "Etude No.1": Three separate sound production methods are simultaneously used on the three voices.



The final bar (see Figure 5.6) is an example where RH fretting is used to strum, as opposed to pluck, a chord. It is particularly useful in this case because the Cmaj$^{(add\#11)}$ chord is voiced in a way that would have been impossible using any other strummed method in standard tuning.

Figure 5.6: Bars 42-45 of "Etude No.1": RH fretted note that is produced by way of a strum to form a Cmaj($^{add\#11}$) chord.



CHAPTER 6: “Song For Hannah”, “Slap Marcus” and “Slap Crackle Pop”

Overview

“Song for Hannah”, “Slap Marcus” and “Slap Crackle Pop” are all compositions that use tapping techniques sparingly and in conjunction with other techniques. Therefore, they have been grouped together into one chapter. Even though they use tapping far less than the previous compositions, the unique ways in which tapping has been combined with other techniques, make them prime examples of its usefulness.

“Song For Hannah” is a pop ballad that uses classical guitar style plucking and natural harmonics for most of the piece. However, tapping, with the RH, is used in the A^1 section to add melody notes to a sustained chord in the other. It is written in the key of D-major so that the open E, A and D-strings could be used to ring out roots to chords while the LH shifts position. The key of the piece also allows for natural harmonics to be played, opposed to artificial harmonics.

“Slap Marcus” is in the funk style and is inspired by the slap bass compositions and bass lines of Marcus Miller, including “Power”, “Nikki’s Groove”[55], and his bass line in “Frankenstein”[56]. The key of G-minor allows for the use of open strings, crucial to many parts of the piece.

“Slap Crackle Pop” is also in the funk style, but more upbeat then “Slap Marcus”. It was written in C#minor to allow for the use of the open E, A and D-strings.

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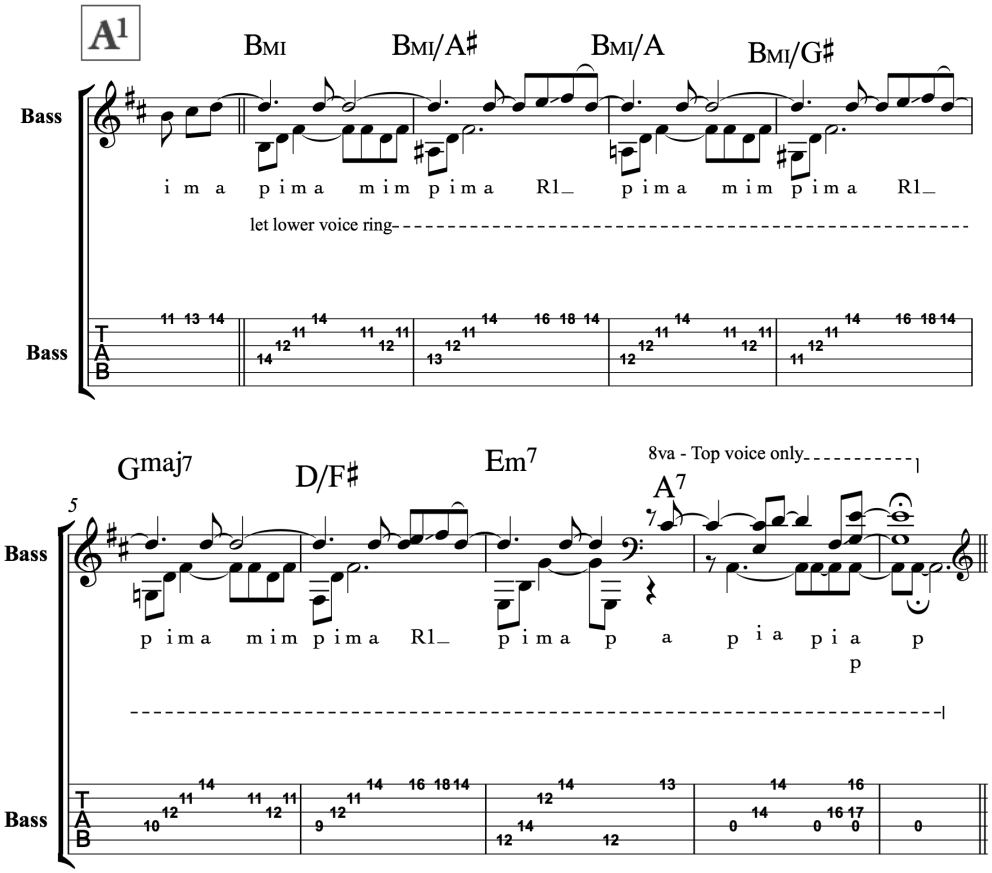
[55] Miller, Marcus. *M²*. Telarc CD-83534, 2001, compact disc. See "Power" and "Nikki's Groove" tracks 1 and 4.

[56] Miller, Marcus. *Silver Rain*. Koch Records KOC-CD-5779, 2005, compact disc. See "Frankenstein" track 5.

"Song For Hannah" Analysis

The opening section of "Song for Hannah" (A^1) uses tapping to play melodic pitches on the high C-string with the RH while sustaining chords with the LH (see Figure 6.1). The RH taps an E (C-string, 16th fret) and then slides up a major 2nd to the F# (C-string, 18th fret) before pulling-off onto the LH fretted D (C-String, 14th fret). This pattern occurs again in A^2 (see Appendix E).

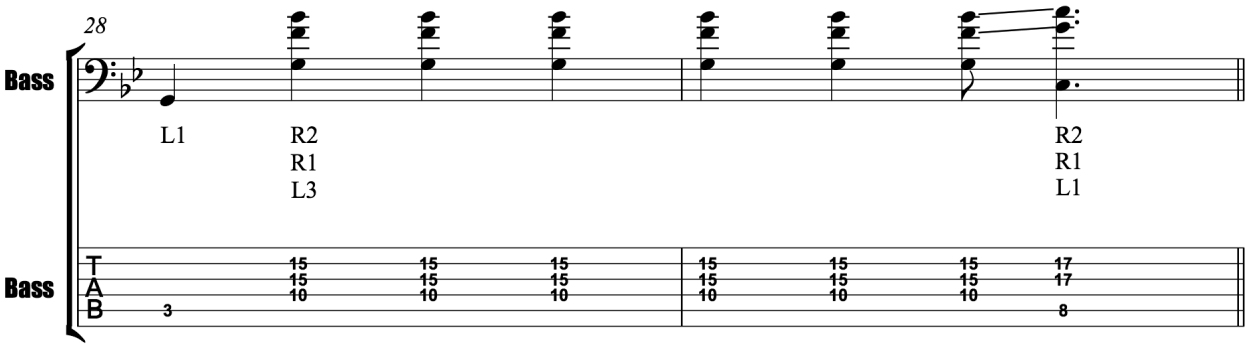
Figure 6.1: Bars 1-9 of "Song For Hannah": Arpeggiated and then sustained chords in the LH with a tapped melodic pitch in the RH which slides to another pitch before pulling-off to the LH.



"Slap Marcus" Analysis

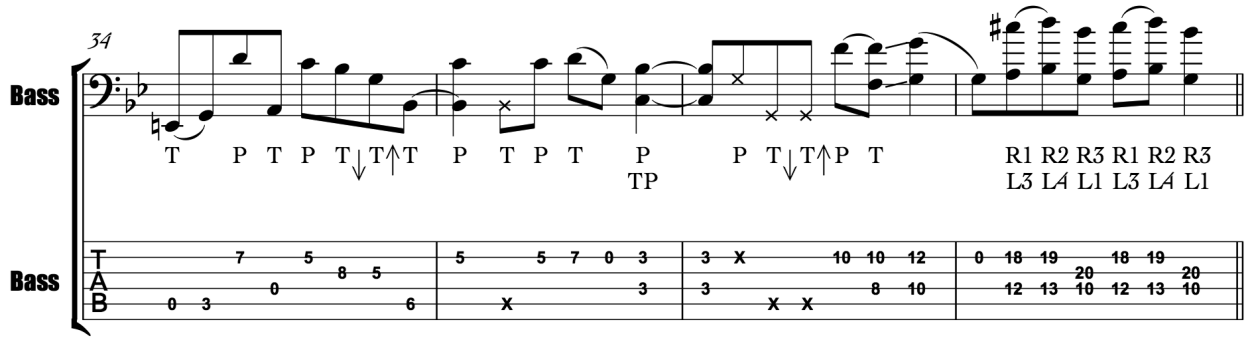
The end of the A^1 section of "Slap Marcus" (see Figure 36) uses two-hand tapping to play a $Gmin^7$ chord voicing that moves into a C^5 double stop voicing in a way that would not be conducive to a plucking technique. The guide tones F ($b7^{th}$) and Bb ($b3^{rd}$) tapped by the R2 and R1, slide up a whole tone to become the root and 5^{th} of the C^5 double stop voicing. The LH, which is tapping the root of the $Gmin^7$ chord with the L3, switches to the L1 to tap the root of the C^5 double stop without sliding, contrary to the articulation in the movement of the RH tapped pitches. Also, the timbre produced by the tapping technique is more percussive than plucking techniques and works well with the slap technique used in the rest of the piece.

Figure 6.2: Bars 28 and 29 of "Slap Marcus": Uses two-hand tapping to move from two different chord/double stop voicings in a way that wouldn't be conducive to plucking technique.



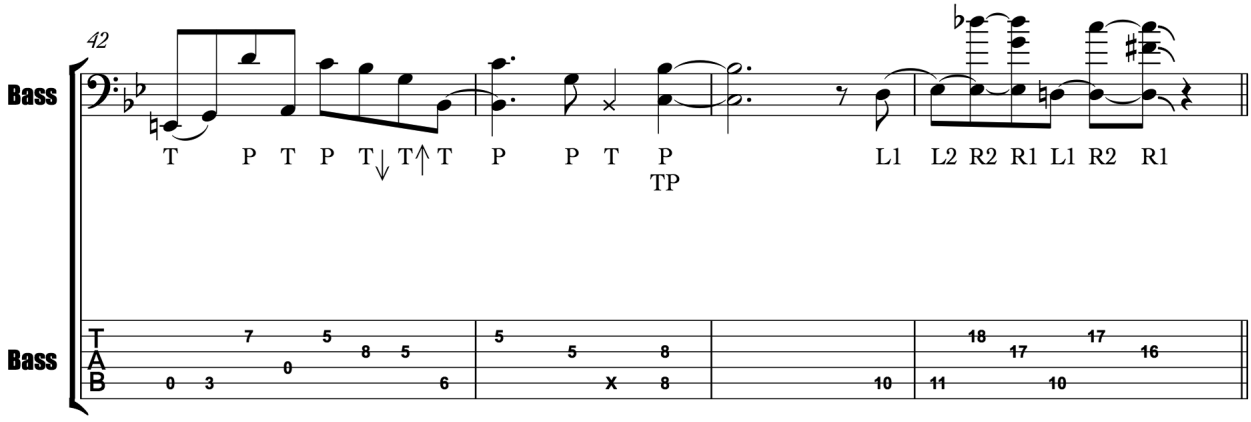
The 8^{th} bar of the B^1 section of "Slap Marcus" uses tapping to play a line that is harmonized in 10^{ths} (see Figure 6.3). The hammer-ons used and the speed in which the line is played makes this difficult to replicate with a plucking technique. Also, just like previous examples, the percussive timbre of tapping works well with the overall funky style of the piece.

Figure 6.3: Bars 34-37 of "Slap Marcus": Tapping used to harmonize a melody in 10^{ths}.



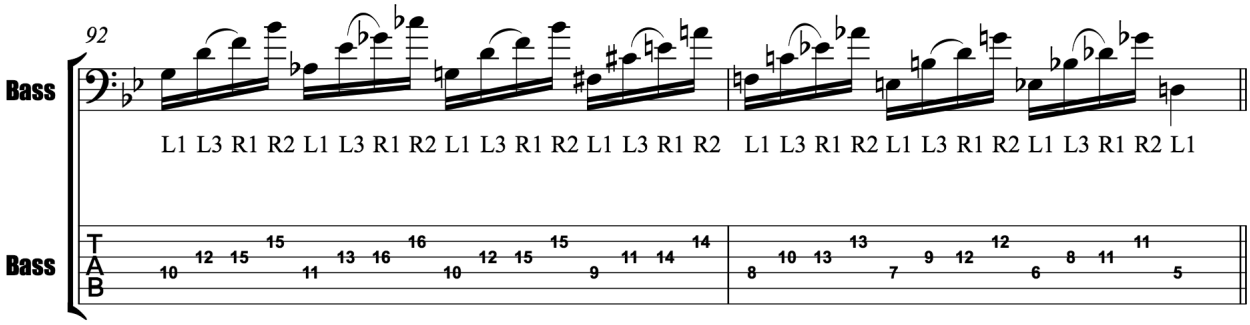
The last bar of the B^{1} section in "Slap Marcus" uses tapping to arpeggiate an Eb^{7} chord descending a semitone to a D^{7} chord (see Figure 6.4). Although the same passage could be accomplished using a plucking technique with the E, G and C-strings, the timbre achieved by tapping is percussive and works well with the funky nature of the piece.

Figure 6.4: Bars 42-45 of "Slap Marcus": Tapping is used to arpeggiate descending dominant 7th chords. Guide tones are tapped by the RH and roots are tapped by the LH.



The last two bars of the B^2 section of "Slap Marcus" (see Figure 6.5) use tapping to play a series of min^7 ascending arpeggios that move in semitones up and then down the neck, similar to a method employed by Marcus Miller in his recording of "Frankenstein"[57]. The voicing of the arpeggio (Root, 5^{th}, $b7^{th}$, $b10^{th}$) could also be played, in a different finger position, with a four-finger plucking technique or a sweeping technique. However, tapping is inherently percussive in timbre which works well with the style of the composition, and for many players it is an optimal way of obtaining high velocities when playing moving arpeggios such as this.

Figure 6.5: Bars 92 and 93 of "Slap Marcus": Both hands are used together to tap a high velocity monophonic line consisting of min^7 ascending arpeggios, moving in semitones up and then down the neck.



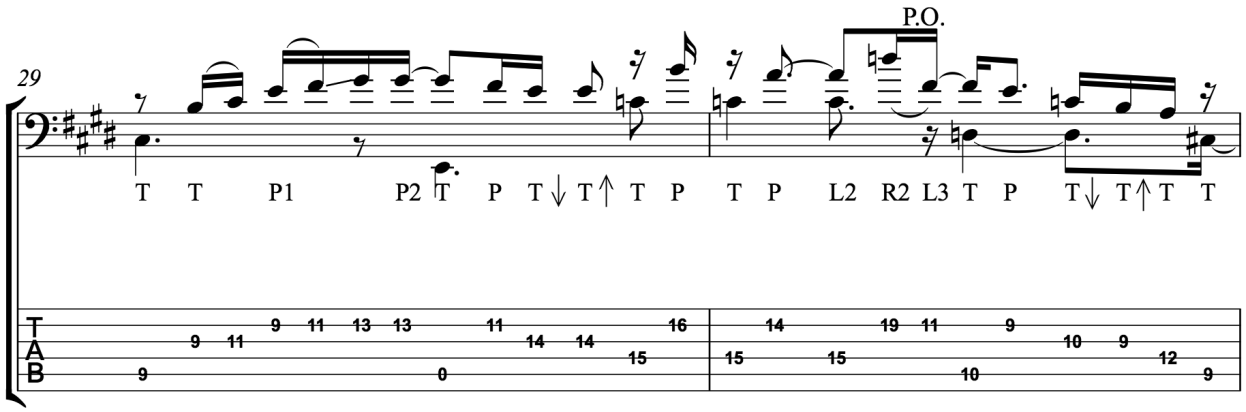
"Slap Crackle Pop" Analysis

In the C section of "Slap Crackle Pop", tapping is used to play notes from part of a melodic phrase on the G-string, while continuing to play the roots of chords on the A and E-strings (see Figure 6.6). Tapping is used so that the line is slurred (hammered-on and pulled-

[57] Miller, Marcus. *Silver Rain*. Koch Records KOC-CD-5779, 2005, compact disc. See "Frankenstein" track 5. The ascending passage of min7 arpeggios that in "Slap Marcus", shown in Figure 39 are based on a similar use of the technique used by Marcus Miller in Frankenstein" at 4:59mins-5:04mins.

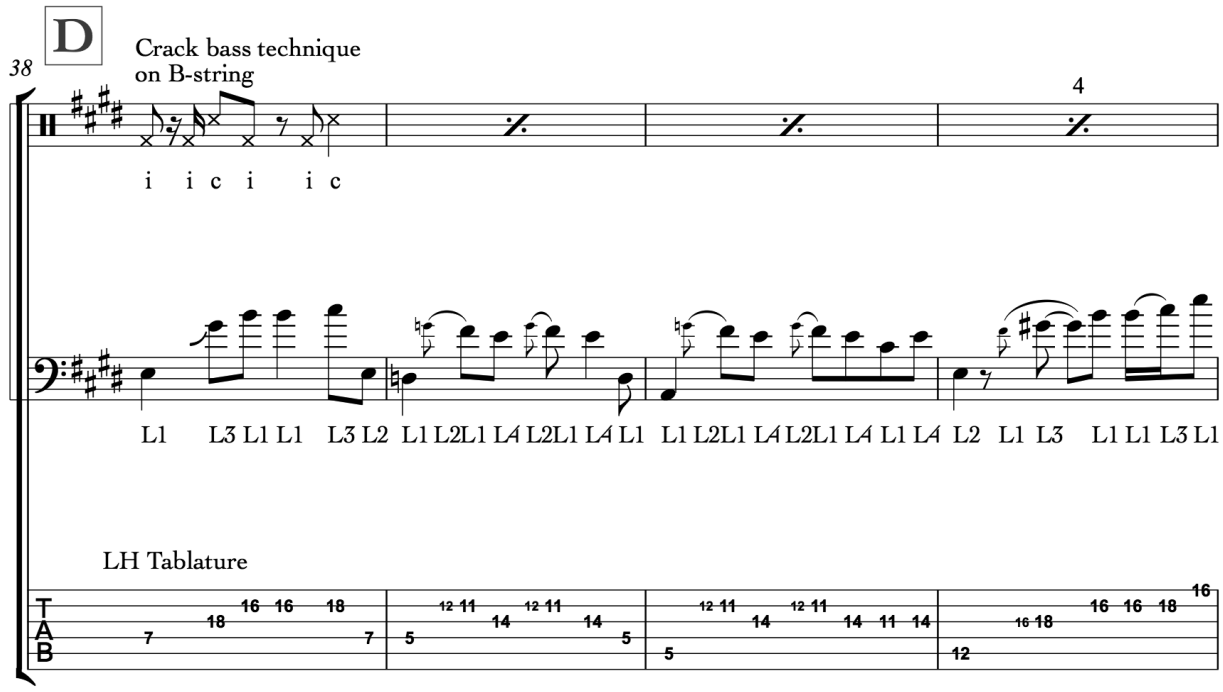
off) as opposed to the non-slurred articulation that could be achieved by using a plucked technique on the C-string. Tapping with the RH allows for the access of pitches that are out of reach on the G-string in the current position occupied by the LH.

Figure 6.6: "Slap Crackle Pop": Tapping is used to play notes within a melodic line, in a slurred manner (hammer-ons and pull-offs), while playing roots of chords in the bass register.



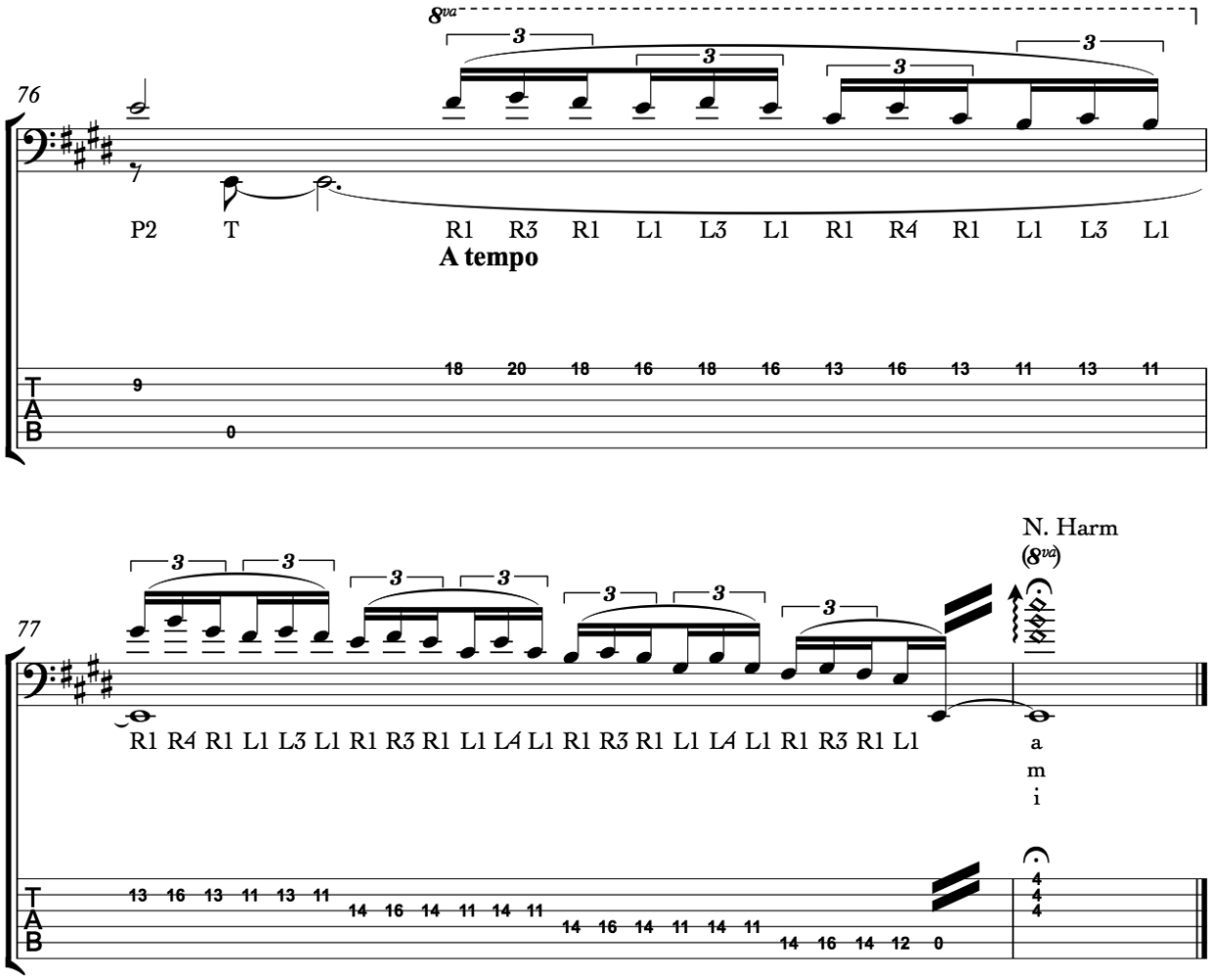
The D section of "Slap Crackle Pop" uses the LH to tap back and forth between a melody and a bass line while the RH plays a non-pitched percussive ostinato, using the "crack bass" technique (see Figure 6.7). This is a prime example of using tapping, in conjunction with a percussive technique, to create the semblance of an ensemble performance. The bass line is played on beat one of every bar and sometimes on the "and" of beat four. The melody is always tapped in between.

Figure 6.7: Bars 38-41 of "Slap Crackle Pop": LH tapping is used to play both a melody and an intermittent bass line while the RH is used exclusively to play a non-pitched rhythmic pattern, using the crack bass technique.



The last three bars of the E section use tapping to play a high-velocity, slurred, monophonic line, while the open E-string is ringing-out, giving the line harmonic context (see Figure 6.8). Both hands work together to play the same line, passing one segment on to the other, before returning into position for the next. It is sort of a "passing of the torch" method that not only aids in speed, but allows for the continuation of a slurred articulation by means of hammer-ons and pull-offs.

Figure 6.8: Bars 76-78 of "Slap Crackle Pop": both hands tap together to play a high-velocity, monophonic and slurred line.



CONCLUSIONS:

7.1-Summary

The research for this paper and the composition of the seven solo pieces and their detailed analysis has made it abundantly clear that tapping techniques are invaluable to solo electric bass composition with a diverse range of applications. Each composition has separately highlighted different scenarios in which these techniques can be useful. However, upon the completion of these analyses, a more broad description of each area of composition, in which tapping has been shown to provide a solution, can be ascertained. In summary, several of the most critical of these areas have been identified and properly attributed to their respective compositions in the text below. However, solutions to various challenges that impede the potential of the technique, like string-cancelling among others, has been left to the detailed analyses within chapters 2-6.

Contrapuntal Composition

Contrapuntal forms can be loosely defined as any composition that uses two or more lines that sound simultaneously[58]. Given this definition, tapping techniques used to make the execution of contrapuntal forms possible can be attributed to most of the compositions in this thesis. The most notable include the introduction and C sections of "Alejandra" which use tapping techniques to play in 3-part and occasionally 4-part counterpoint (see figures 2.1, 2.2, 2.3 and 2.14). Another prime example is in the A sections of "Out of the Bassment" which use tapping to play in 2-part counterpoint, consisting of an ostinato bass line and a melody, with

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[58] Apel, Willi. "Counterpoint." In *The Harvard Dictionary of Music*. Cambridge, MA: Belknap Press of Harvard University Press, 1974.

an implied 3rd part, a chordal pattern that occurs intermittently between the other two lines (see figures 3.3 and 3.4). The A3 section of "Tappin' Away" used tapping to simulate the sound of a guitarist improvising a melody, while a bassist played a walking bass line, an example of 2-part and sometimes 3-part counterpoint (see figures 4.4 and 4.5). The ostinato, yet harmonically modulating chordal pattern that occurs throughout "Etude No.1", and the simultaneous melody line, use both RH fretting and standard tapping in conjunction with plucking to execute a form of 2-part counterpoint (see figures 5.1-5.6). "Slap Crackle Pop" simulated the sound of a bassist and a guitarist simultaneously playing together, using tapping in the LH[59] and the crack bass technique in the RH to emulate the addition of a drummer. This created a form of 3-part, or arguably the illusion of 4-part counterpoint[60](see Figure 6.7).

High Velocity Monophonic Legato Lines

Instances where tapping is used to play high velocity monophonic lines has been shown to occur in some of compositions of this thesis. The E section of "Slap Crackle Pop" used tapping to execute an ultimately descending line, spanning more than two octaves, that used the E-major pentatonic scale (see Figure 6.8). In this line, tapping not only facilitates the capacity for speed but also the ability to maintain a slurred articulation to the line by way of hammer-ons and pull-offs. Both of these attributes were shown to be possible by having each hand

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[59] Technically the bass part and the simulated guitar melody part are played back and forth instead of simultaneously. However, when one hears it, the end result sounds as if a guitarist and a bassist are playing together.

[60] The crack bass part in the RH, in this case, could be argued to consist of two parts, a snare, and a kick drum, totally 4-parts when combined with the bass and simulated guitar part.

cross over each other to pass each segment of the line back and forth, similar to methods used in the performance of many piano compositions[61].

Another example of tapping used in this regard is in bars 92 and 93 of "Slap Marcus (see Figure 6.5). There, tapping was used to play a series of min7 arpeggios (voiced root-5th-b7th-b10th), ascending from Gmin7 to Abmin7 and then descending to Dmin7 in semitones. Tapping was shown to be very conducive to executing this ascending pattern while also maintaining a percussive attack to each note, thus keeping with the stylistic continuity of the piece.

The C section of "Tappin' Away" was also shown to employ tapping to facilitate the speed necessary to play a particular line. Using a parachordal finger placement, as opposed to the orthochordal finger placement used in most of the compositions, a series P4th intervals were grouped in sets of two, to be played from bottom to top, and divided amongst the 1st and 2nd fingers of each hand. This enabled each hand to maneuver into position while the other was tapping a group two notes (see Figure 4.7).

Melody Line Played in Octaves Against a Simultaneous Bass line

In many of the compositions, tapping provided a way of playing melodies in octaves[62] with the RH, while leaving the LH to tap a bass line. This was shown in the B section of "Alejandra" (see Figure 2.7), again in the A^5 section of "Out of the Bassment" (see Figure 3.7) and in the A^3 section of "Tappin' Away" (see Figure 4.4).

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[61] Crossing-over of the hands is a common technique used in piano music. One example is an étude by Franz Liszt. Liszt, Franz. *Concert Étude No. 3, Un sospiro*. N.p.: Kistner, 1849.

[62] See footnote #48.

Particular Chord Voicings

Tapping was shown to be useful in playing particular chord voicings that included large distances between the voices, tightly condensed voicings, and particular orders of strummed notes within a voicing that would been difficult or impossible to play in standard tuning without the application of tapping. This occurred in many of the compositions, however it was clearly pointed out in "Tappin' Away" and "Etude No.1". The final chord in "Tappin' Away" (see Figure 4.7), an Amaj$^{13(\#11)(omit3)}$ (voiced A, E, B, D#, F#)[63] was made possible with the use of tapping[64]. "Etude No.1" used RH fretting to make possible the playing of the final chord, voiced with a large range and a particular order of strummed pitches (see Figure 5.6).

Melody Played Simultaneously in Octaves with Extensive Ornamentation

In the B section of "Out of the Bassment", tapping was shown to enable a performer to play a melody in octaves with extensive ornamentation (see Figure 3.5). The hammer-ons and pull-offs were possible simultaneously in each hand, a feature that would be hard to execute using non-tapping methods like Wes Montgomery's use of strumming octaves with the RH thumb[65].

---

[63] The Amaj$^{13(\#11)(omit3)}$ chord is also missing the major 7th (G#), as well as the major 3rd (C#) and therefore could have other names like B$^{(add11)}$/A.

[64] In standard tuning it is also possible for a plucking technique to play the chord voicing, however it would require one minor change, the A on the bottom would have to be dropped down the octave to the open A-string.

[65] See footnote #48

Sustained Chordal Shape with Added Tapped Notes

Sustaining chord shapes with the LH while the RH taps melodies on the same strings which then pull-off onto the LH is a technique that was used in a number of the compositions[66]. "Alejandra" featured this particular use of technique, however with one difference, the LH sustained a double stop consisting of an Ab on the bottom and P11th, a Db on top with the addition of an Ab octave, or a P8th in the middle, as opposed to a chord (see Figure 2.10). The RH was then used to tap melody notes on the two upper strings that would pull-off to the P8th (Ab) and P11th (Db) being sustained by the LH. A far more rudimentary use of this technique was also shown in the opening bars of "Tappin' Away" (see Figure 4.1).

Ascending or Descending Conjunct Lines Consisting of Diatonic Double Stops

Tapping was also shown to facilitate ascending and descending conjunct lines, consisting of diatonic double stops, while maintaining an overall slurred articulation with the use of hammer-ons, pull-offs and slides. One instance of this was shown in the B section of "Tappin' Away" in bars 97 and 98 (see Figure 4.5). The line consisted of conjunct movement in diatonic 10^{ths} within the D-dorian mode. Another example of this was shown in the B section of "Slap Marcus" which used tapping to execute a conjunct line in diatonic 10^{ths} within the G-dorian mode (see Figure 6.3)[67].

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[66] Smeck, Roy. *That Goes Double*. Warner Bros., 1933. Rubinstein, Anton. *Melody in F.* Smeck uses the tapping technique on a ukelele. He strums a chord voicing that is fretted in the LH and continues with tapping melody notes on higher frets on the same strings. He then pulls-off to the chord notes being fretted by the LH after each tapped note in the RH.

[67] The line from "Slap Marcus", shown in Figure 6.3 included a skip of a minor 3rd but was for the most part a conjunct phrase.

7.2-Conclusion

Leonard Bernstein described technique (from a conductor's point of view) as being synonymous with communication[68]. Bernstein's definition could be extended to solo performers who can be seen as conductors of their own performances. When empowered with the mastery of a vast array of techniques, they can access an immense number of timbres, complex articulations, and polyphony, similar in many ways to an orchestra.

The research of this thesis has shown that tapping techniques can be a powerful communication tool in solo electric bass composition. It has accomplished this by highlighting many different scenarios in which it has been applied to compositions in this thesis. Through scrupulous analysis of these compositions, the value of tapping has come to light by showing its ability to provide access to musical material that would have not otherwise been conducive to the role and design of the instrument. Most important of these elements was contrapuntal composition, a vital benchmark for the soloist, allowing them to give the listener a simultaneous experience of harmony, melody and rhythm.

This thesis is intended to provide the stimulation necessary to generate interest amongst composers to write for the solo electric bass after seeing how useful tapping can be. Furthermore, I am optimistic that their compositions will be adopted into the music education system and provide a more extensive literature for the instrument. This in turn could inspire a generation of young bassists to embark on a more diverse path that will see the electric bass as more than just an accompaniment instrument.

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[68] Bernstein, Leonard. *The New Penguin Dictionary of Modern Quotations*. Compiled by Robert Andrews. 2nd ed. London, England: Penguin Book, 2003.

REFERENCES:

Bibliography

Apel, Willi. "Counterpoint." In *The Harvard Dictionary of Music*. Cambridge, MA: Belknap Press of Harvard University Press, 1974.

———. "Electronic Music." In *Harvard Dictionary of Music*. 8th Printing ed. Cambridge, MA: Belknap Press of Harvard University Press, 1974.

"Artificial Harmonics." In *Grove's Dictionary of Music and Musicians*, edited by J.A. Fuller Maitland. Vol. 2.

Baldemor, Jay, ed. *Fretwraps*. N.p.: Gruv Gear, n.d. http://www.gruvgear.com/fretwraps.

Bernstein, Leonard. *The New Penguin Dictionary of Modern Quotations*. Compiled by Robert Andrews. 2nd ed. London, England: Penguin Book, 2003.

Bunker, Dave. "The History of the Touch Guitar™ Dual Neck." Dave Bunker Guitars. http://davebunkerguitars.com/touch_history.html.

Cappelli, Frank. "Guitar Timeline." In *The Guitar: An Illustrated Step-by-step Instructional Guide*, 107. Pittsburgh, PA: Eldorado Ink, 2007.

Capuzzo, Guy. "Two-Hand Tapping." In *Guitar Technique Builders Series: Tapping: Take Your Playing to a New Level!*, 22. Guitar Technique Builders Series. N.p.: Alfred Publishing, 1995.

Chapman, Emmett. "A Brief History of the Stick." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/history/stick/.

Chapman, Emmett. "Instruments NS/Stick Damper and Nut." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/instruments/ns/damper.html.

———. "The Evolution of a Musical Art." *Electronic Musician Magazine*, May 1987. http://www.stick.com/articles/evolution/.

———. "Stick Tunings. 10-String Matched Reciprocal." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/instruments/tunings/10/mr/.

Clayton, Stuart. "Adding the 'Pop.'" In *Ultimate Slap Bass*, 24. N.p.: Bassline Publishing, 2006.

———. "Left Hand Slaps and Sixteenth Note Lines." In *Ultimate Slap Bass*, 61. N.p.: Bassline Publishing, 2006.

———. "Slapping Bassics." In *Ultimate Slap Bass*, 16. N.p.: Bassline Publishing, 2006.

Cohen, Josh. "“Crack Bass” Technique Demystified." *The Music of Josh Cohen* (blog). Entry posted July 21, 2014. http://themusicofjoshcohen.tumblr.com/post/92464609644/crack-bass-technique-demystified.

Erskine, Damian. "Bass Ramps: The How and Why." No Treble. Last modified April 3, 2013. http://www.notreble.com/buzz/2013/04/03/bass-ramps-the-how-and-why/.

Glise, Anthony. "Finger Vibrato." In *Classical Guitar Pedagogy*, 106. N.p.: Mel Bay, 1997.

Jordan, Stanley. "Getting Started with the Touch Technique." *Guitar Player Magazine*, July 1984. http://www.stanleyjordan.com/Technique/starting.html.

Kjelland, James. "The World of Pizzicato." In *Orchestral Bowing: Style and Function*, 60. Spi ed. N.p.: Alfred Music, 2004.

Lee, Nelson, and Julian O. Smith III. "Virtual String Synthesis." In *The Science of String Instruments*, edited by Thomas Rossing, 435. New York, NY: Spring Science + Business Media, 2010.

Liszt, Franz. *Concert Étude No. 3, Un sospiro*. N.p.: Kistner, 1849.

MacMillan, Hamish, and Guitar Factory School. "http://www.guitarfactoryschool.com/lessons_files/Lesson%2037%20.pdf." N.d. PDF.

Schneider, John. "Electronics." In *The Contemporary Guitar*, 245. Lanham, MD: Rowman and Littlefield, 2015.

"Slap Bass." In *Concise Oxford English Dictionary: Main Edition*, edited by Oxford Dictionaries, Angus Stevenson, and Maurice Waite. 12th ed.

Snyder, Jerry. "Right Hand Playing Technique." In *Bass Today: A Beginning Electric and Acoustic Bass Method*, 4. N.p.: Alfred Publishing Co., Inc., 2006.

Stick Enterprises, Inc. "History: Timeline of Stick Developments." Stick Enterprises, Inc. Home of the Chapman Stick. http://www.stick.com/history/timeline/.

Stidham Music. "Learn Standard Notation The Easy Way: A Guitarists Guide." *Stidham Music* (blog). Entry posted October 21, 2013. http://stidhammusic.com/2013/10/21/standard-notation-removing-the-fear-and-confusion/.

Turetzky, Bertram. *The Contemporary Contrabass*. Berkeley, CA: University of California Press, 1974.

———."Pizzicato." In *The Contemporary Contrabass*, edited by Alain Hénon, 6-7. Berkeley, CA: University of California Press, 1974.

Wooden, Alec. "Performer's Interview with Victor Wooten.". Performer Magazine. Last modified April 2, 2013 http://performermag.com/performers-interview-with-victor-wooten/.

Wooten, Victor, and Steve Gorenberg. *The Best of Victor Wooten*. N.p.: Cherry Lane Music Company, 2003.

Wright, Michael. Guild Solidbody Guitars to *Guitar Stories: The Histories of Cool Guitars*, 70. Vol. 2. N.p.: Vintage Guitar Books, 2000.

Discography

Benson, George. *Big Boss Band*. Wounded Bird Records WOU2629, 2008, compact disc. Recorded 1990.

Claypool, Les. *Primus: Animals Should Not Try to Act Like People*. 2003. N.p.: Interscope Records, 2003. DVD.

Gaye, Marvin. *Let's Get it On*. Motown 314530885-2, 1998, compact disc. Recorded 1973.

Jordan, Stanley. *Magic Touch*. Blue Note CDP 7 46092 2, 1998, compact disc. Recorded 1985.

Miller, Marcus. *M²*. Telarc CD-83534, 2001, compact disc.

———. *Silver Rain*. Koch Records KOC-CD-5779, 2005, compact disc.

Montgomery, Wes. *The Wes Montgomery Trio*. Recorded October 6, 1959. Original Jazz Classics 00025218603423, 2006, compact disc.

Sinatra, Frank. *Sinatra and Strings*. Reprise Records 9 46970-2, 1998, compact disc. Recorded November 20, 1961.

———. *Sinatra Reprise: The Very Good Years*. Reprise Records 9 26501-2, 1991, compact disc. Recorded January 27, 1964.

Van Halen, Eddie. *Van Halen*. Warner Bros. Records 3075-2, 1990, compact disc. Recorded 1978.

Webster, Jimmie. *Webster's Unabridged, Jimmie Webster's Stereo Guitar*. RCA Victor LPM-1942, 1959, LP. Recorded December 30, 1958.

Wonder, Stevie. *Songs in the Key of Life*. Motown HD00602537004720, 2012, flac. Recorded 1976.

Wooten, Victor. *A Show of Hands*. Vix Records 79794-2, 1996, compact disc.

Videography

Adelson, Steve. *Ultimate Stick*. N.p.: True Fire, 2009. DVD.

"Bailey's Bar and Grill Tutorial - Artificial Harmonics." Video file, 09:45. YouTube. Performance. Performed by Steve Bailey. Posted by Framus & Warwick, August 8, 2011. https://www.youtube.com/watch?v=T6Fcs2ZCwRw.

"Dave Bunker - Duo-Lectar." Video file, 2:51. YouTube. Performance on 1960. Performed by Dave Bunker. Posted by Graham Tichy, February 29, 2008. https://www.youtube.com/watch?v=EAstqXR4QTc.

Jordan, Stanley. *Stanley Jordan*. 2005. N.p.: Hal Leonard, 2005. DVD.

"Lord of the Rings Medley." Video file, 5:37. YouTube. Performance on May 26, 2014. Performed by Zander Zon. Composed by Howard Shore. Posted by Zander Zon, May 26, 2014. https://youtu.be/xtVkxXOu_Mo.

Manring, Michael. *Bass Day 1998*. By Stanley Turrentine. 1998. N.p.: Hudson Music, 2002. DVD.

Pastorius, Jaco. *Weather Report: Live at Montreux 1976*. By Jaco Pastorius. 1976. Montreux, Switzerland: Eagle Rock Ent, 2007. DVD.

"Scott Morris Video Lesson - Barring Technique." Lecture presented at Guitar Salon International Showroom, Santa Monica, CA. Video file, 11:33. YouTube. Posted by Guitar Salon International, October 7, 2014. https://www.youtube.com/watch?v=utguuFcvClw.

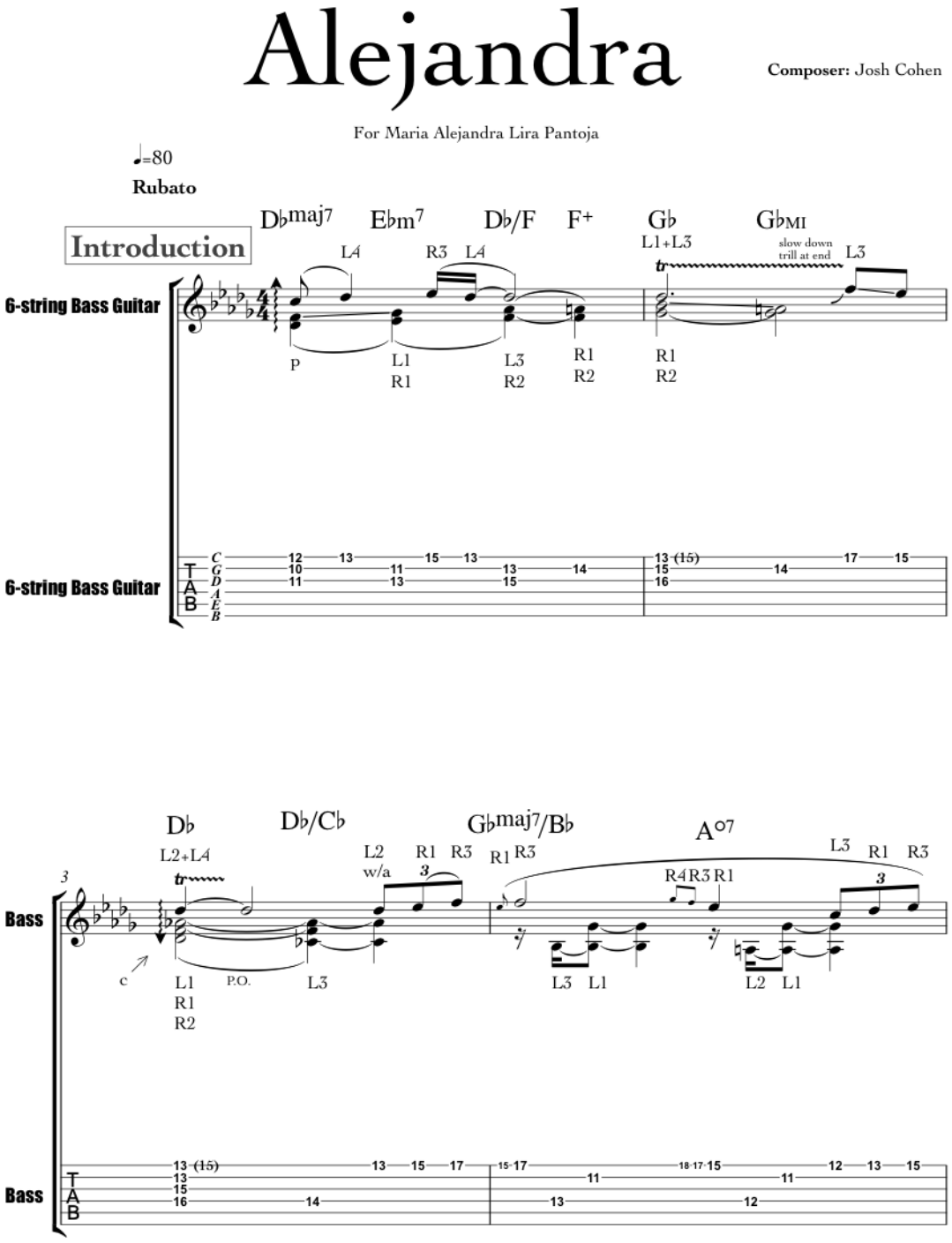
Smeck, Roy. *That Goes Double*. Warner Bros., 1933.

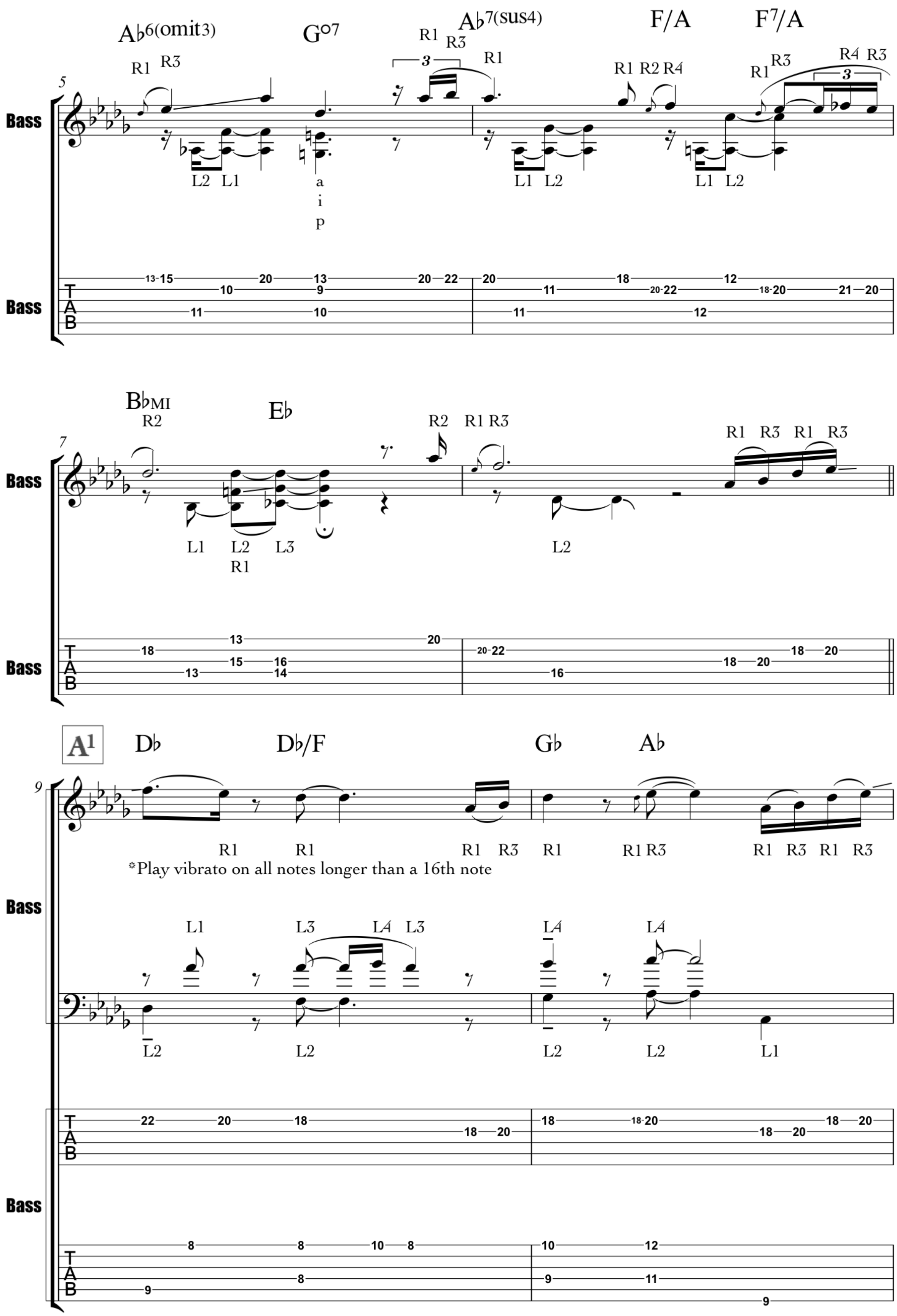
Taylor, Martin. *Martin Taylor in Concert*. By George Gershwin. 1997. Pittsburgh, The United States: Vestapool, 2003. DVD.

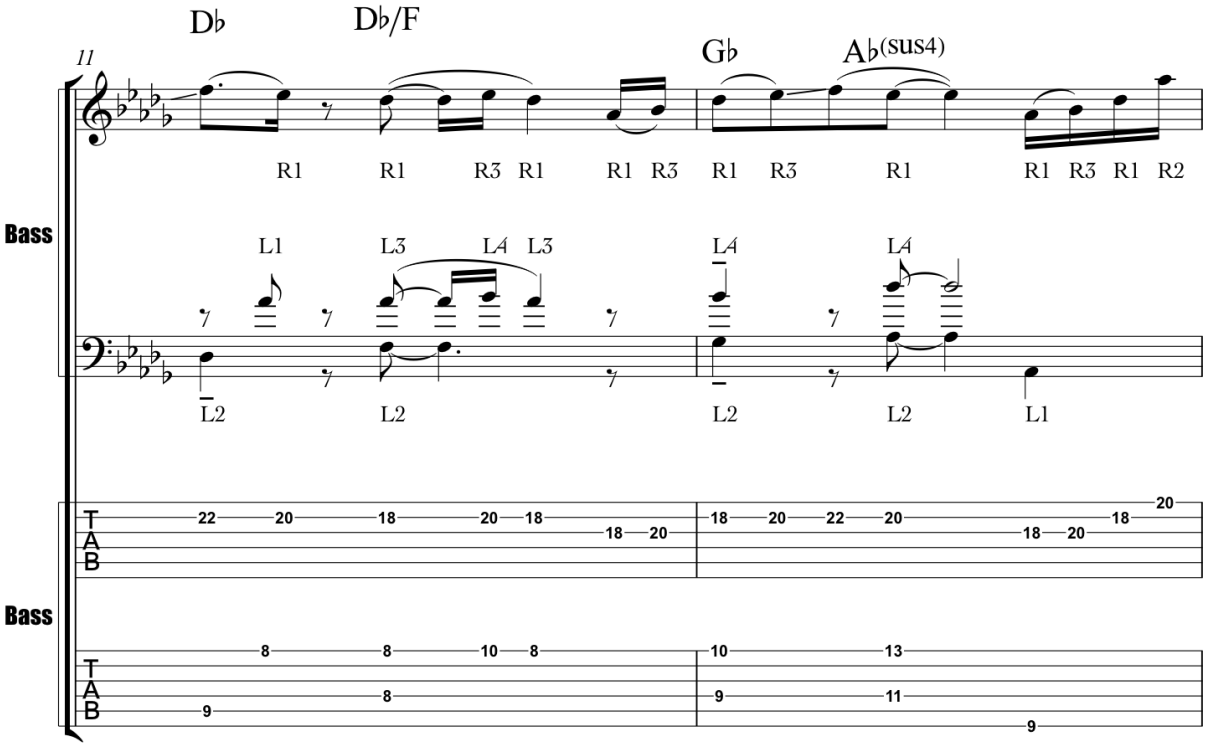
"Victor Wooten Reenacting the Earthquake in Haiti." Video file, 20:14. YouTube. Performance in Los Angeles, United States on 2013. Performed and composed by Victor Wooten. Posted by Jonathan Moyer, February 5, 2013. https://www.youtube.com/watch?v=5NerjNLskk8.

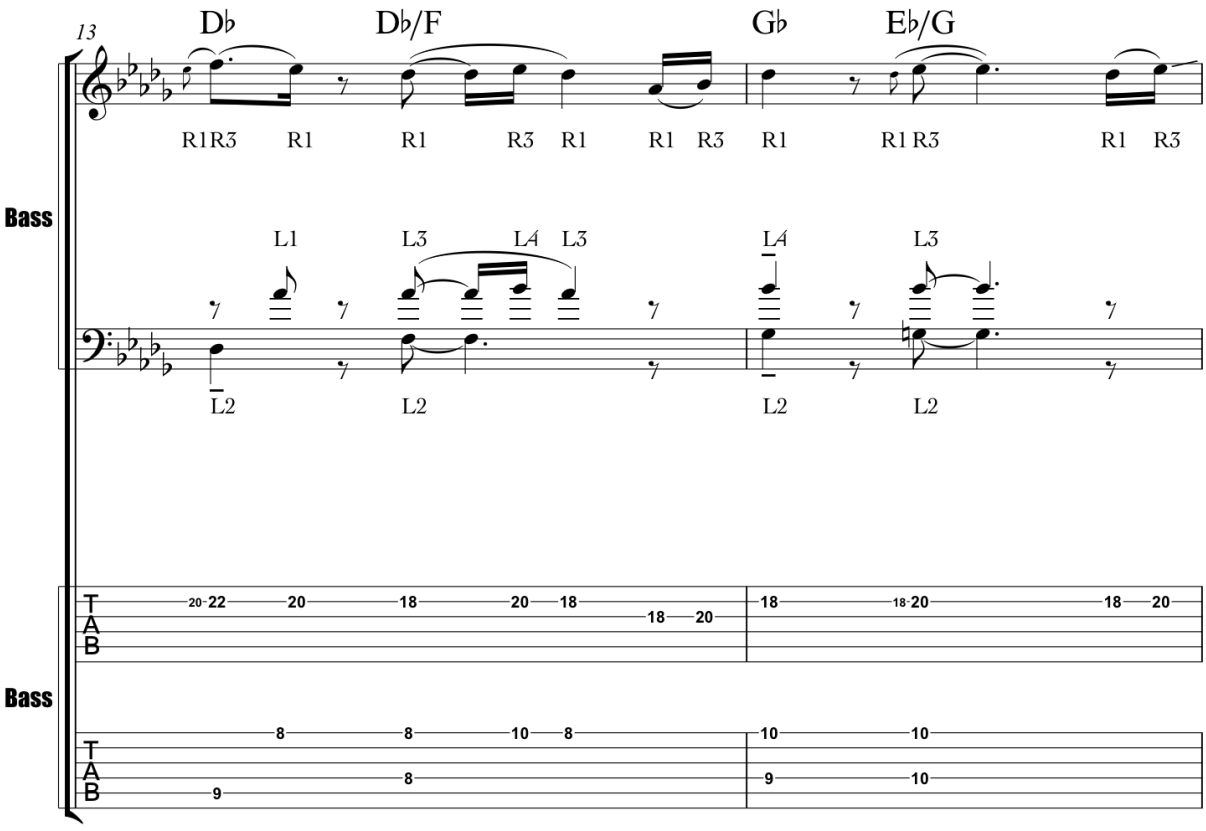
Wooten, Victor. *Victor Wooten: Groove Workshop*. 2008. N.p.: Hudson Music, 2008. DVD.

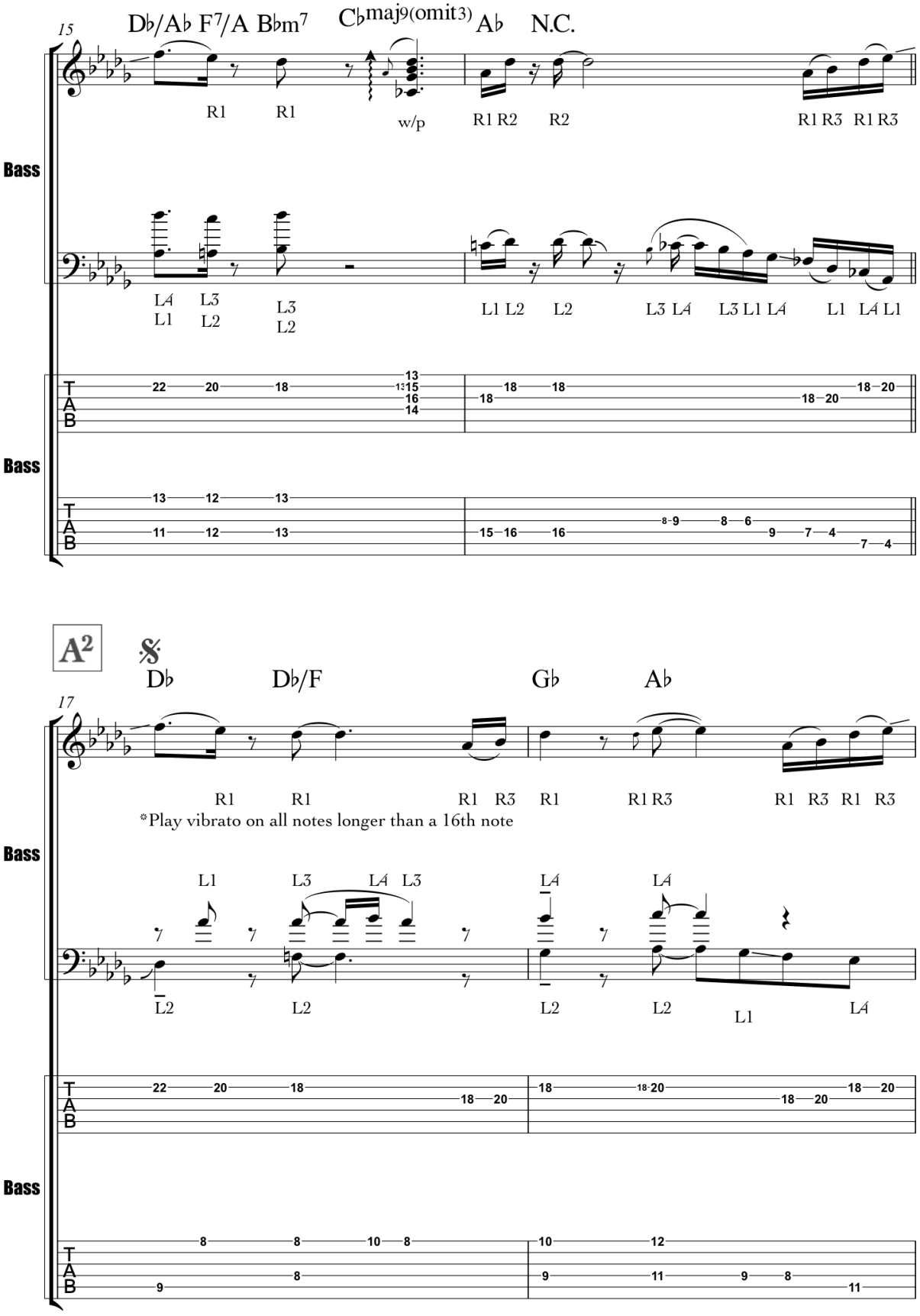
APPENDIX A: "Alejandra" Full Score

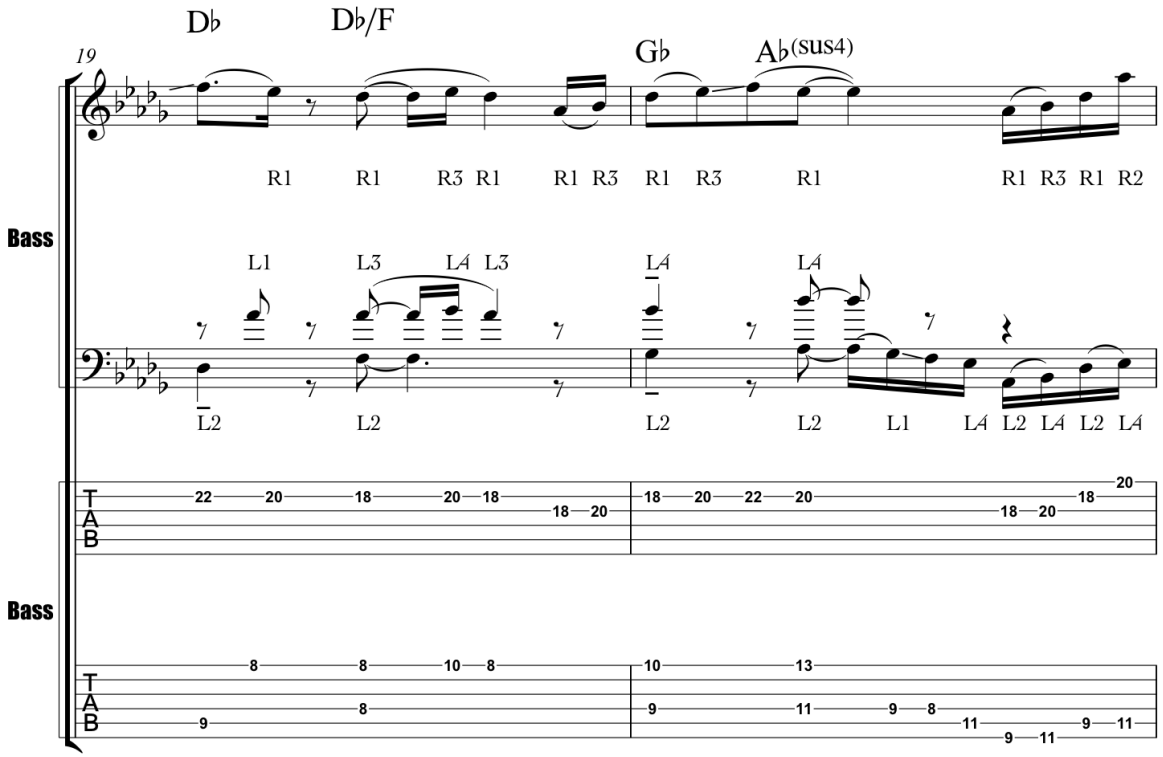


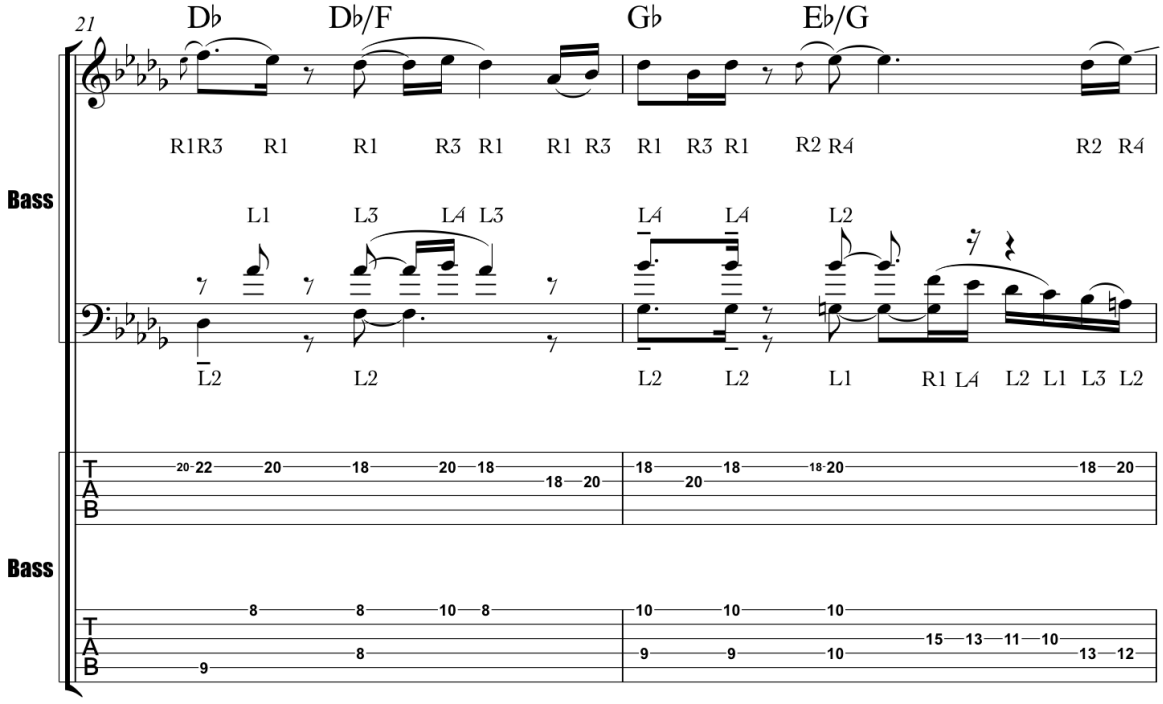

A♭6(omit3)
G°7
A♭7(sus4)
F/A
F7/A
Bass
B♭MI
E♭
Bass
A1
D♭
D♭/F
G♭
A♭
*Play vibrato on all notes longer than a 16th note
Bass
Bass

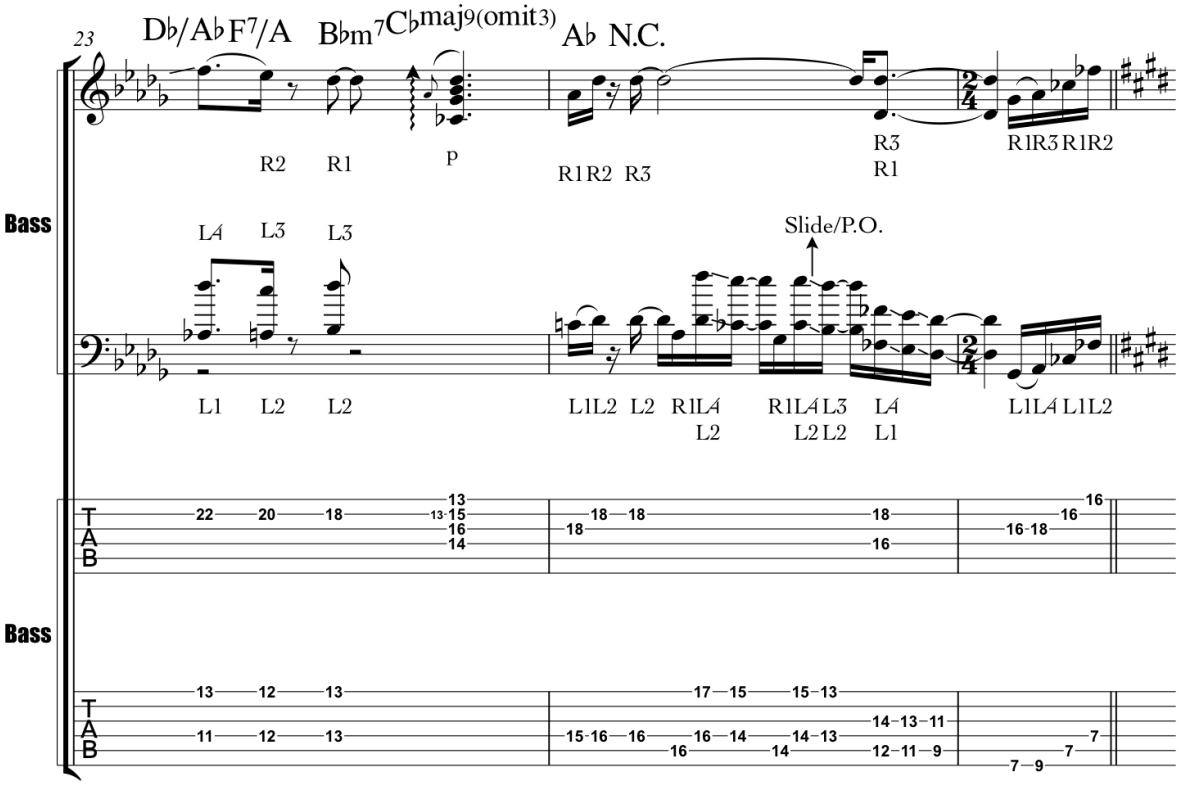

11
D♭
D♭/F
G♭
A♭(sus4)
R1 R1 R3 R1 R1 R3 R1 R3 R1 R1 R3 R1 R2
L1 L3 L4 L3 L4 L4
L2 L2 L2 L2 L1
Bass
TAB
22 20 18 20 18 18 20 18 20 22 20 18 20 20
8 8 10 8 10 13
9 8 9 11 9
Bass
TAB

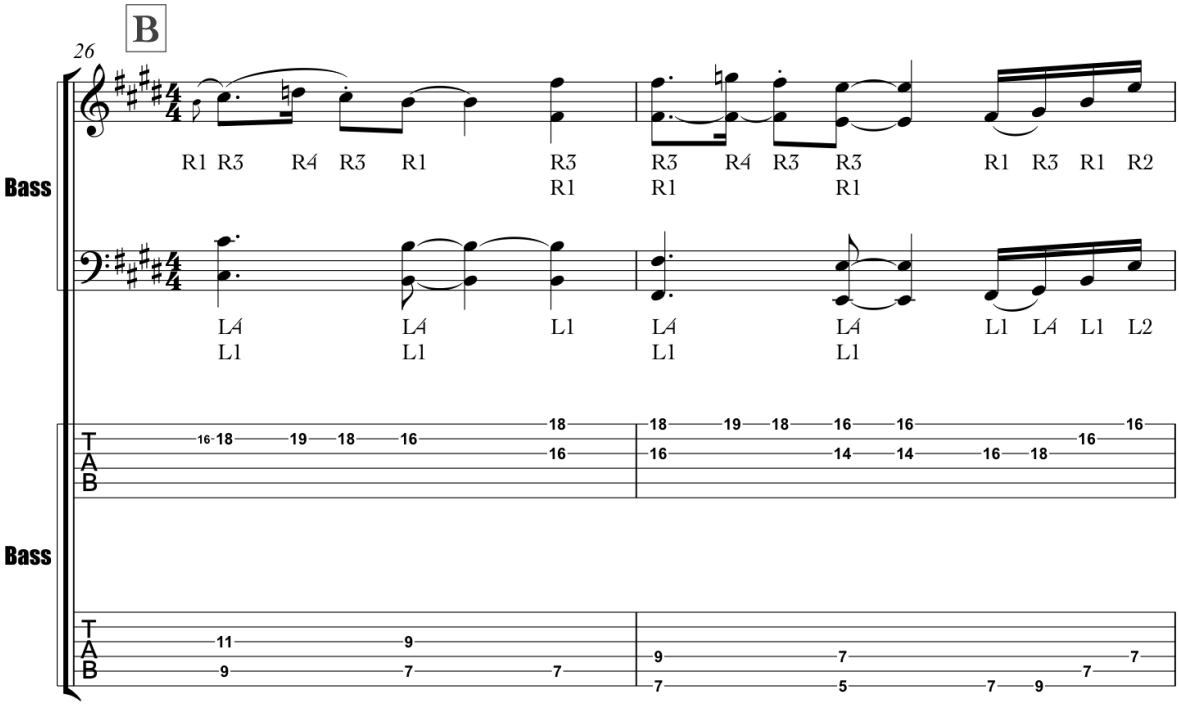

13
D♭
D♭/F
G♭
E♭/G
R1R3 R1 R1 R3 R1 R1 R3 R1 R1R3 R1 R3
L1 L3 L4 L3 L4 L3
L2 L2 L2 L2
Bass
TAB
20 22 20 18 20 18 18 20 18 18 20 18 20
8 8 10 8 10 10
9 8 9 10
Bass
TAB

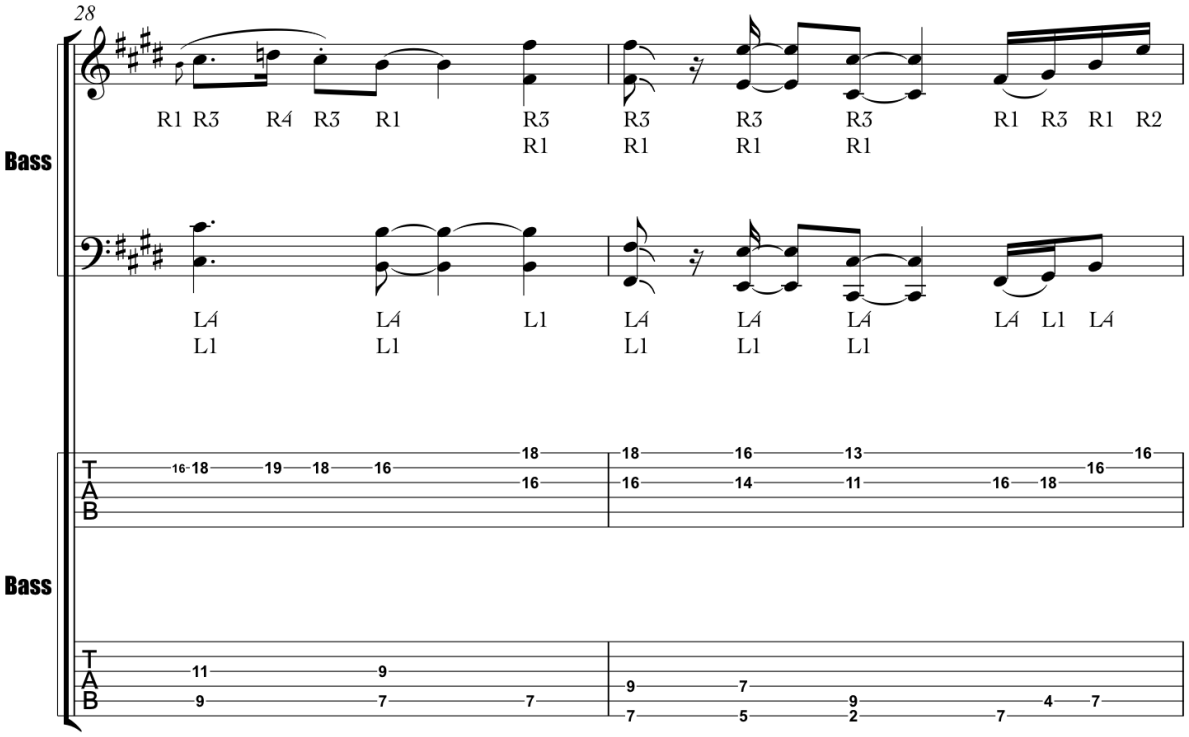

15
Db/Ab F7/A Bbm7 Cbmaj9(omit3) Ab N.C.
R1 R1 w/p R1 R2 R2 R1 R3 R1 R3
Bass
LA L3 L3 L1 L2 L2 L3 LA L3 L1 LA L1 LA L1
L1 L2 L2
Bass
A2
Db Db/F Gb Ab
17
R1 R1 R1 R3 R1 R1 R3 R1 R3 R1 R3
*Play vibrato on all notes longer than a 16th note
Bass
L1 L3 LA L3 LA LA
L2 L2 L2 L2 L1 LA
Bass

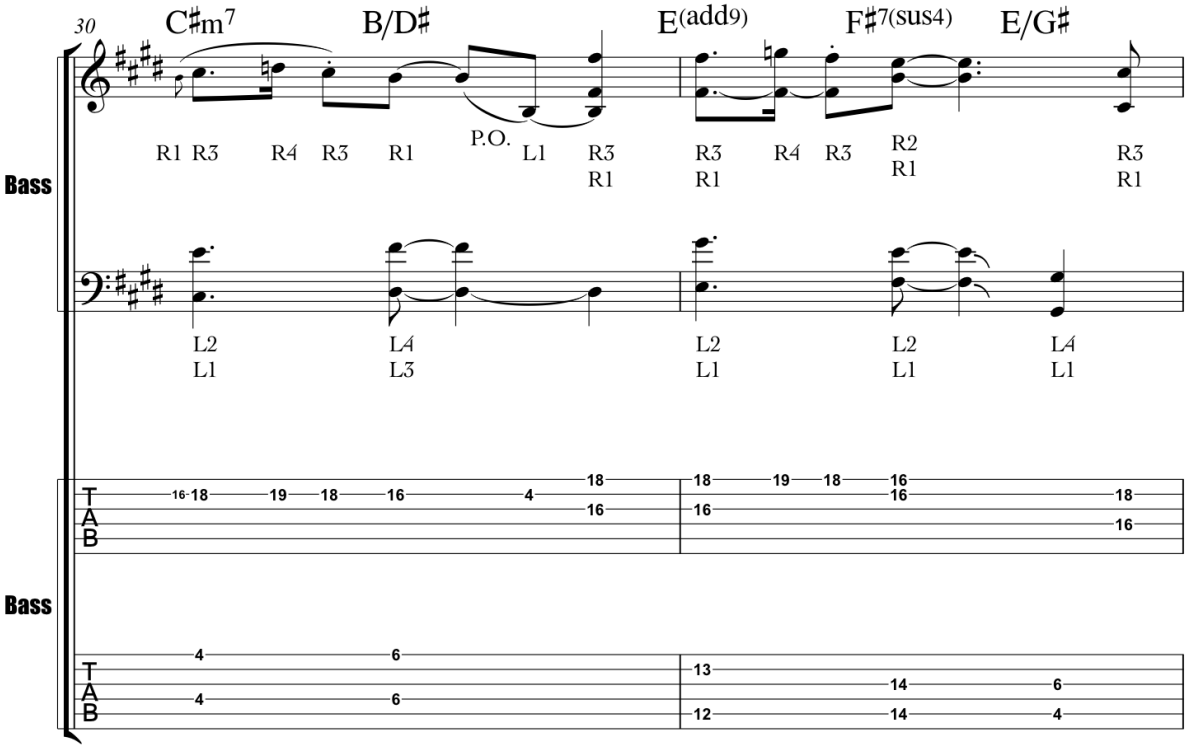

19
Db
Db/F
Gb
Ab(sus4)
Bass
Bass

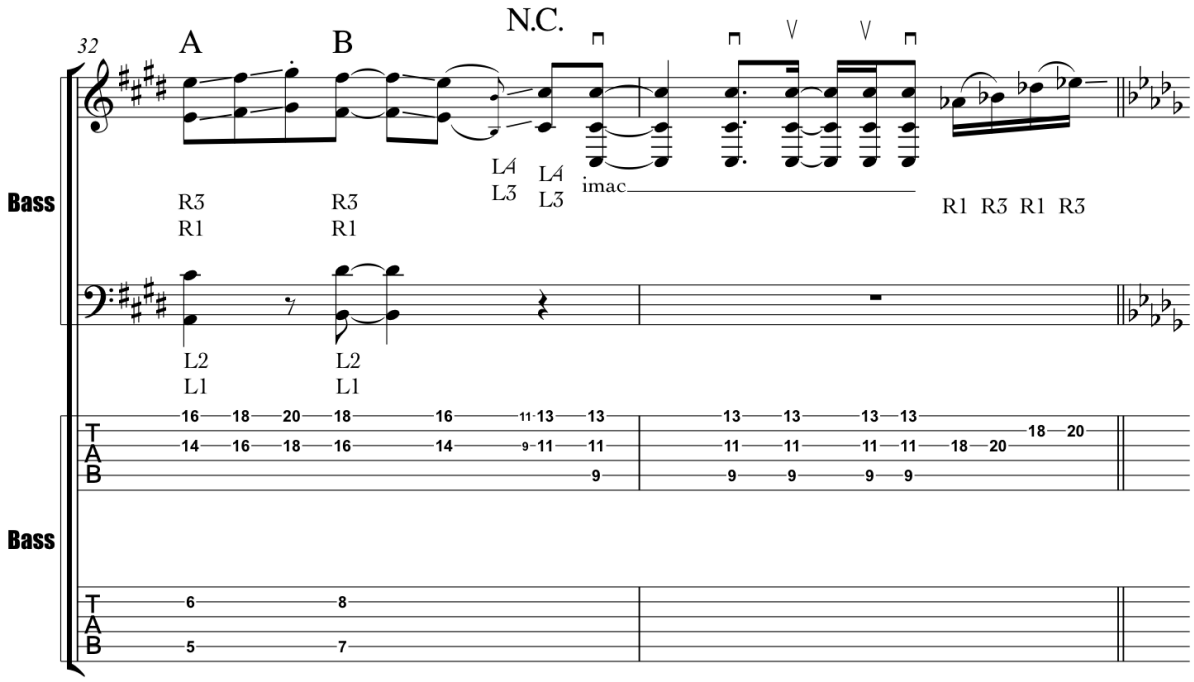

21
Db
Db/F
Gb
Eb/G
Bass
Bass

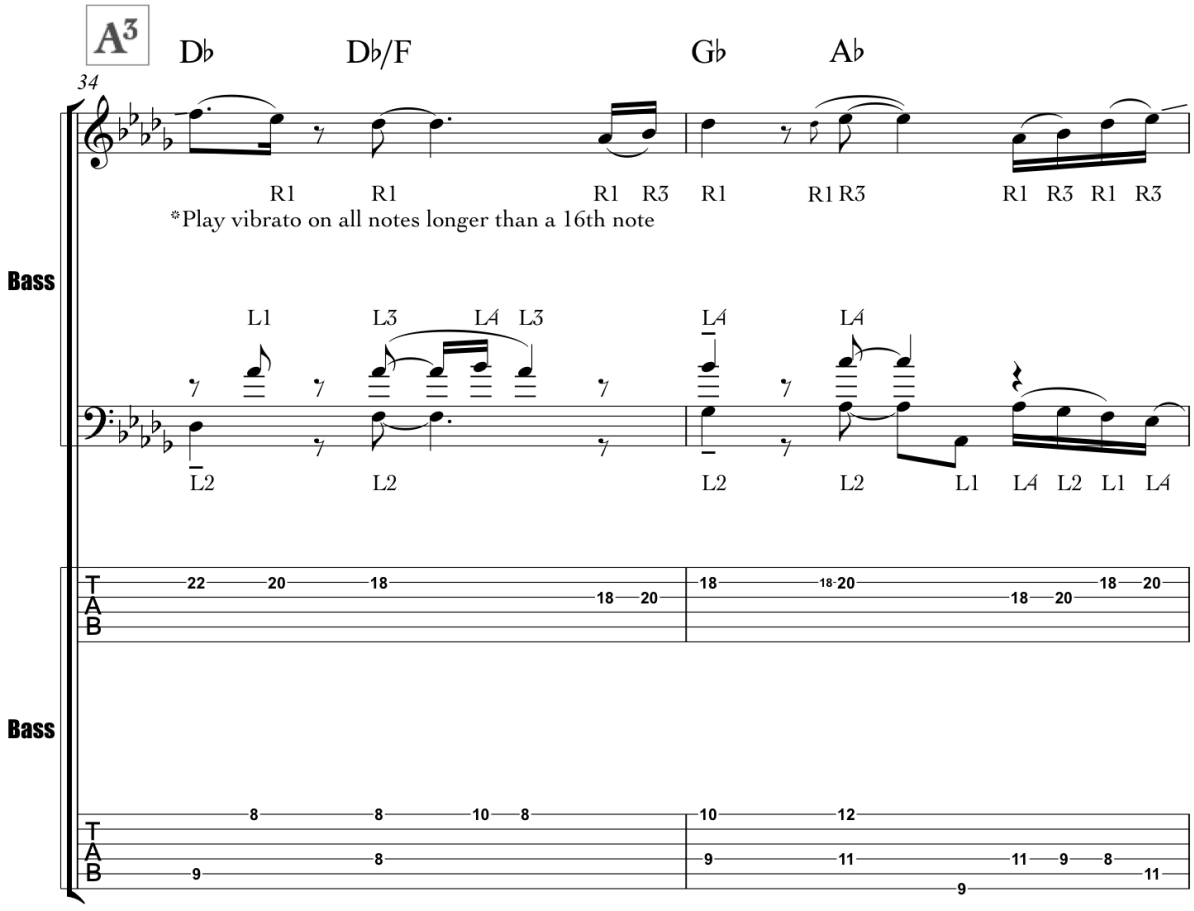

23
Db/Ab F7/A
Bbm7 Cbmaj9(omit3)
Ab N.C.
Bass
Slide/P.O.
Bass

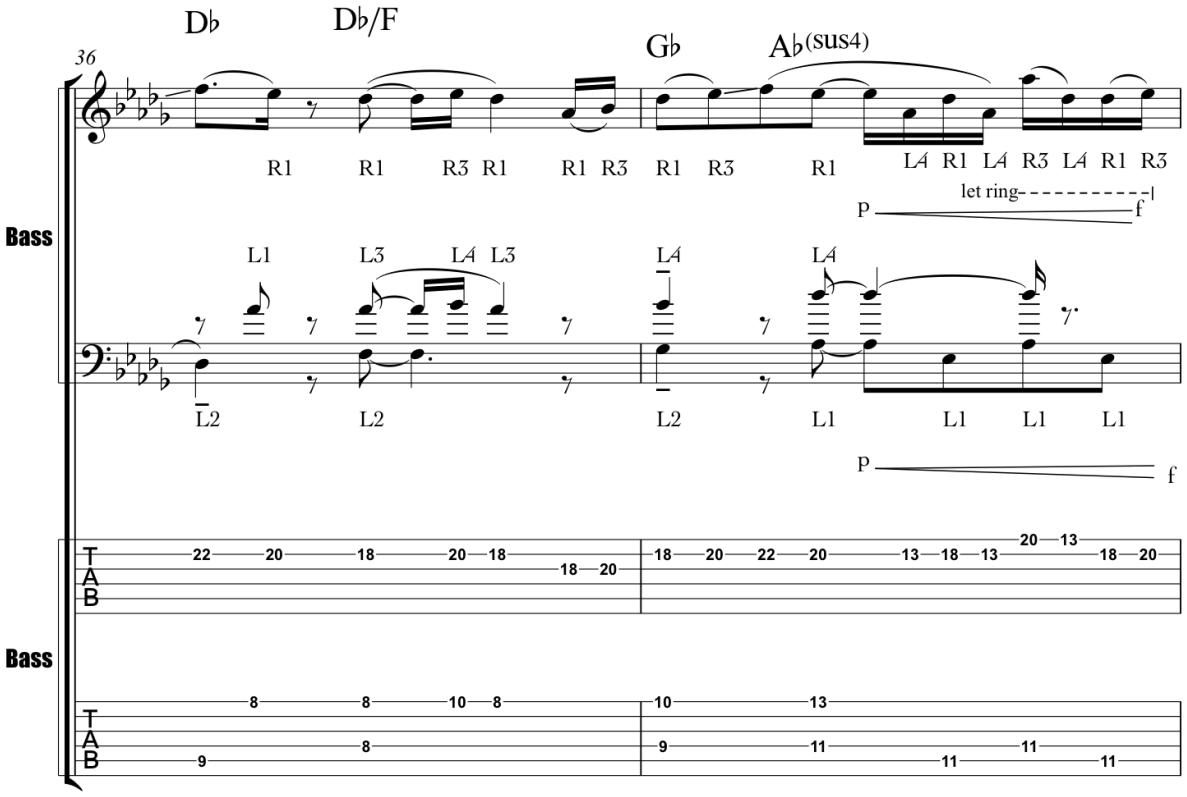

B
26
Bass
Bass

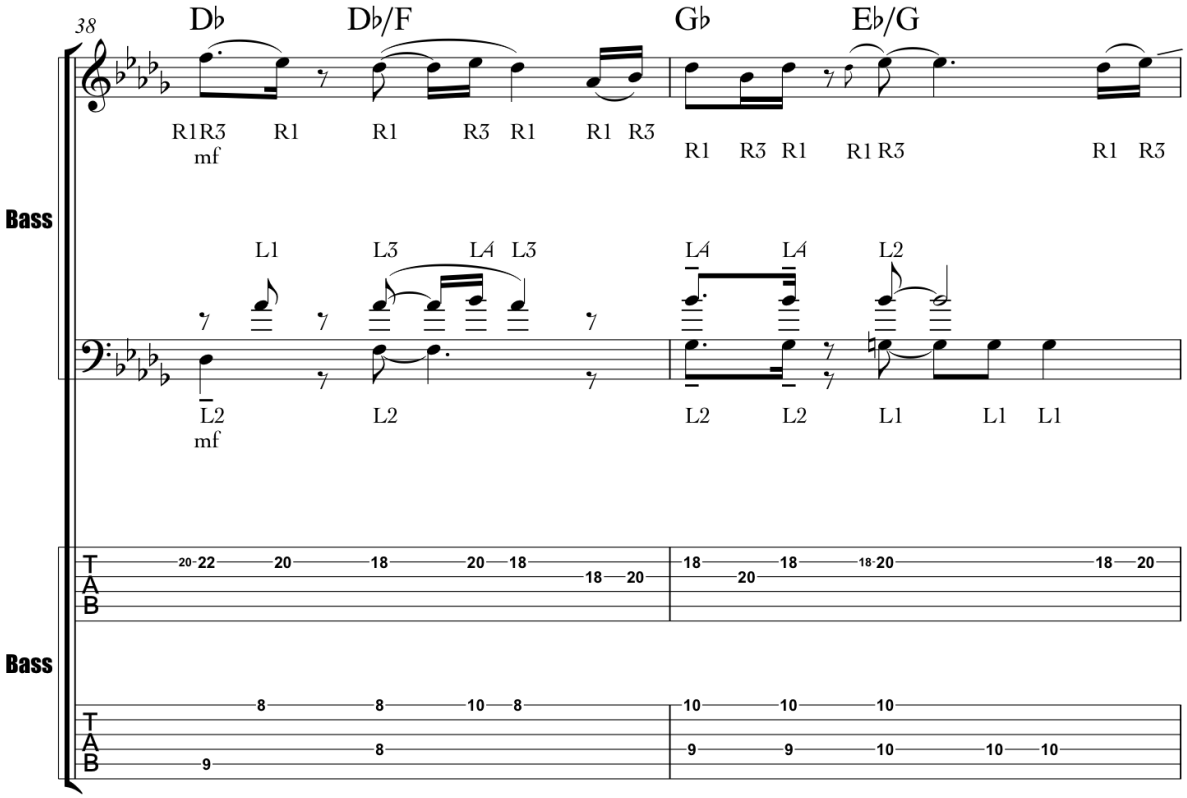

28
Bass
R1 R3 R4 R3 R1 R3 R3 R3 R3 R1 R3 R1 R2
R1 R1 R1 R1
L4 L4 L1 L4 L4 L4 L4 L1 L4
L1 L1 L1 L1 L1
Bass
T A B
16 18 19 18 16 18 16 18 16 16 14 13 11 16 18 16 16
11 9 9 7 7 9 7 7 5 9 2 7 4 7

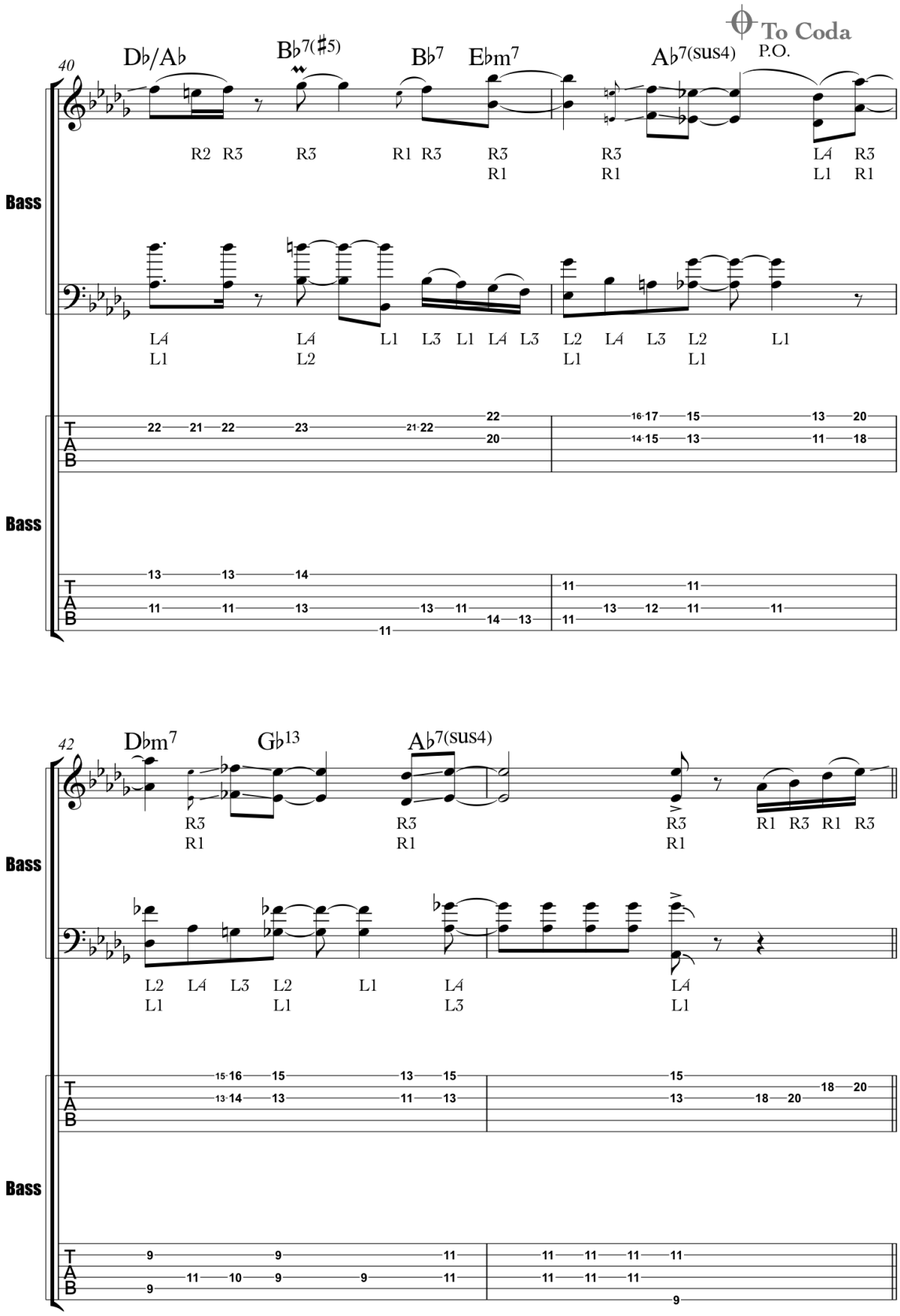

30
C♯m7
B/D♯
E(add9)
F♯7(sus4)
E/G♯
Bass
R1 R3 R4 R3 R1 P.O. L1 R3 R3 R4 R3 R2 R3
R1 R1 R1 R1
L2 L4 L2 L2 L4
L1 L3 L1 L1 L1
Bass
T A B
16 18 19 18 16 4 18 16 18 19 18 16 18 16 16 18
4 6 4 6 13 12 14 14 6 4

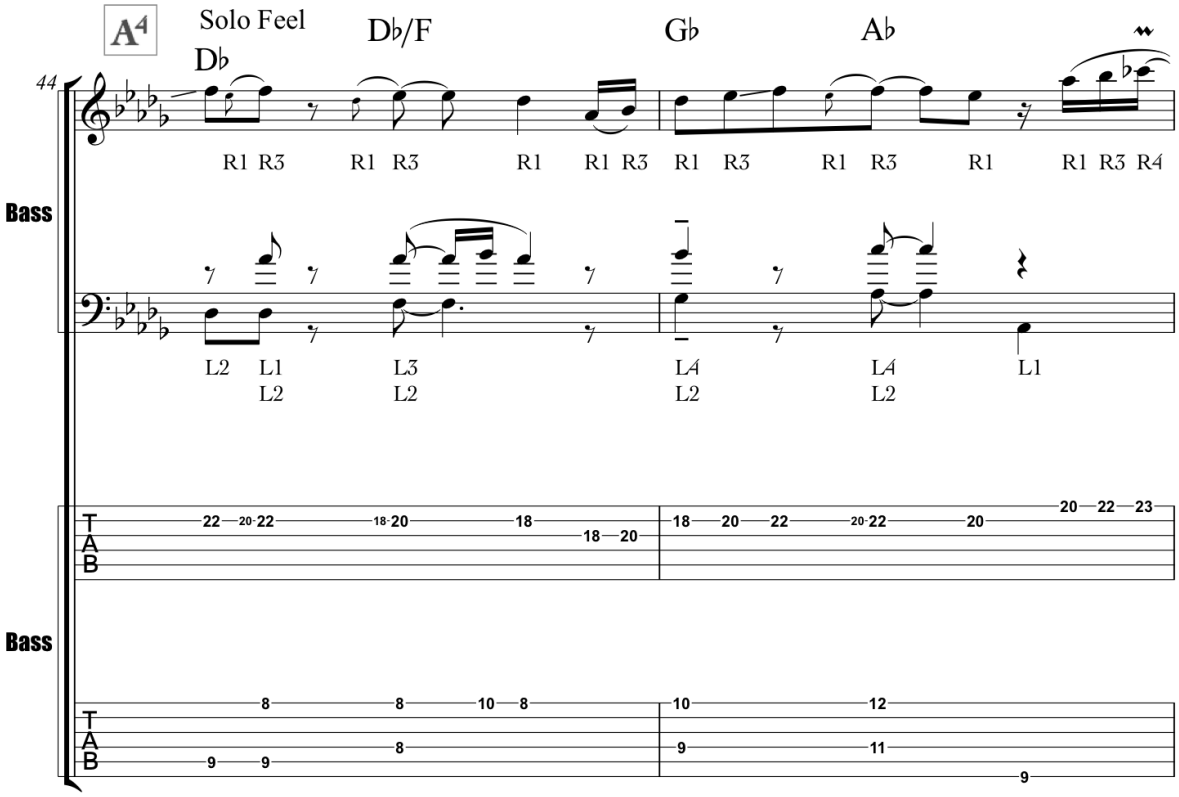

32
A
B
N.C.
imac
Bass
R3 R1
R3 R1
L2 L1
L2 L1
R1 R3 R1 R3
Bass

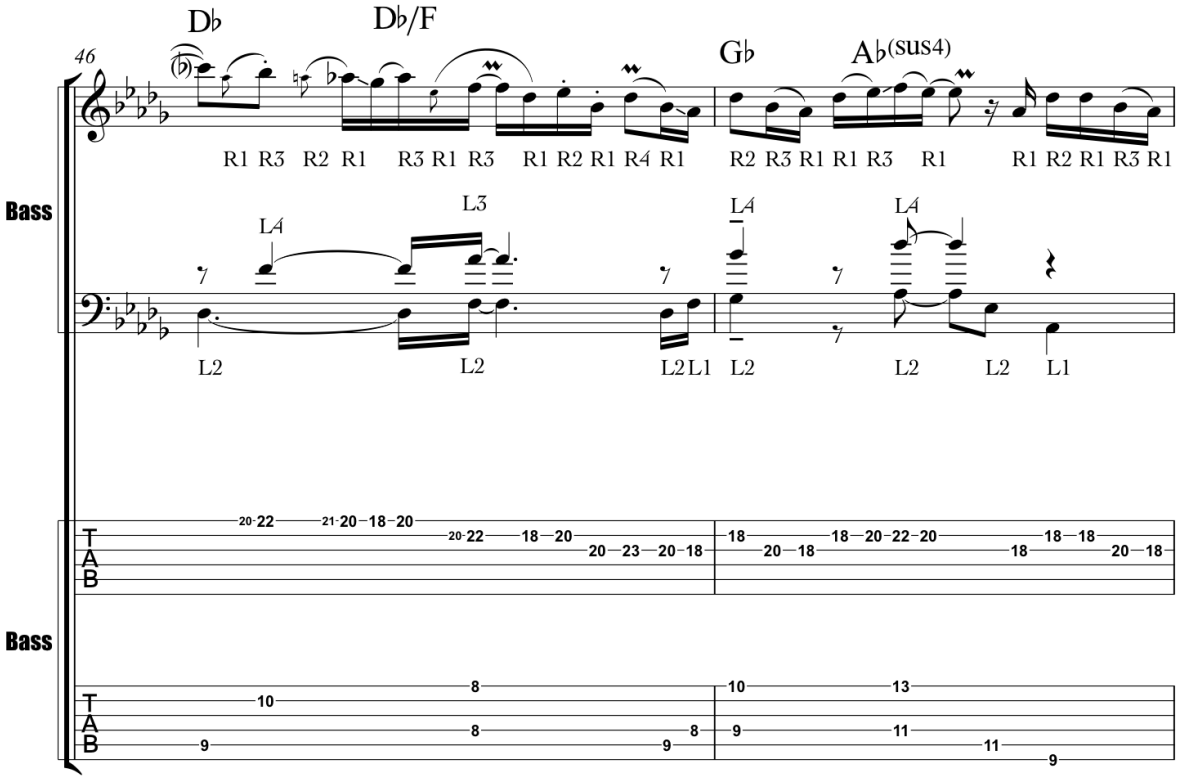

A3
D♭
D♭/F
G♭
A♭
34
R1 R1 R1 R3 R1 R1 R3 R1 R3 R1 R3
*Play vibrato on all notes longer than a 16th note
Bass
L1 L3 L4 L3 L4 L4
L2 L2 L2 L2 L1 L4 L2 L1 L4
Bass

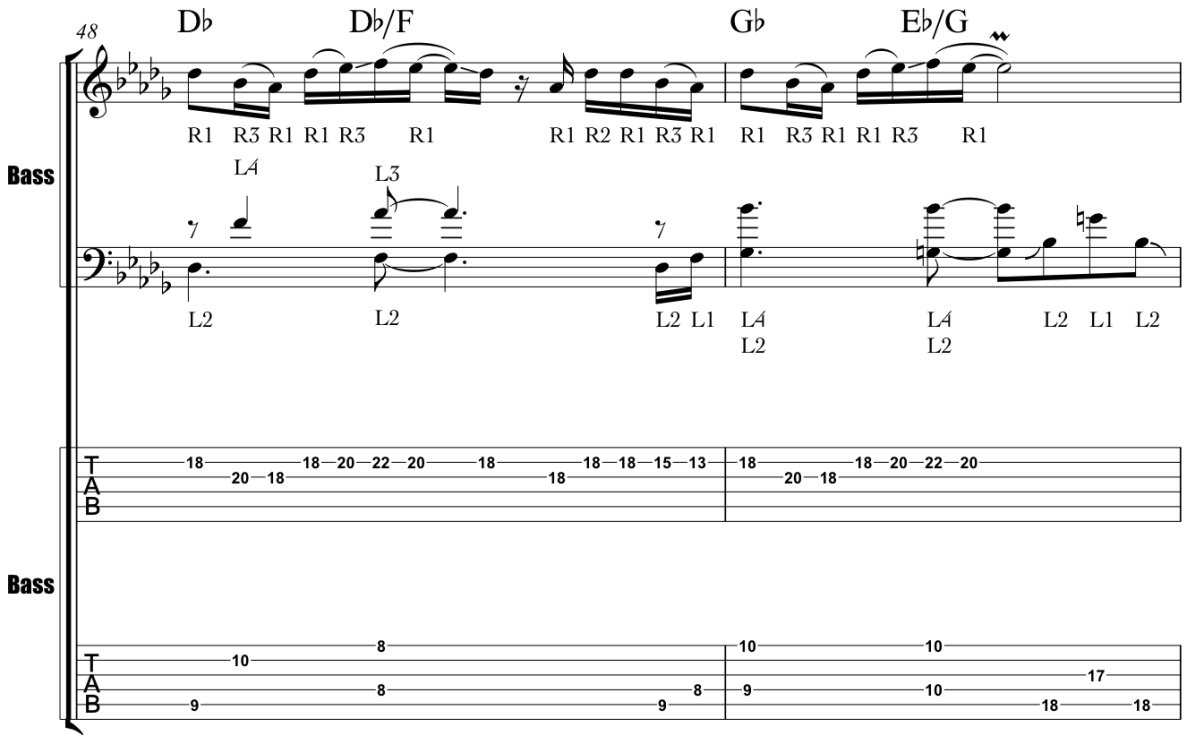

Db
Db/F
Gb
Ab(sus4)
36
R1 R1 R3 R1 R1 R3 R1 R3 R1 LA R1 LA R3 LA R1 R3
let ring
p
f
Bass
L1 L3 LA L3 LA LA
L2 L2 L2 L1 L1 L1 L1
p
f
T
A
B
22 20 18 20 18 18 20 18 20 22 20 13 18 13 20 13 18 20
8 8 10 8 10 13
9 8 9 11 11 11

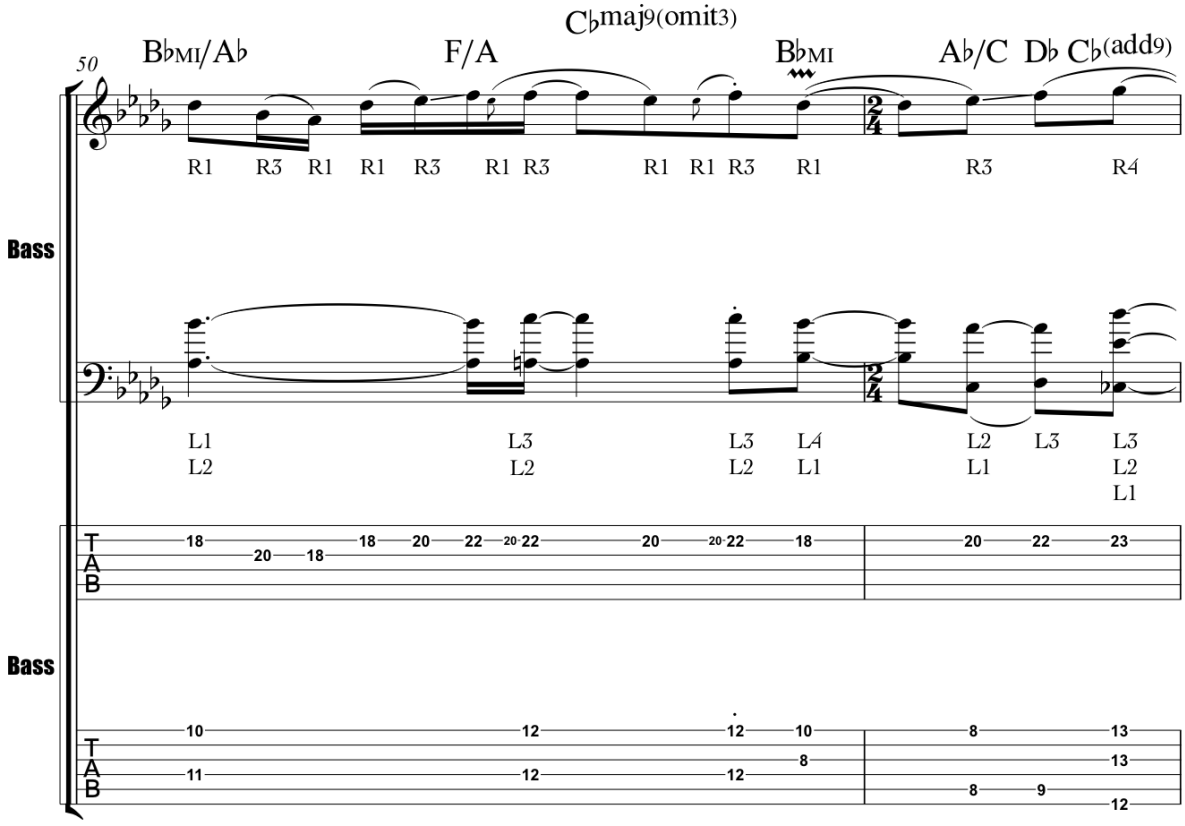

Db
Db/F
Gb
Eb/G
38
R1R3 R1 R1 R3 R1 R1 R3 R1 R3 R1 R1 R3 R1 R3
mf
Bass
L1 L3 LA L3 LA LA L2
L2 L2 L2 L2 L1 L1 L1
mf
T
A
B
20 22 20 18 20 18 18 20 18 18 20 18 20
8 8 10 8 10 10 10
9 8 9 9 10 10 10

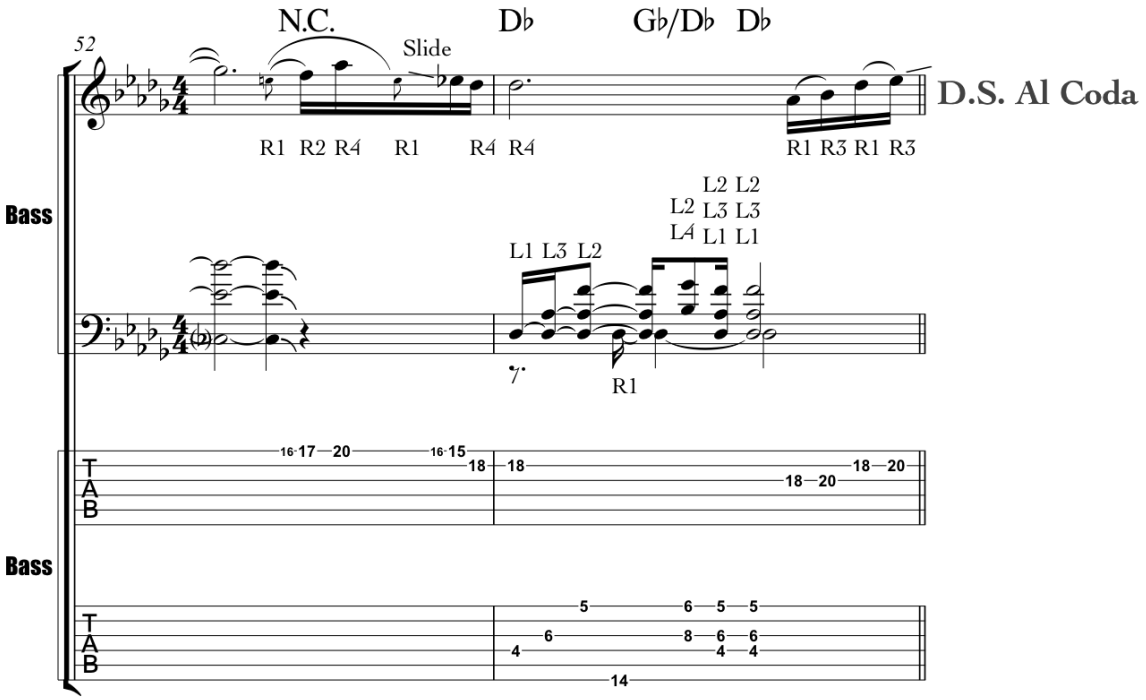

40
Db/Ab
Bb7(#5)
Bb7
Ebm7
Ab7(sus4)
To Coda
P.O.
Bass
Bass
42
Dbm7
Gb13
Ab7(sus4)
Bass
Bass

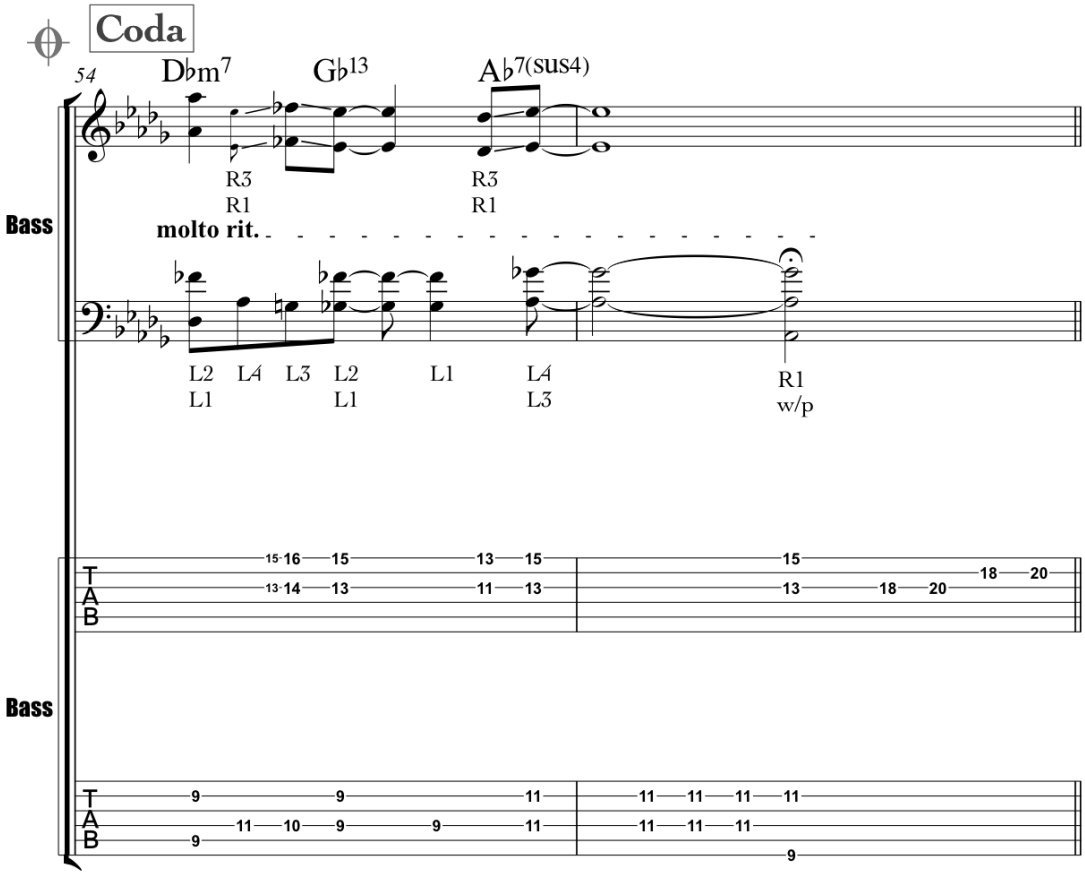

A4
Solo Feel
Db
Db/F
Gb
Ab
44
Bass
R1 R3 R1 R3 R1 R1 R3 R1 R3 R1 R3 R1 R1 R3 R4
L2 L1 L2 L3 L2 L4 L2 L4 L2 L1
T A B
Bass
T A B

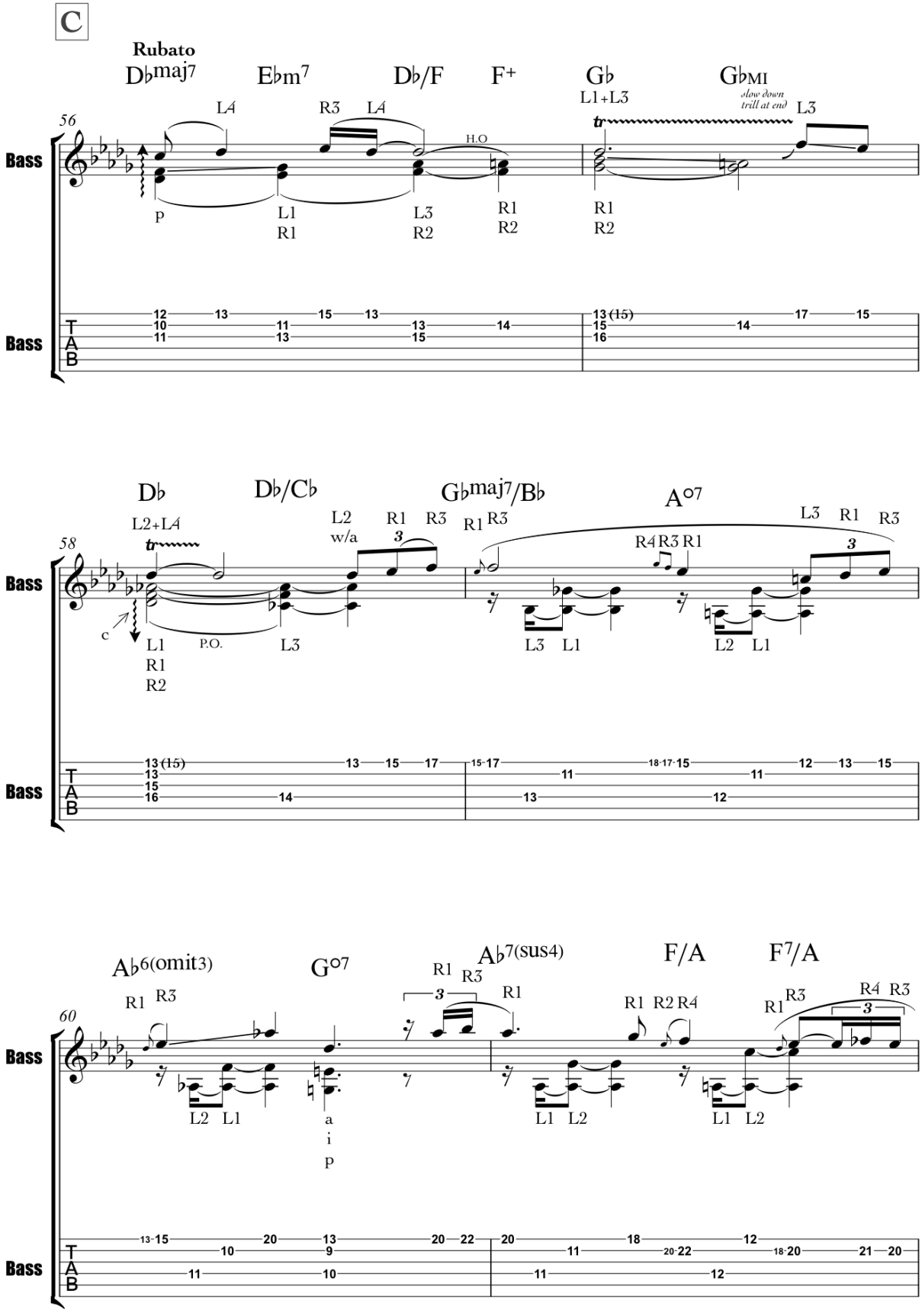

Db
Db/F
Gb
Ab(sus4)
46
Bass
R1 R3 R2 R1 R3 R1 R3 R1 R2 R1 R4 R1 R2 R3 R1 R1 R3 R1 R1 R2 R1 R3 R1
L4 L3 L4 L4
L2 L2 L2 L1 L2 L2 L2 L1
T A B
Bass
T A B

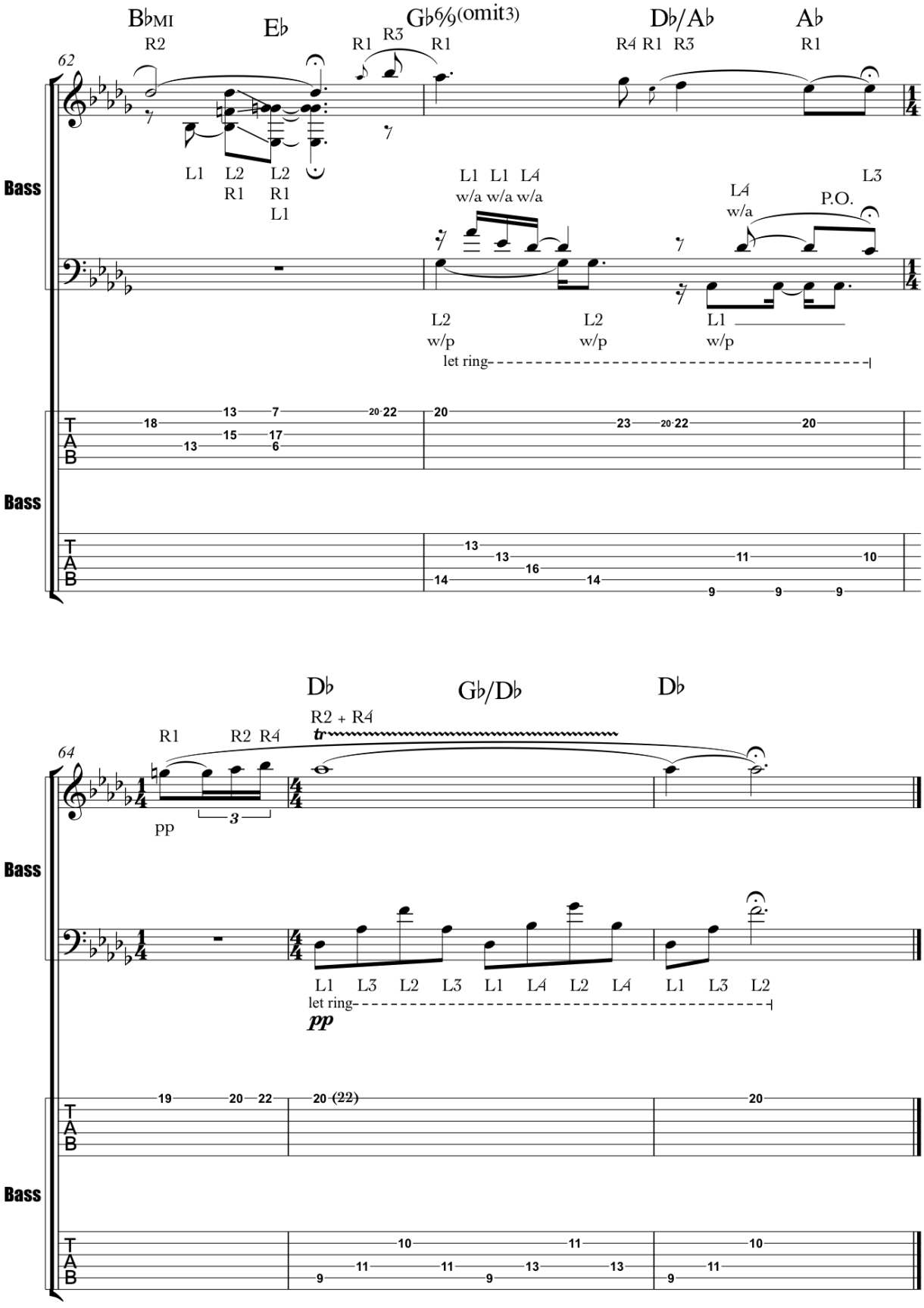

48
D♭
D♭/F
G♭
E♭/G
R1 R3 R1 R1 R3 R1 R1 R2 R1 R3 R1 R1 R3 R1 R1 R3 R1
Bass
L4
L3
L2 L2 L2 L1 L4 L4 L2 L1 L2
L2 L2
T
A
B
18 20 18 18 20 22 20 18 18 18 18 15 13 18 20 18 18 20 22 20
Bass
10 8 9 8 9 8 10 10 9 10 17 18 18


50
B♭MI/A♭
F/A
C♭maj9(omit3)
B♭MI
A♭/C
D♭
C♭(add9)
R1 R3 R1 R1 R3 R1 R3 R1 R1 R3 R1 R3 R4
Bass
L1 L2 L3 L2 L3 L2 L4 L1 L2 L1 L3 L3 L2 L1
T
A
B
18 20 18 18 20 22 20 22 20 20 22 18 20 22 23
Bass
10 11 12 12 12 10 8 8 9 13 13 12

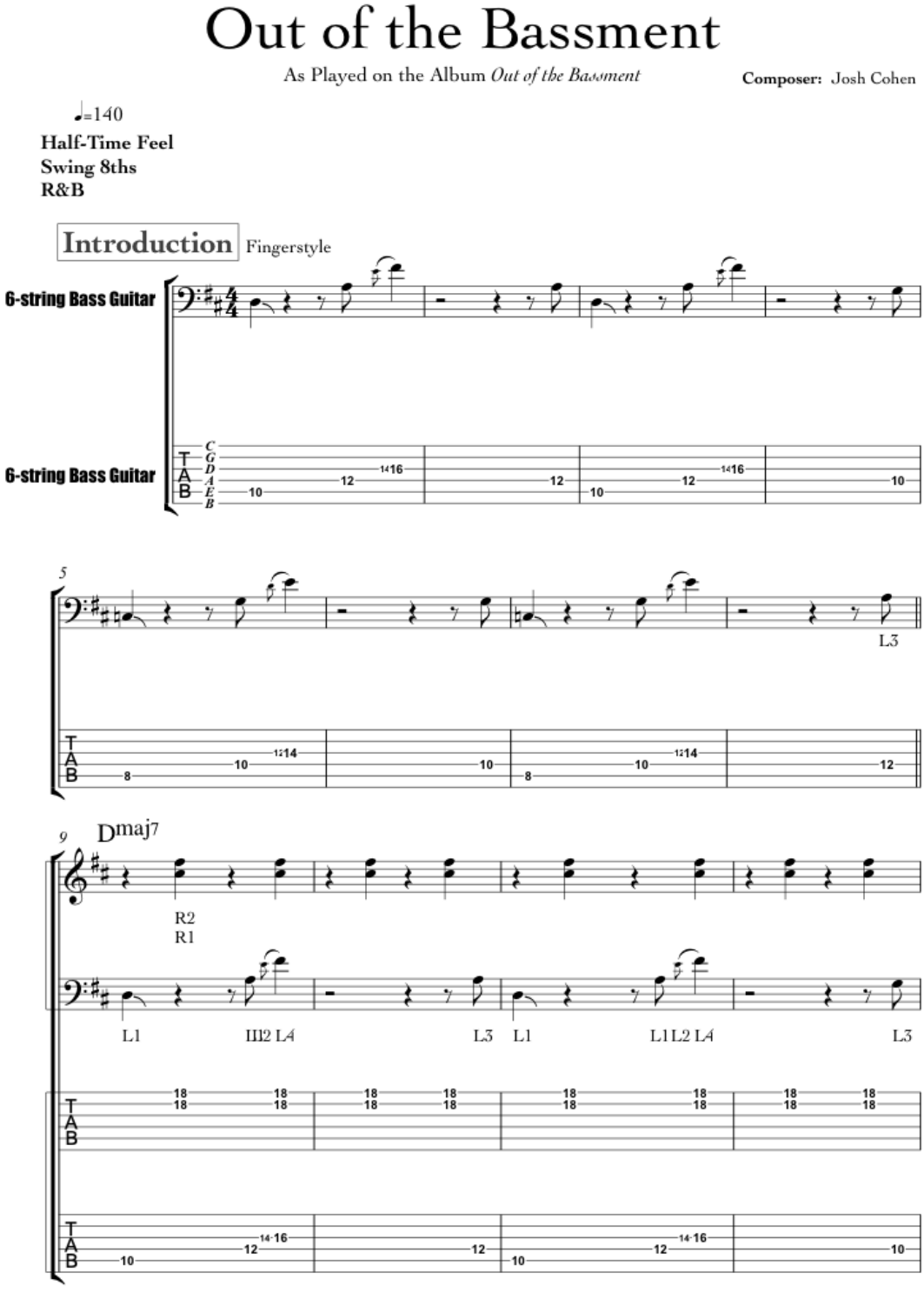

52
N.C.
Slide
D♭
G♭/D♭
D♭
D.S. Al Coda
R1 R2 R4 R1 R4 R4
R1 R3 R1 R3
Bass
L1 L3 L2
L2 L2
L2 L3 L3
L4 L1 L1
R1
Bass

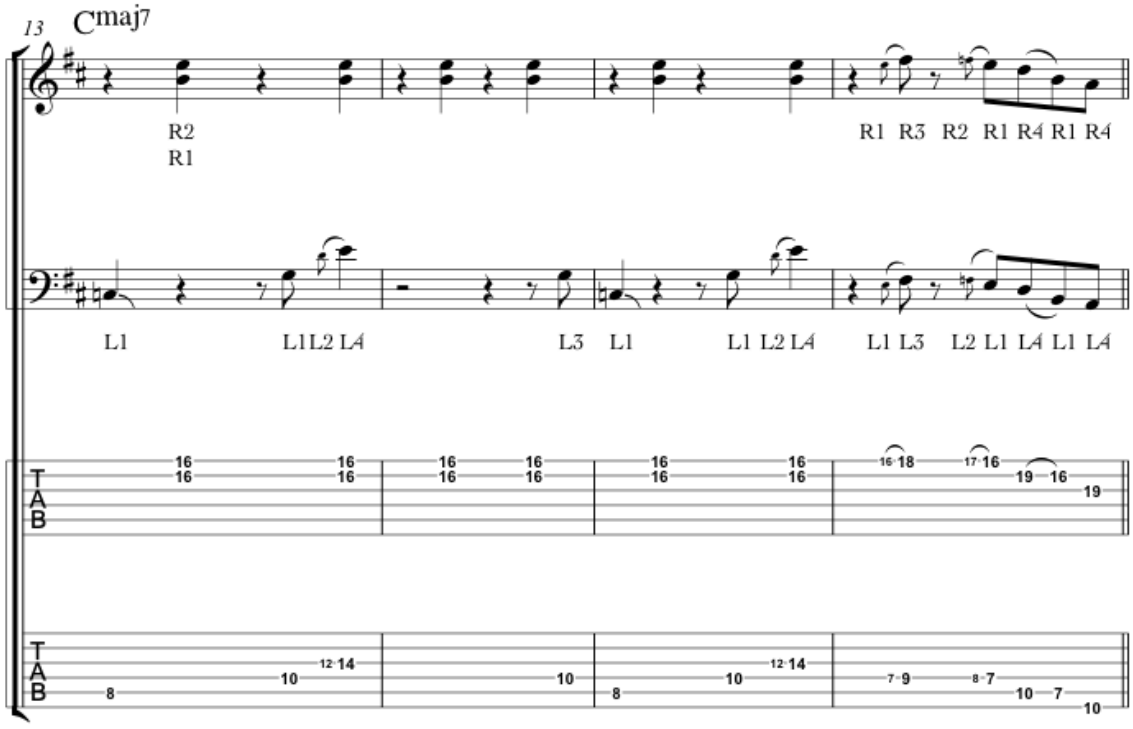

Coda
54
D♭m7
G♭13
A♭7(sus4)
R3
R1
R3
R1
Bass
molto rit.
L2 L4 L3 L2 L1 L4
L1 L1 L3
R1
w/p
Bass

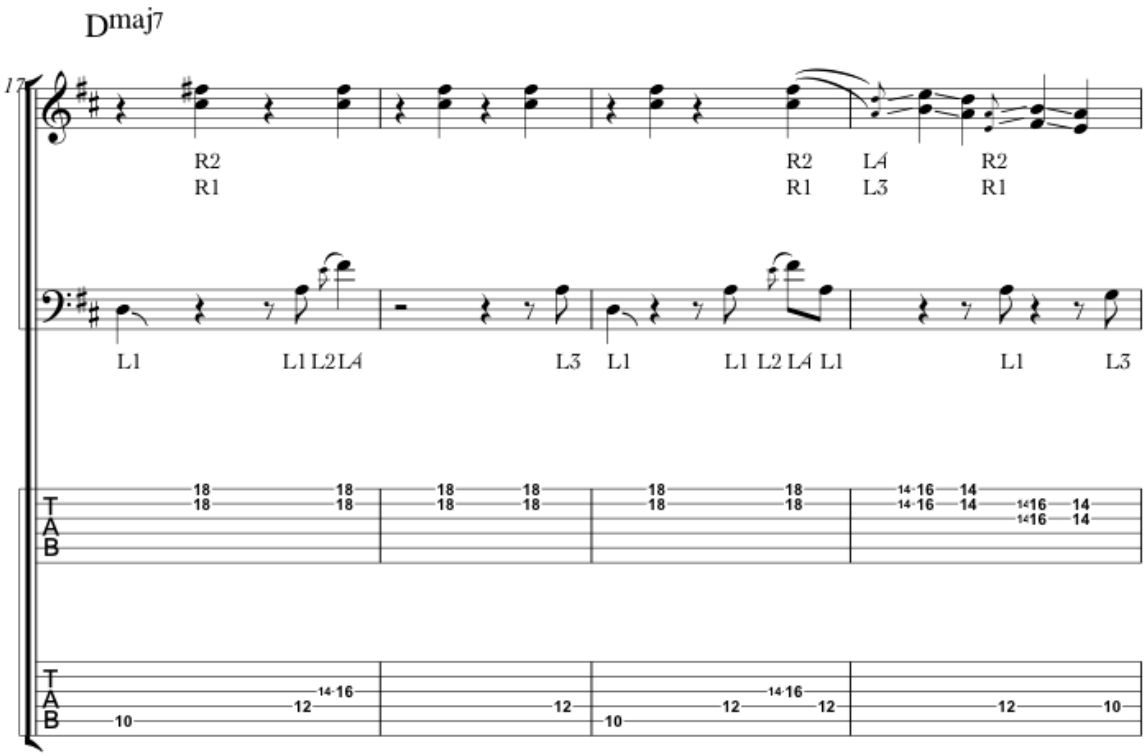

C
Rubato
Db maj7
Eb m7
Db/F
F+
Gb
Gb MI
slow down trill at end
56
Bass
L4
R3 L4
H.O
L1+L3
L3
p
L1 R1
L3 R2
R1 R2
R1 R2
TAB
Bass
Db
Db/Cb
Gb maj7/Bb
A o7
58
L2+L4
L2 w/a
R1 R3
R1 R3
L3 R1 R3
R4 R3 R1
c
L1 R1 R2
P.O.
L3
L3 L1
L2 L1
Bass
TAB
Bass
Ab 6(omit3)
G o7
Ab 7(sus4)
F/A
F7/A
60
R1 R3
R1 R3
R1
R1 R2 R4
R1 R3
R4 R3
L2 L1
a i p
L1 L2
L1 L2
Bass
TAB
Bass

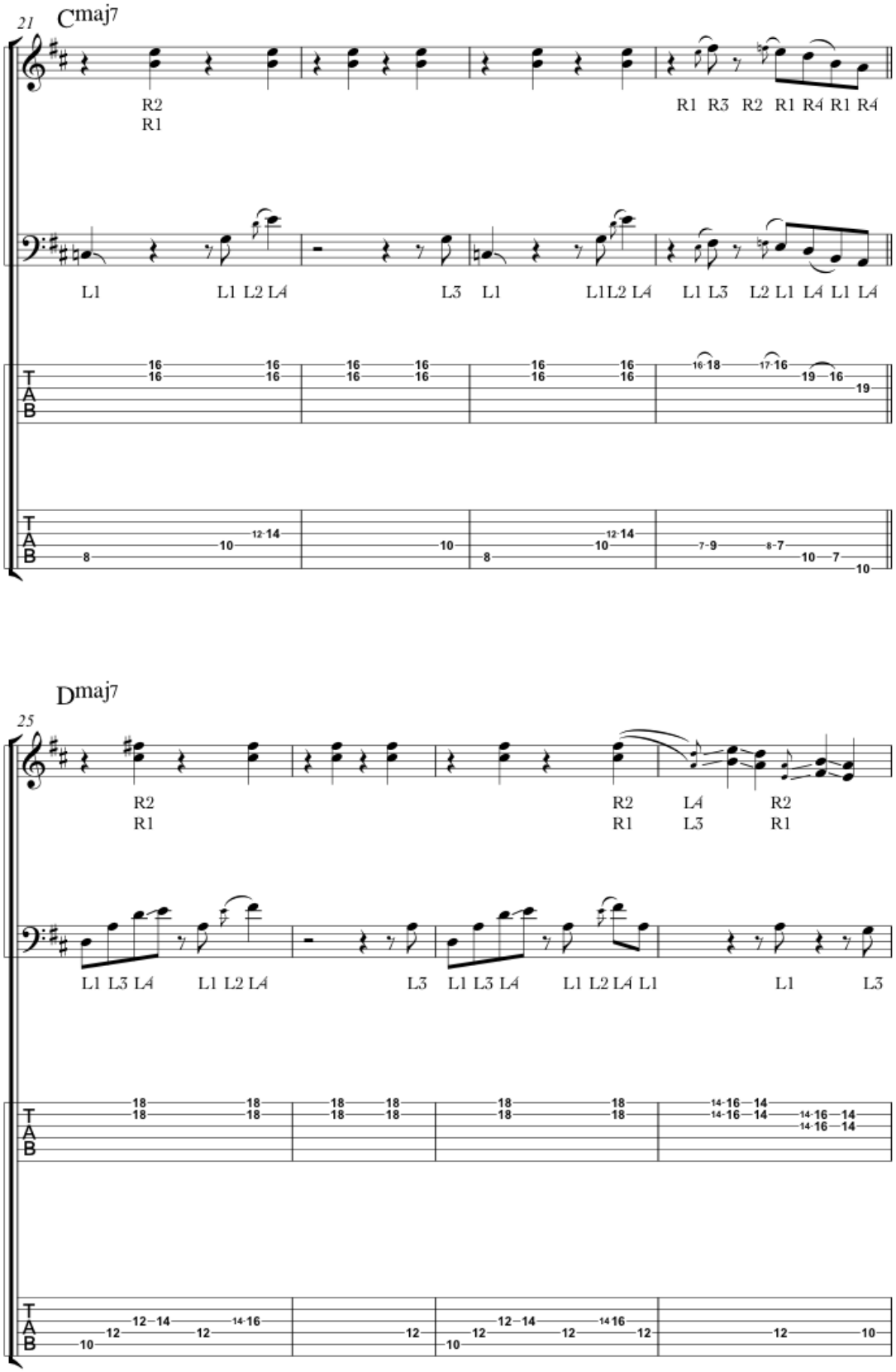

B♭MI
R2
E♭
G♭6/9(omit3)
R1 R3 R1
D♭/A♭
R4 R1 R3
A♭
R1
62
Bass
L1 L2 L2
R1 R1
L1
L1 L1 L4
w/a w/a w/a
L4
w/a
P.O.
L3
L2 L2 L1
w/p w/p w/p
let ring
TAB
18 13 7 20 22 20 23 20 22 20
13 15 17 6
13 13 16 11 10
14 14 9 9 9
D♭
G♭/D♭
D♭
R2 + R4
R1 R2 R4
tr
64
pp
3
L1 L3 L2 L3 L1 L4 L2 L4 L1 L3 L2
let ring
pp
19 20 22 20 (22) 20
10 11 10
9 11 11 9 13 13 9 11

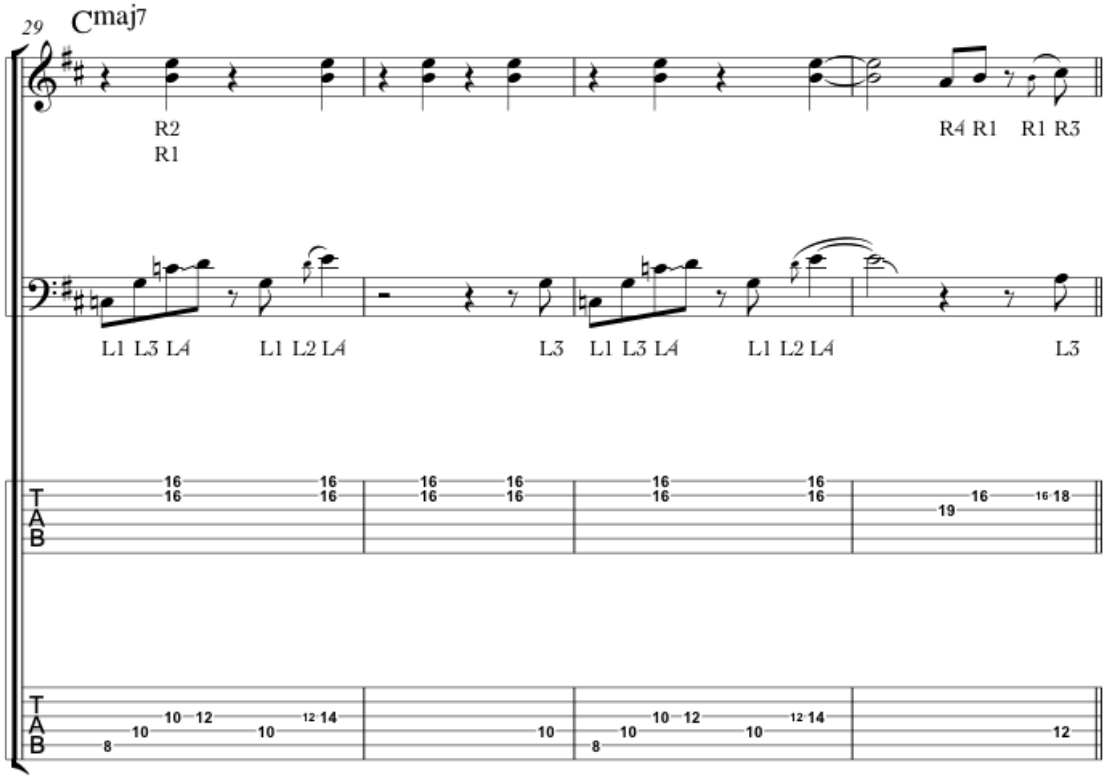
APPENDIX B: "Out of the Bassment" Full Score

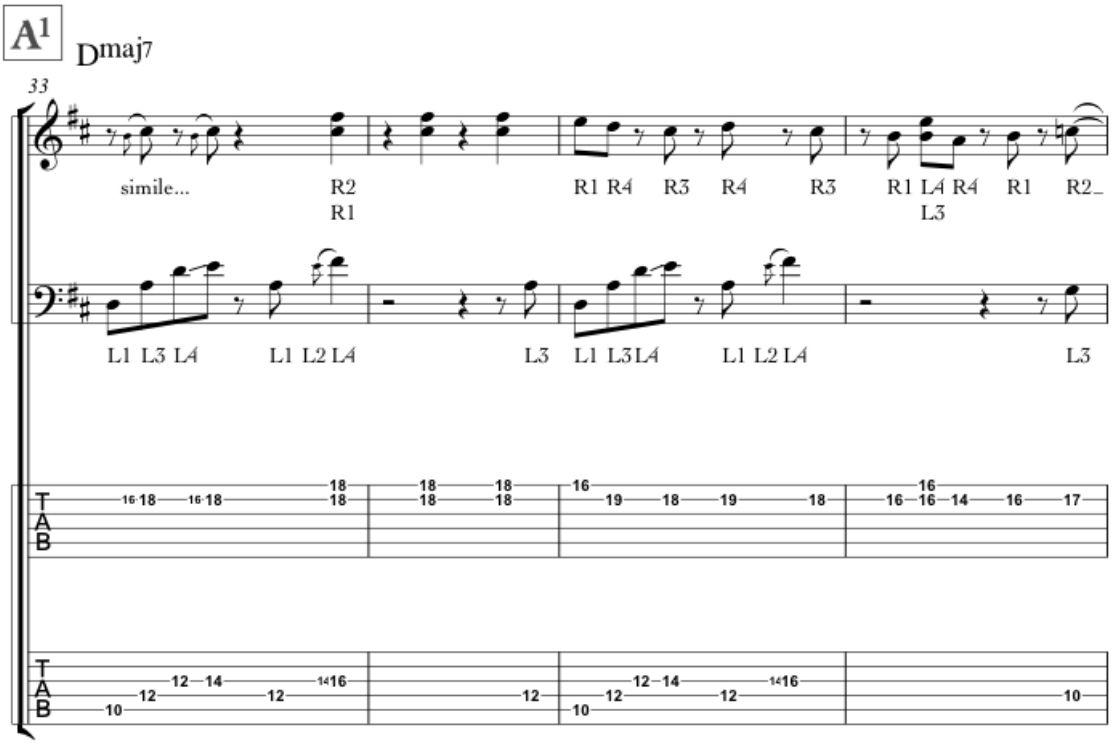


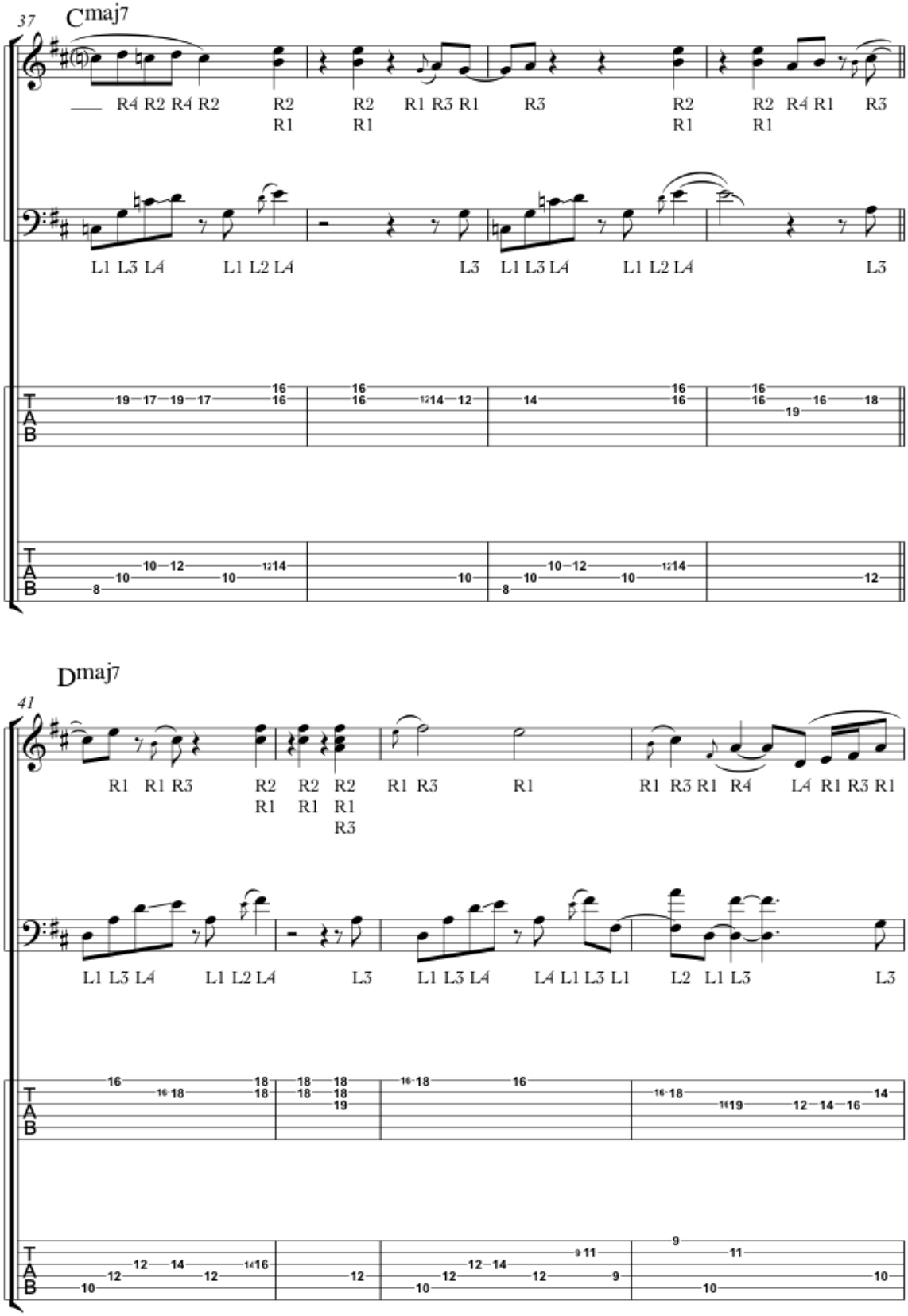

13
Cmaj7
R2
R1
R1 R3 R2 R1 R4 R1 R4
L1
L1 L2 LA
L3
L1
L1 L2 LA
L1 L3 L2 L1 LA L1 LA
T
A
B

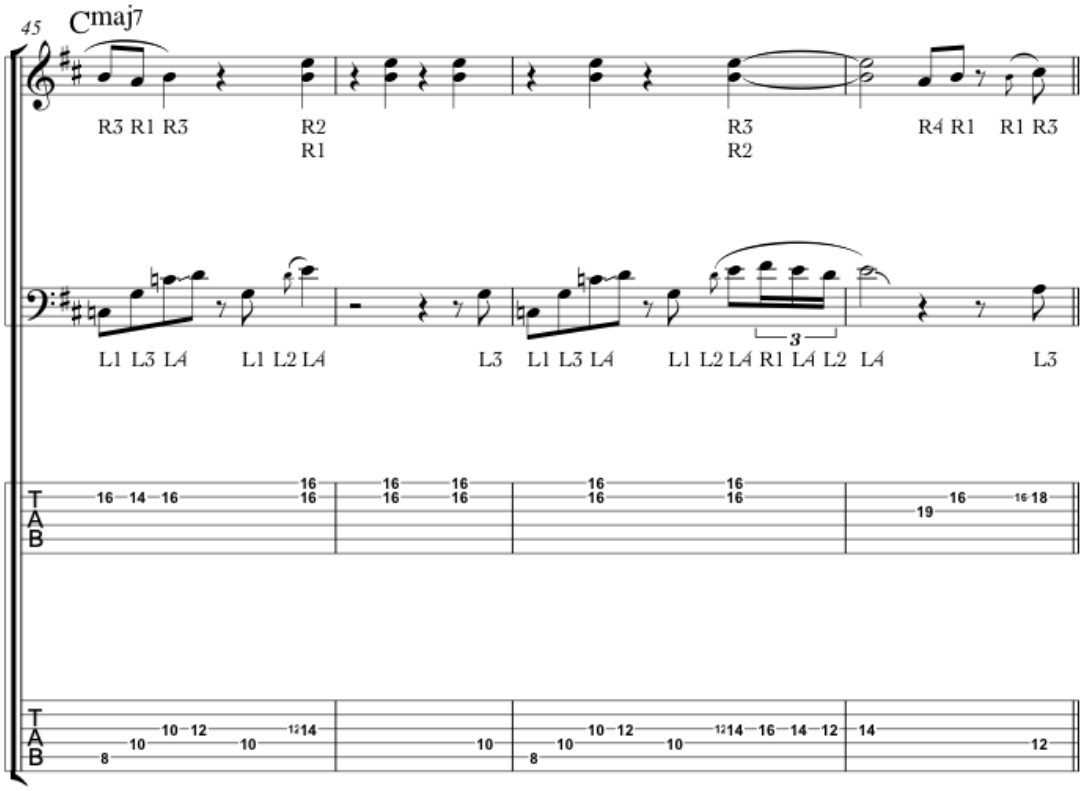

17
Dmaj7
R2
R1
R2
R1
LA
L3
R2
R1
L1
L1 L2 LA
L3
L1
L1 L2 LA L1
L1
L3
T
A
B

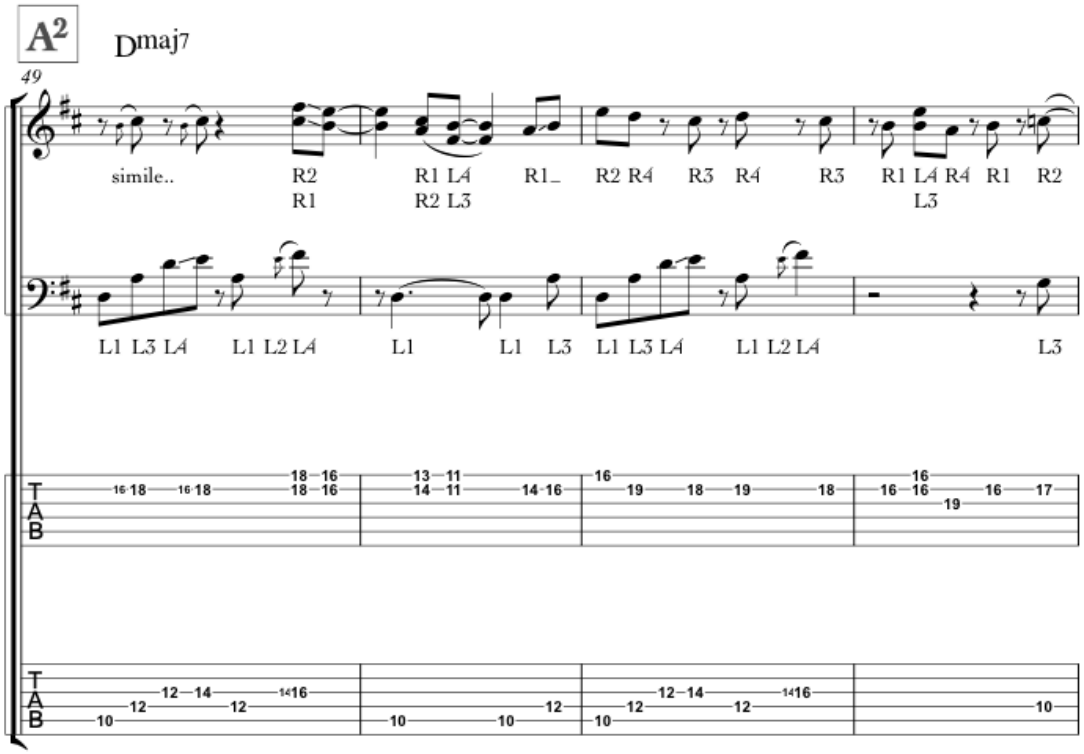

21
Cmaj7
R2
R1
R1 R3 R2 R1 R4 R1 R4
L1
L1 L2 L4
L3 L1
L1L2 L4
L1 L3 L2 L1 L4 L1 L4
Dmaj7
25
R2
R1
R2
R1
L4
L3
R2
R1
L1 L3 L4
L1 L2 L4
L3 L1 L3 L4
L1 L2 L4 L1
L1
L3

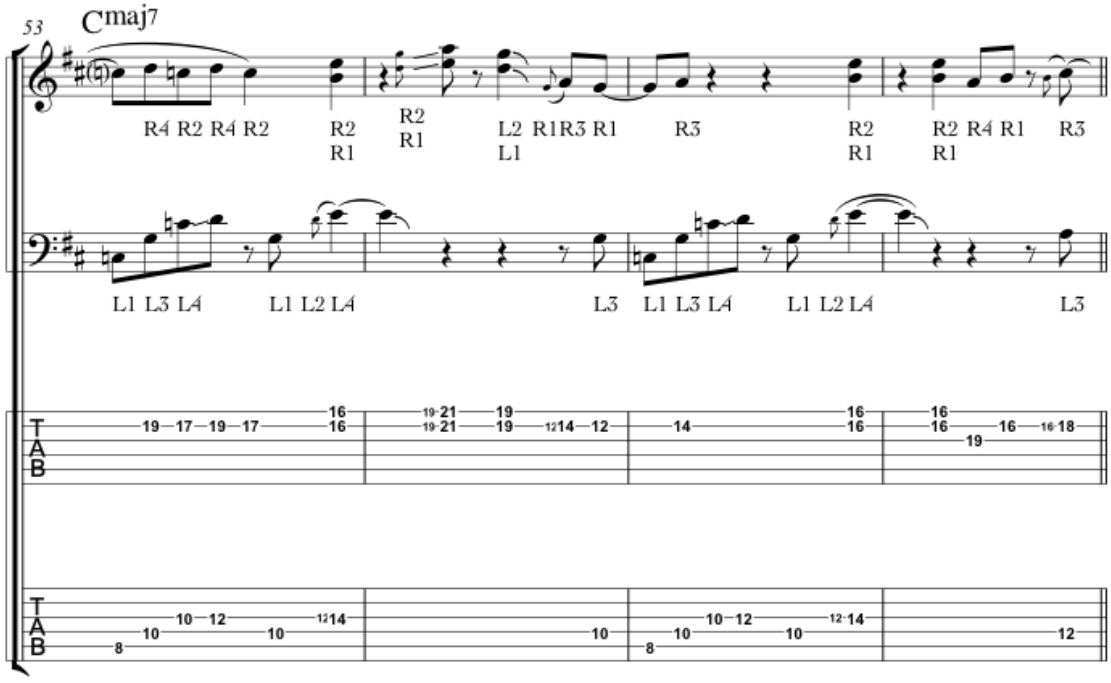

29
Cmaj7
R2
R1
R4 R1 R1 R3
L1 L3 LA L1 L2 LA L3 L1 L3 LA L1 L2 LA L3
TAB

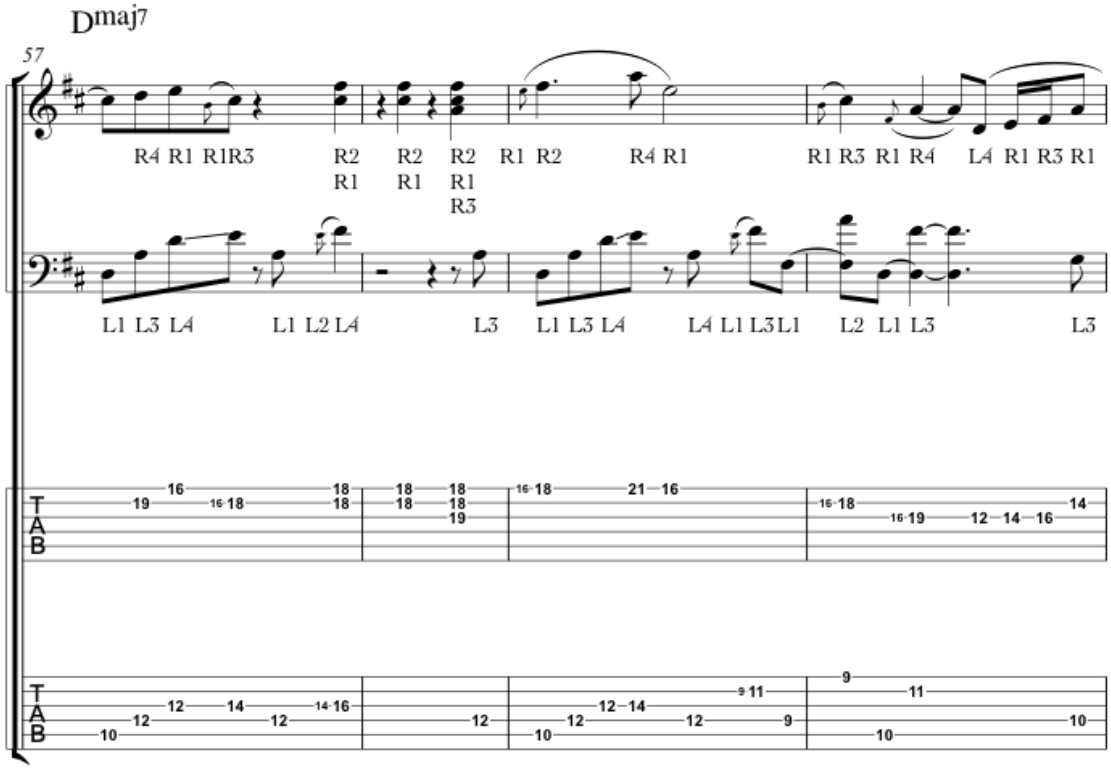

A1
Dmaj7
33
simile...
R2
R1
R1 R4 R3 R4 R3 R1 LA R4 R1 R2
L3
L1 L3 LA L1 L2 LA L3 L1 L3LA L1 L2 LA L3
TAB

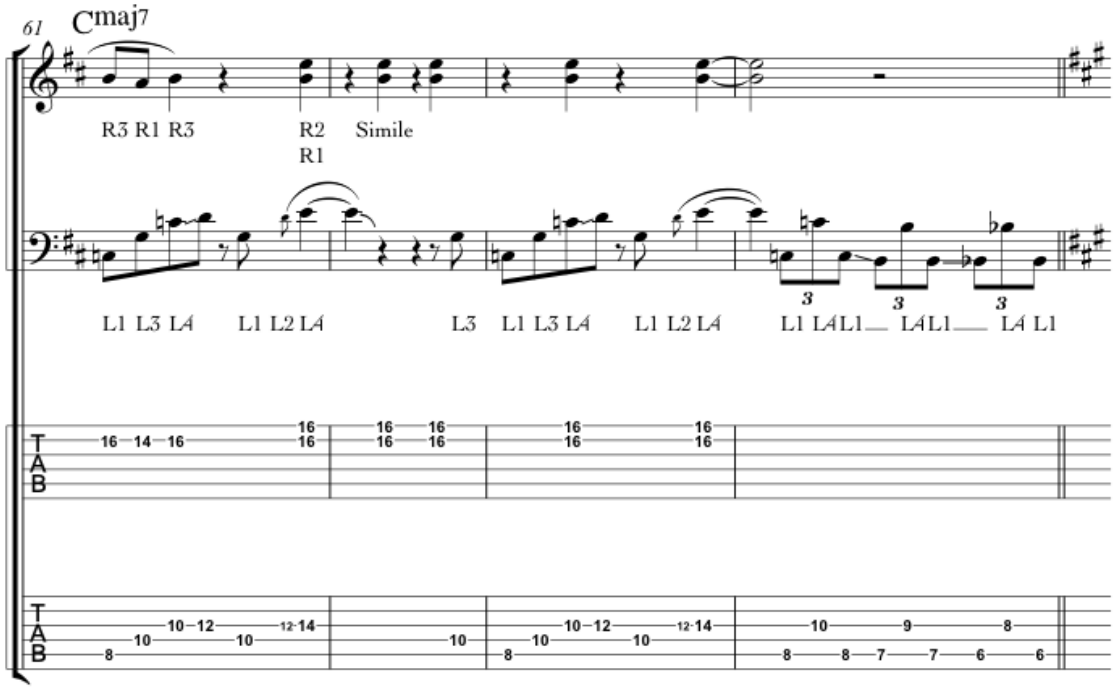

37
Cmaj7
R4 R2 R4 R2
R2
R1
R2
R1
R1 R3 R1
R3
R2
R1
R2 R4 R1
R3
L1 L3 L4
L1 L2 L4
L3
L1 L3 L4
L1 L2 L4
L3
T
A
B
Dmaj7
41
R1 R1 R3
R2
R1
R2
R1
R2
R1
R3
R1 R3
R1
R1 R3 R1 R4
L4 R1 R3 R1
L1 L3 L4
L1 L2 L4
L3
L1 L3 L4
L4 L1 L3 L1
L2 L1 L3
L3

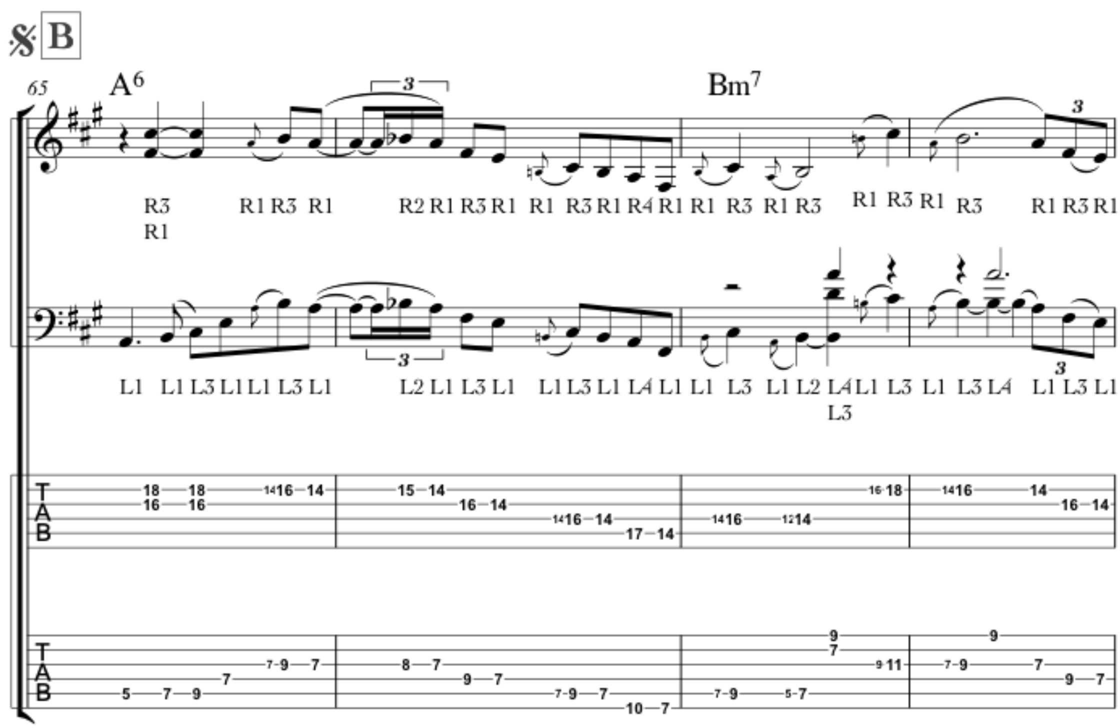

45
Cmaj7
R3 R1 R3
R2
R1
R3
R2
R4 R1
R1 R3
L1 L3 LA
L1 L2 LA
L3
L1 L3 LA
L1 L2 LA R1 LA L2
LA
L3
3
T
A
B

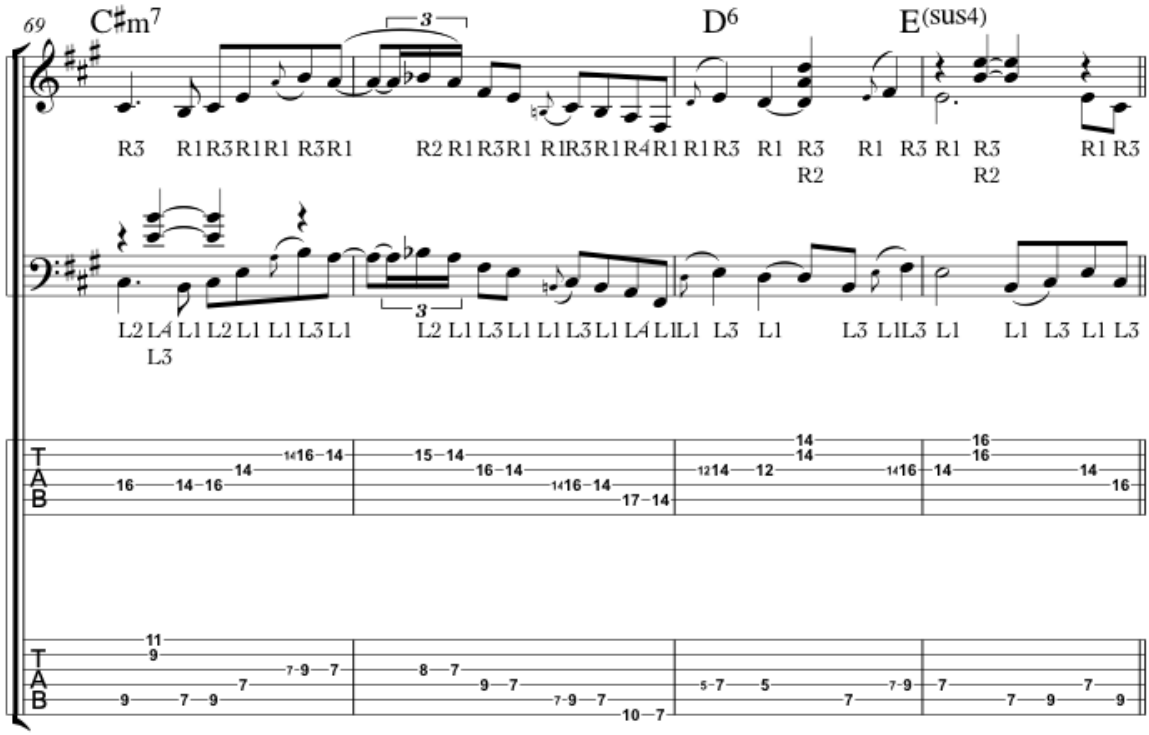

A2
Dmaj7
49
simile..
R2
R1
R1 LA
R2 L3
R1_
R2 R4
R3
R4
R3
R1 LA R4
L3
R1
R2
L1 L3 LA
L1 L2 LA
L1
L1
L3
L1 L3 LA
L1 L2 LA
L3
T
A
B

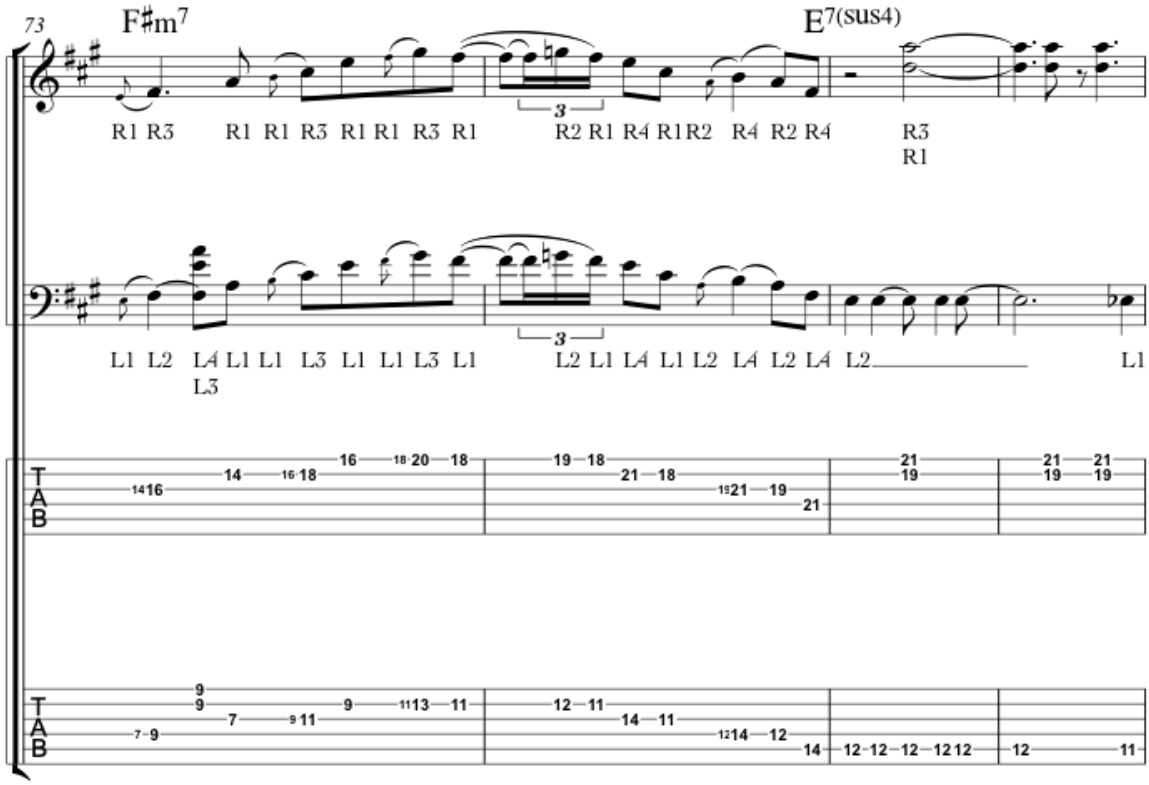

53
Cmaj7

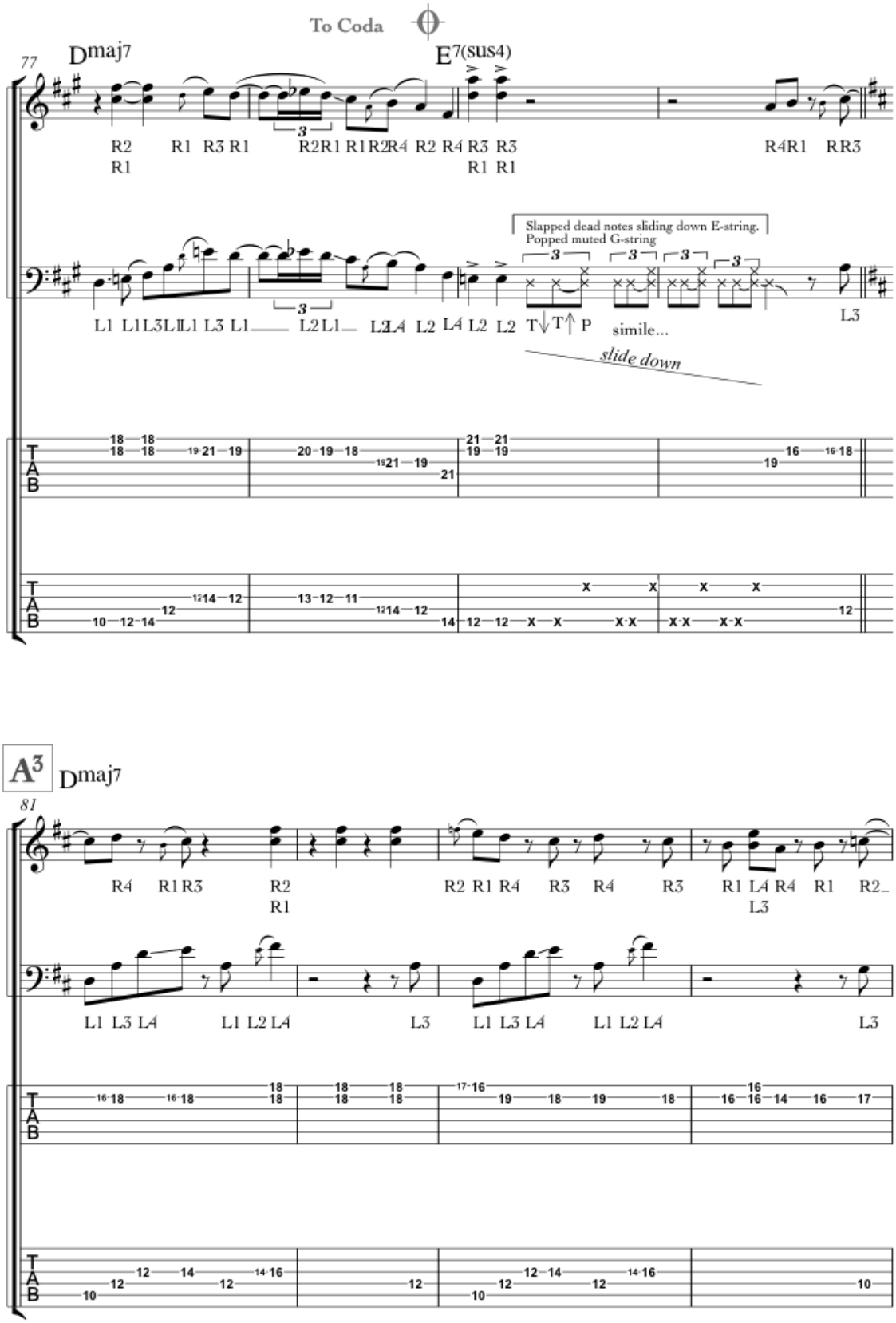

57
Dmaj7

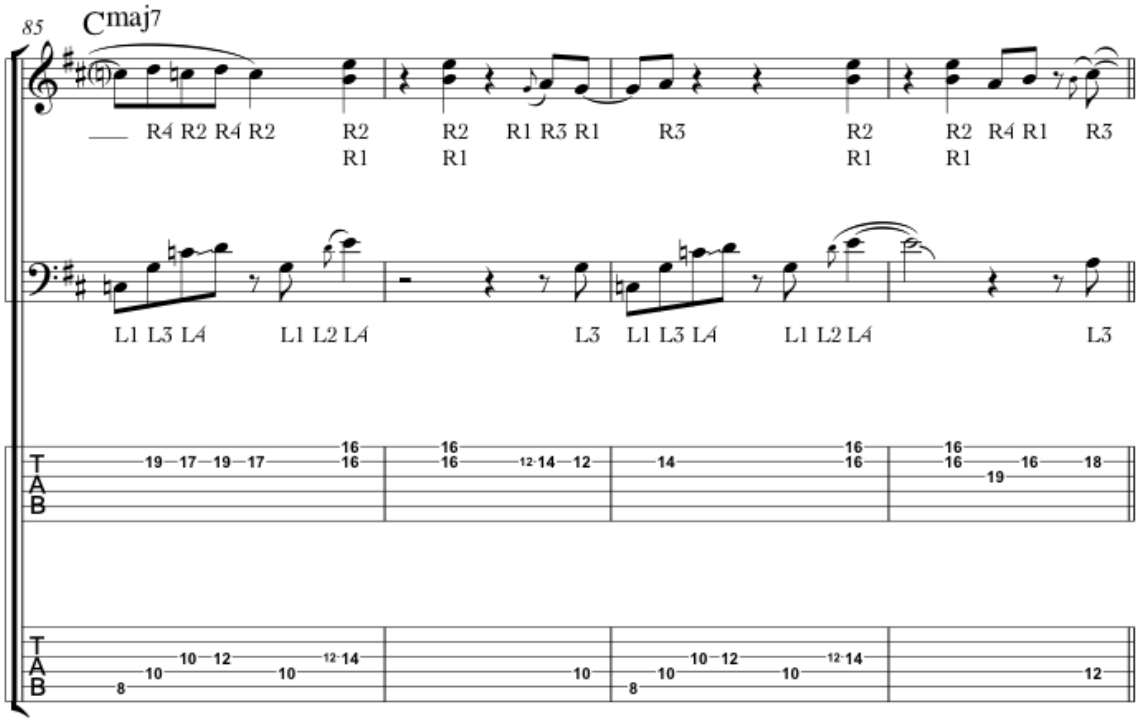

61
Cmaj7
R3 R1 R3
R2
R1
Simile
L1 L3 L4 L1 L2 L4 L3 L1 L3 L4 L1 L2 L4 L1 L4 L1 L4 L1 L4 L1

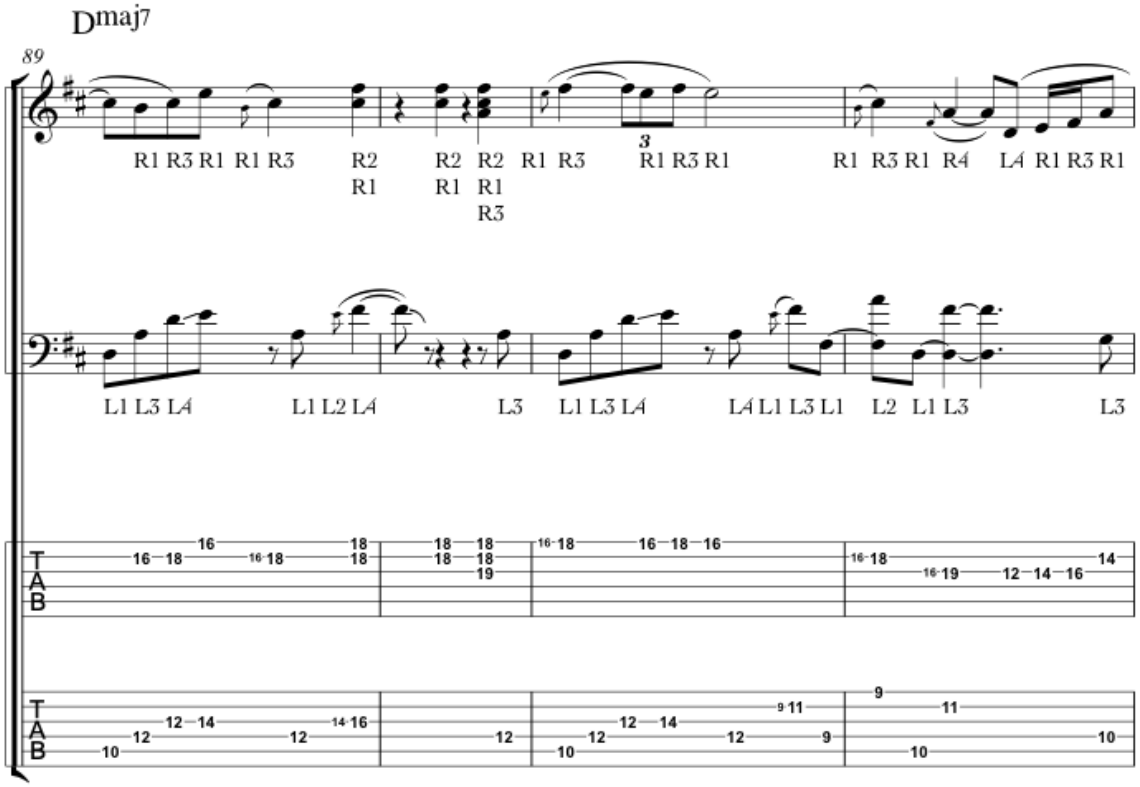

B
65
A6
Bm7
R3
R1
R1 R3 R1 R2 R1 R3 R1 R1 R3 R1 R4 R1 R1 R3 R1 R3 R1 R3 R1 R3 R1 R3 R1
L1 L1 L3 L1 L1 L3 L1 L2 L1 L3 L1 L1 L3 L1 L4 L1 L1 L3 L1 L2 L4 L1 L3 L1 L3 L4 L1 L3 L1
L3

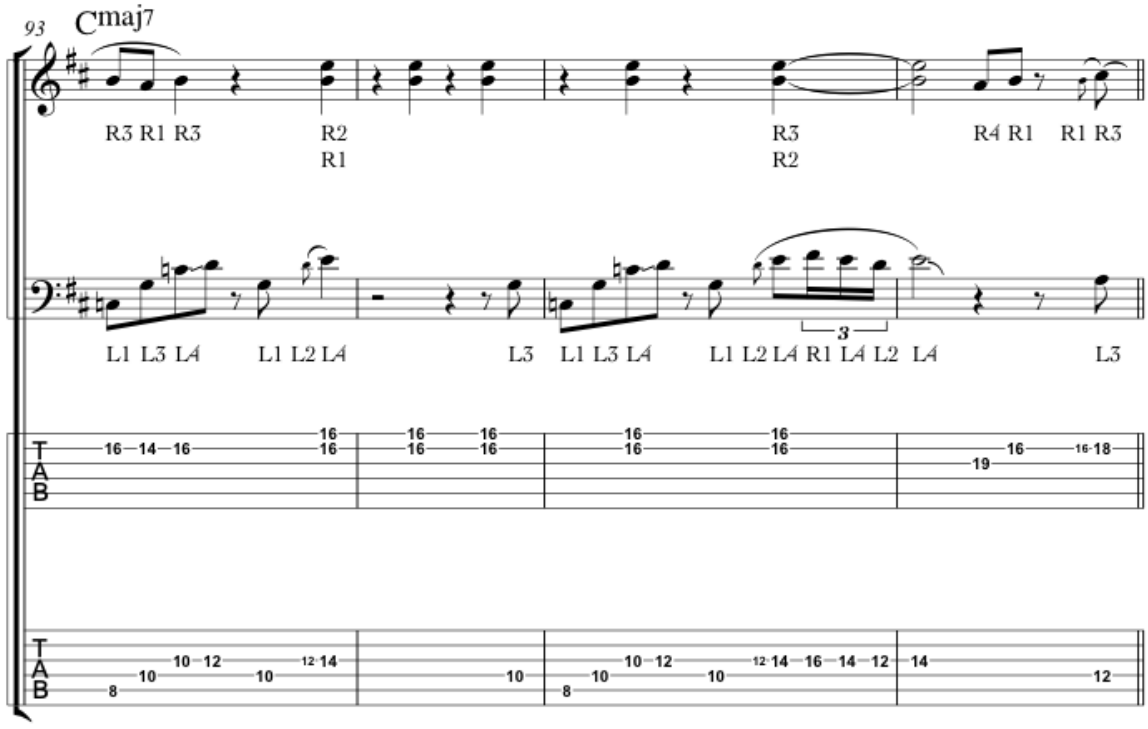

69
C♯m7
D6
E(sus4)

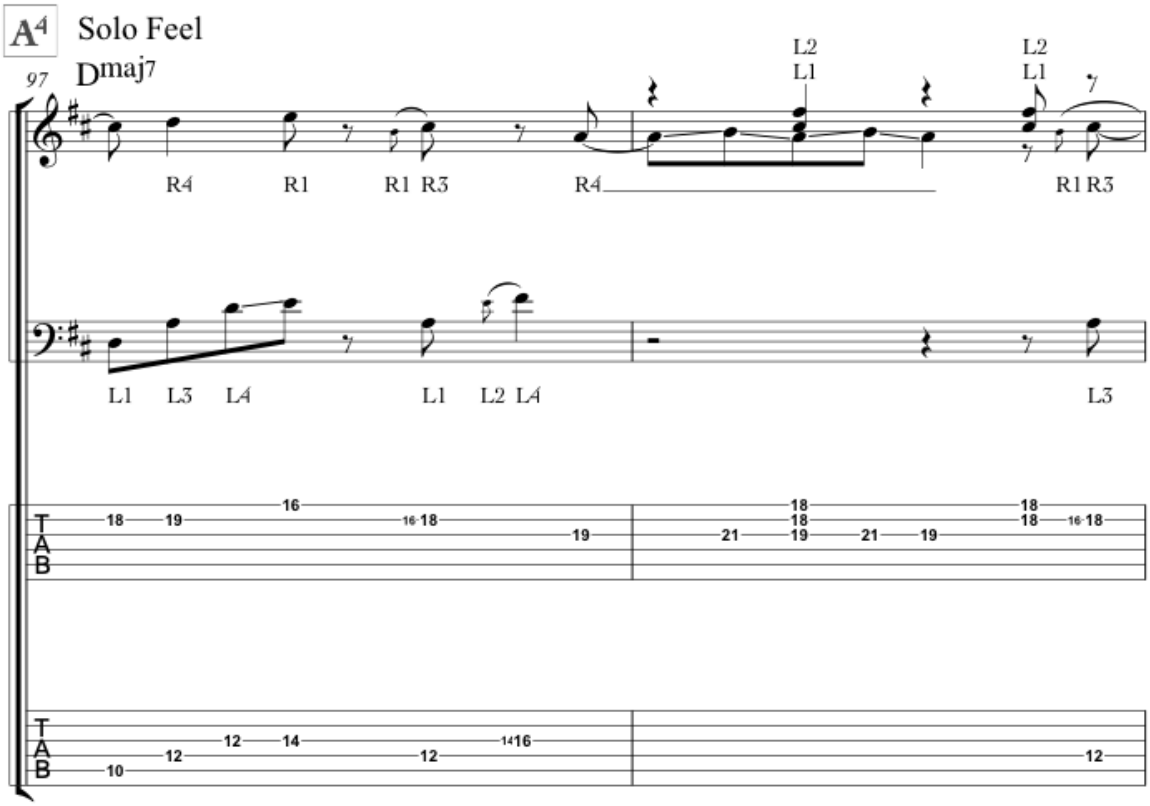

73
F♯m7
E7(sus4)

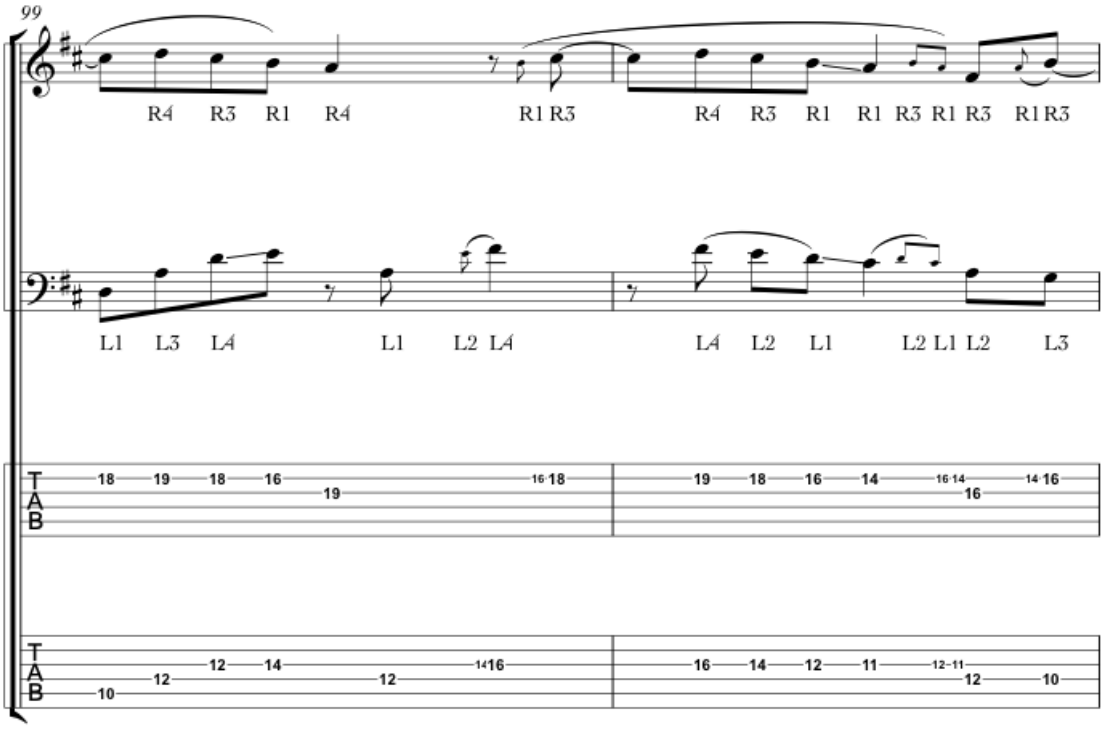

To Coda
77
Dmaj7
E7(sus4)
Slapped dead notes sliding down E-string.
Popped muted G-string
simile...
slide down
A3
Dmaj7
81

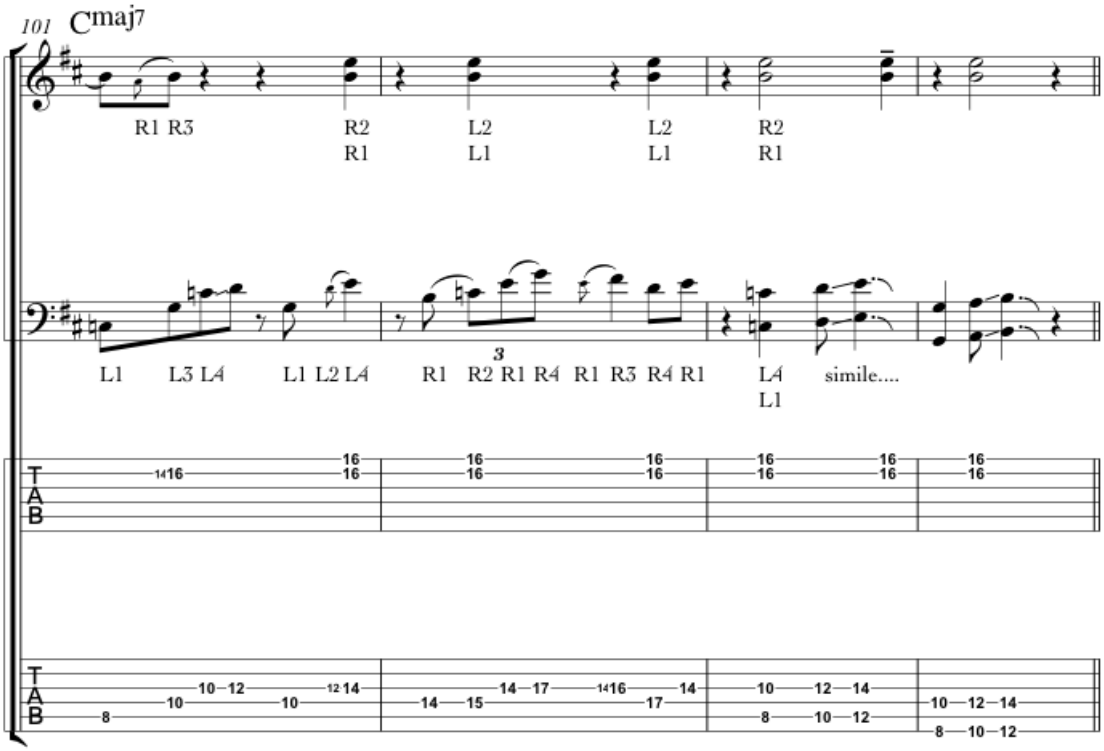

85
Cmaj7
R4 R2 R4 R2 R2 R2 R2 R1 R3 R1 R3 R2 R2 R4 R1 R3
R1 R1 R1 R1
L1 L3 L4 L1 L2 L4 L3 L1 L3 L4 L1 L2 L4 L3
TAB
19 17 19 17 16 16 16 16 12 14 12 14 16 16 16 16 19 16 18
TAB
8 10 10 12 10 12 14 10 8 10 10 12 10 12 14 12

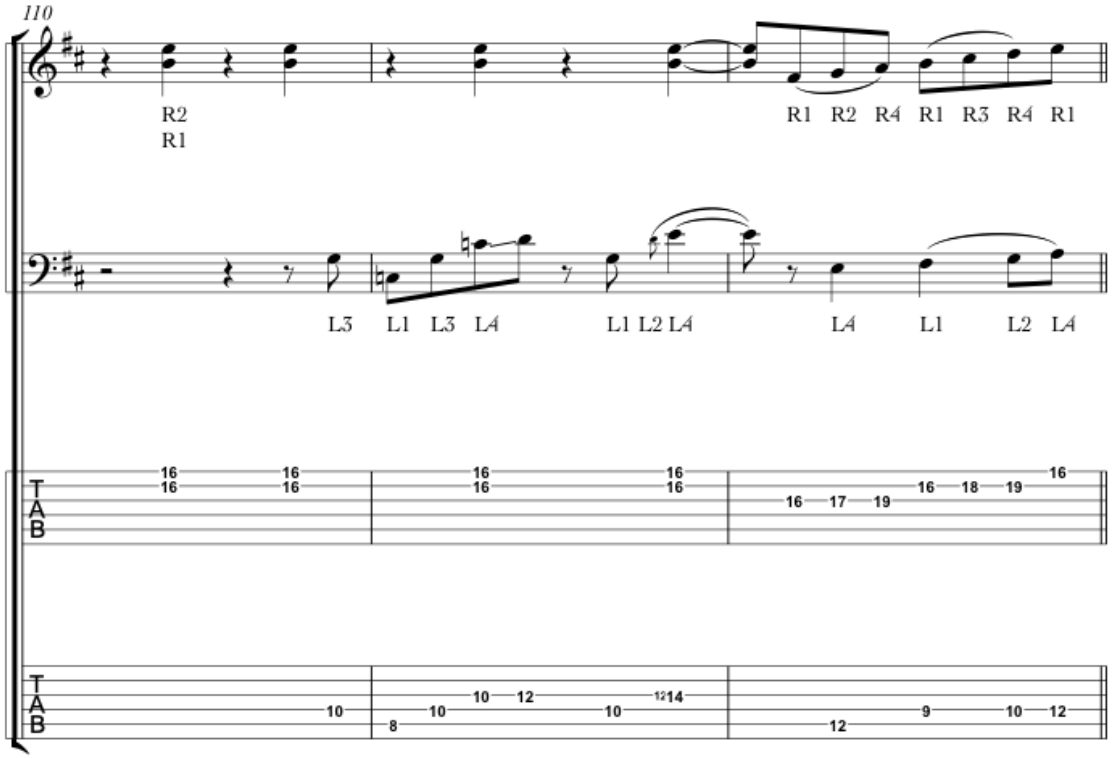

Dmaj7
89
R1 R3 R1 R1 R3 R2 R2 R2 R1 R3 R1 R3 R1 R1 R3 R1 R4 L4 R1 R3 R1
R1 R1 R1 R3
3
L1 L3 L4 L1 L2 L4 L3 L1 L3 L4 L4 L1 L3 L1 L2 L1 L3 L3
TAB
16 16 18 16 16 18 18 18 18 18 18 19 16 18 16 18 16 16 18 16 19 12 14 16 14
TAB
10 12 12 14 12 14 16 12 12 10 12 12 14 9 11 12 9 9 11 10 10

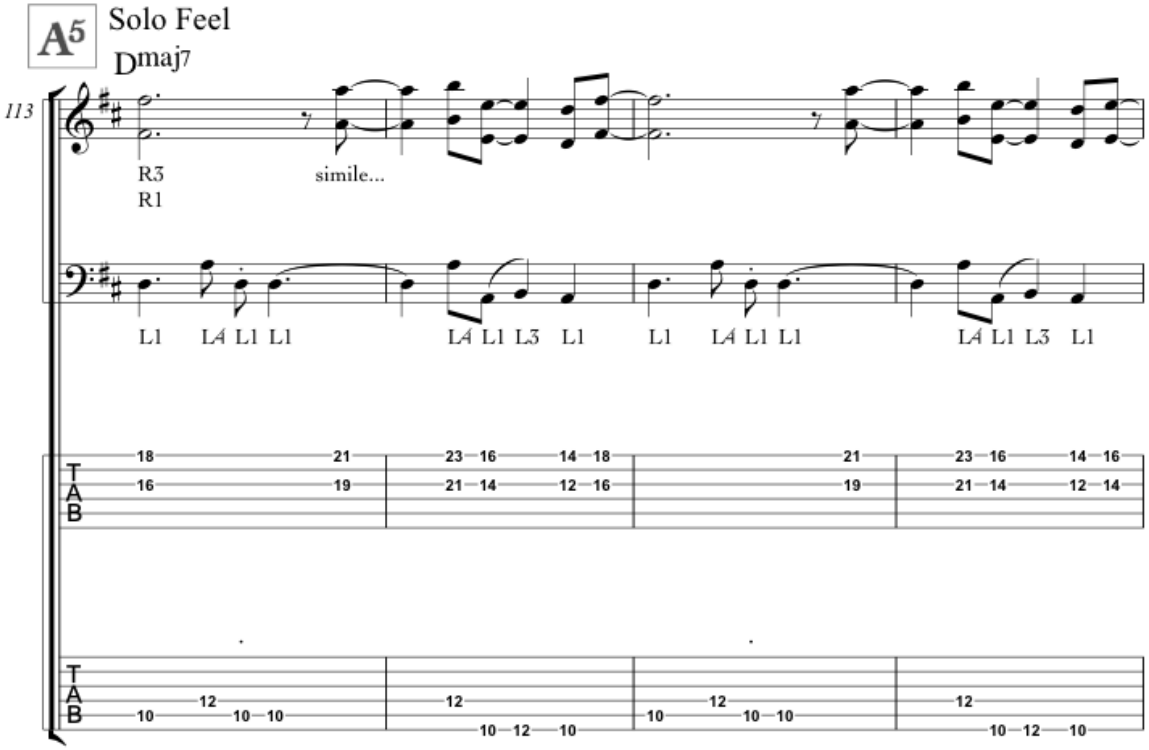

93
Cmaj7
R3 R1 R3
R2
R1
R3
R2
R4 R1
R1 R3
L1 L3 LA
L1 L2 LA
L3
L1 L3 LA
L1 L2 LA R1 LA L2 LA
L3
3
T
A
B

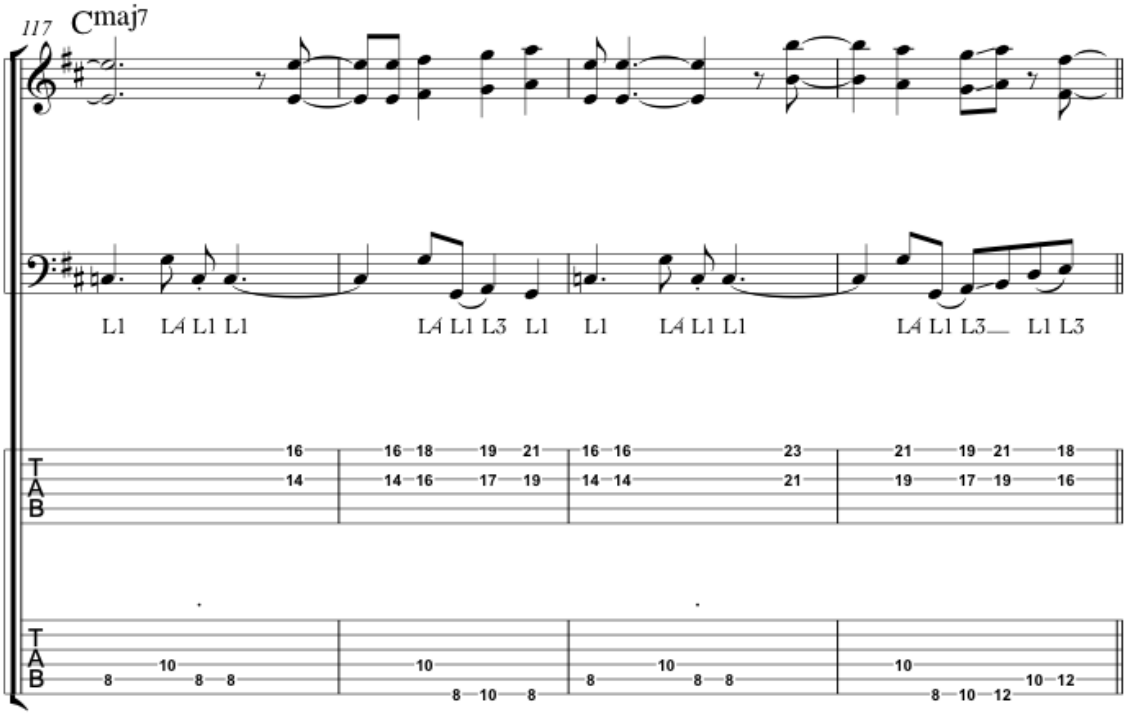

A4
Solo Feel
97
Dmaj7
R4
R1
R1 R3
R4
L2
L1
L2
L1
R1 R3
L1
L3
LA
L1
L2 LA
L3
T
A
B

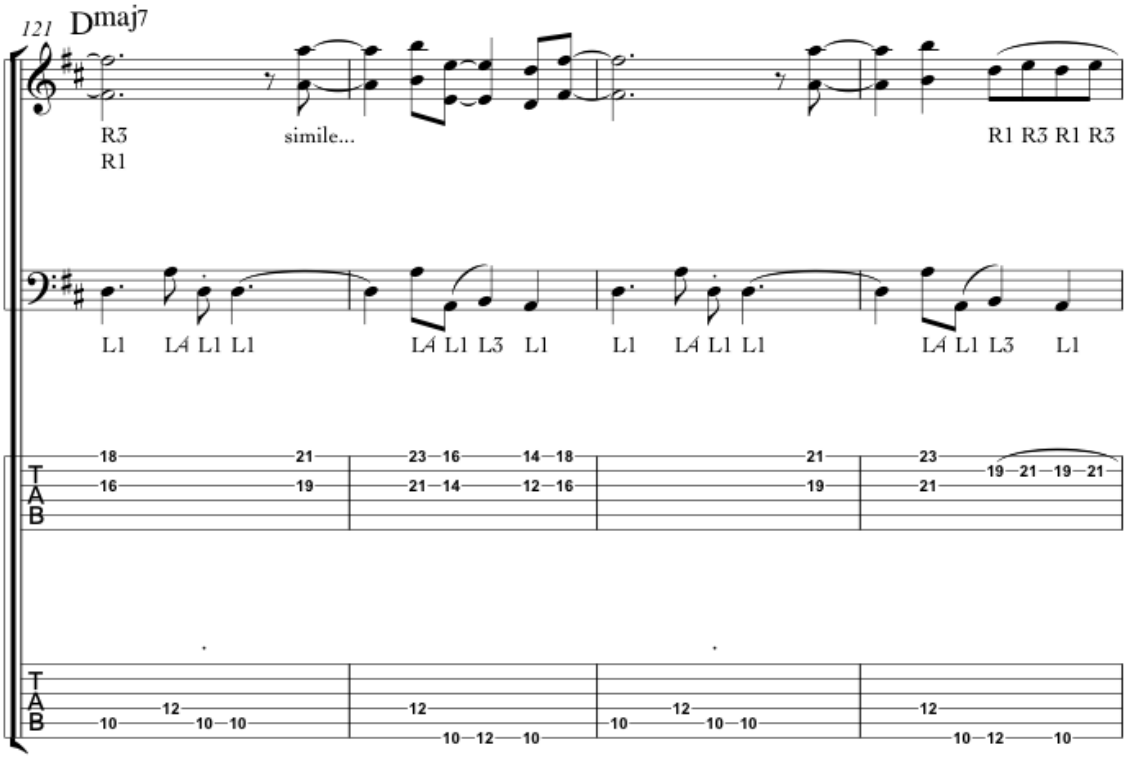

99
R4 R3 R1 R4 R1 R3 R4 R3 R1 R1 R3 R1 R3 R1 R3
L1 L3 L4 L1 L2 L4 L4 L2 L1 L2 L1 L2 L3
T A B
18 19 18 16 19 16 18 19 18 16 14 16 14 14 16 16
10 12 12 14 12 14 16 16 14 12 11 12 11 12 10

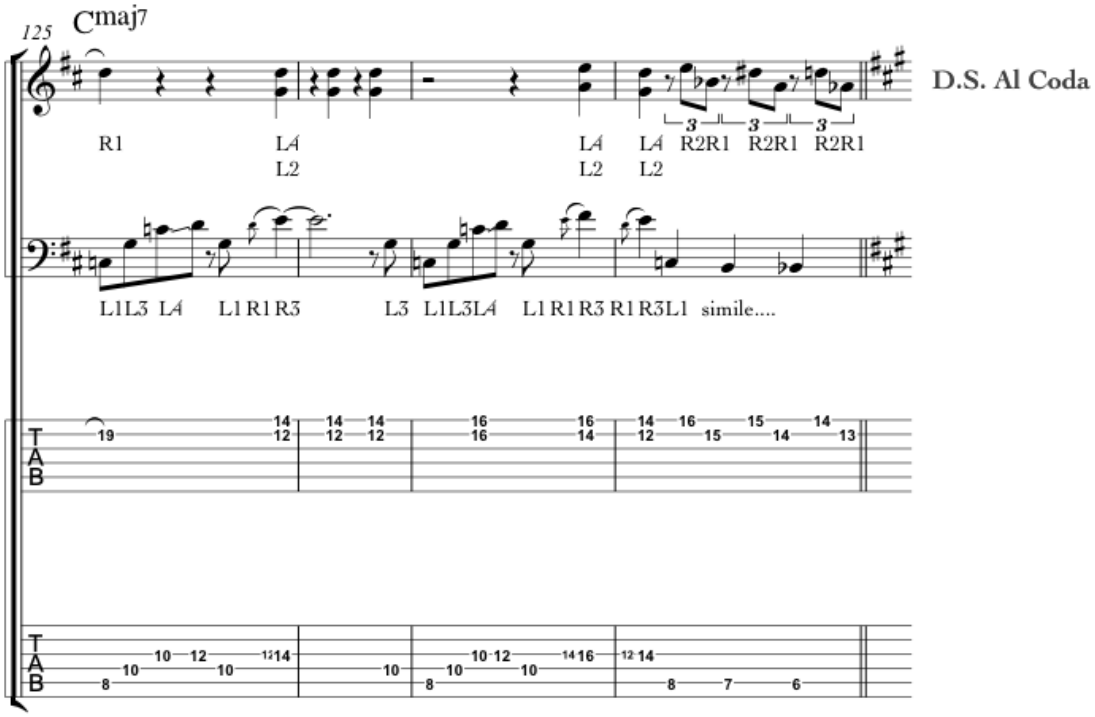

101 Cmaj7
R1 R3 R2 R1 L2 L1 L2 L1 R2 R1
L1 L3 L4 L1 L2 L4 R1 R2 R1 R4 R1 R3 R4 R1 L4 L1 simile....
3
T A B
14 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16
8 10 10 12 10 12 14 14 15 14 17 14 16 17 14 8 10 12 10 12 14 8 10 12

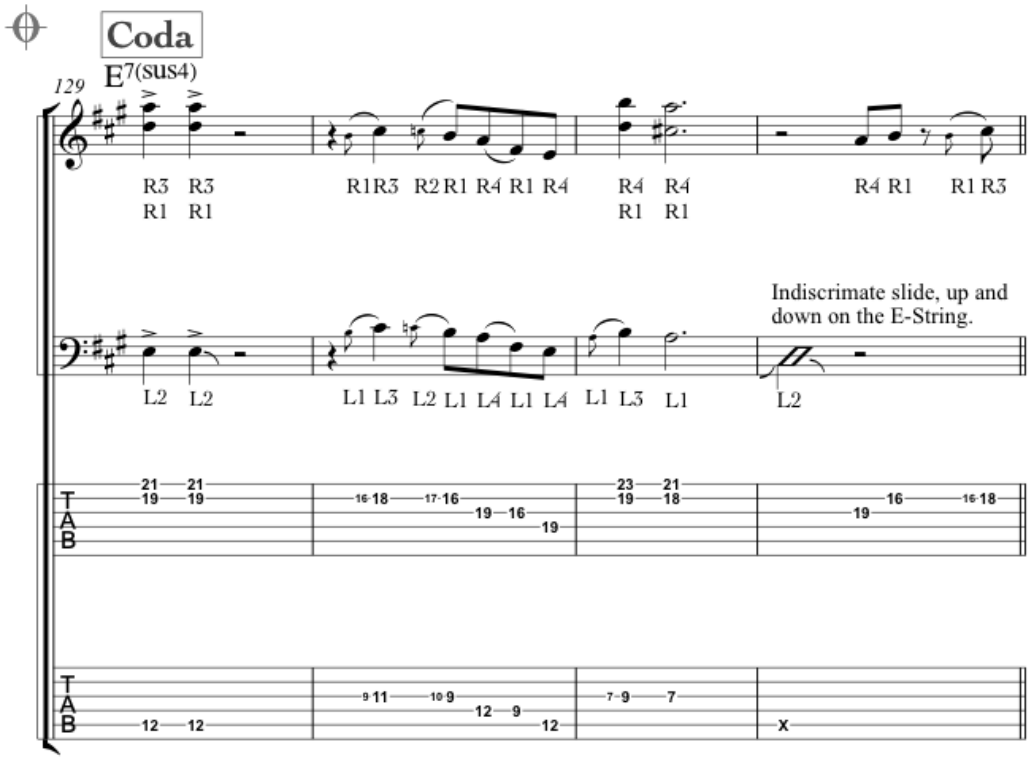

110
R2
R1
R1 R2 R4 R1 R3 R4 R1
L3 L1 L3 LA L1 L2 LA LA L1 L2 LA

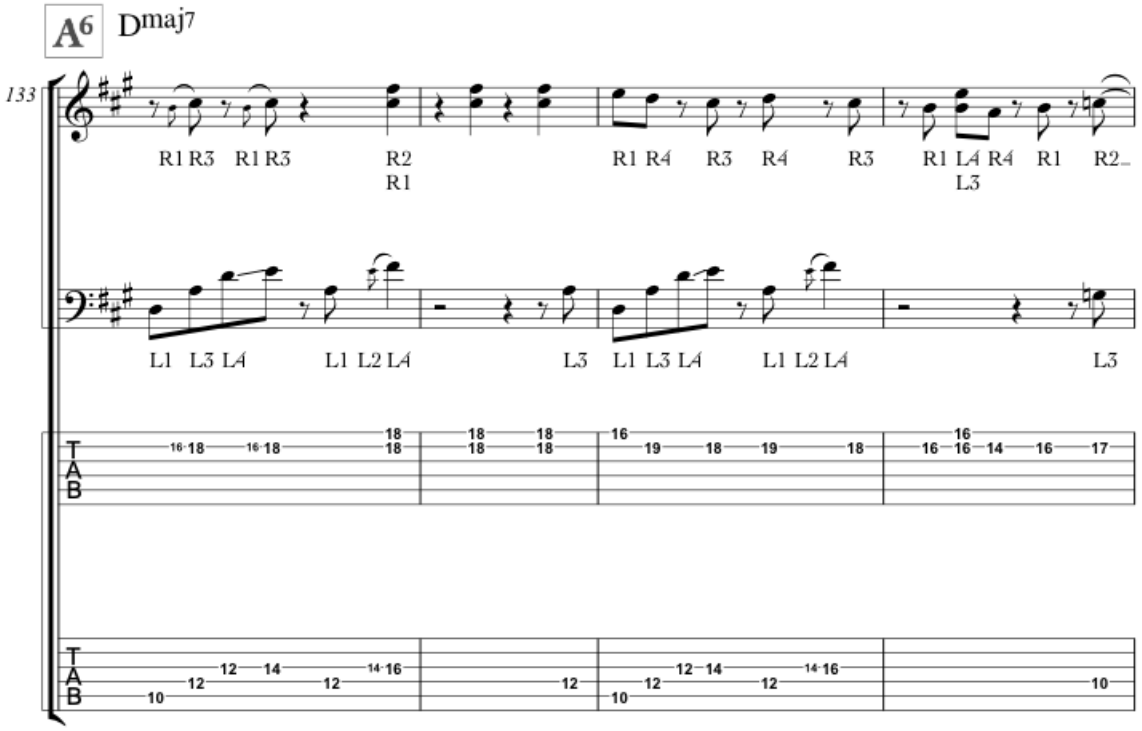

A5
Solo Feel
Dmaj7
113
R3
R1
simile...
L1 LA L1 L1 LA L1 L3 L1 L1 LA L1 L1 LA L1 L3 L1

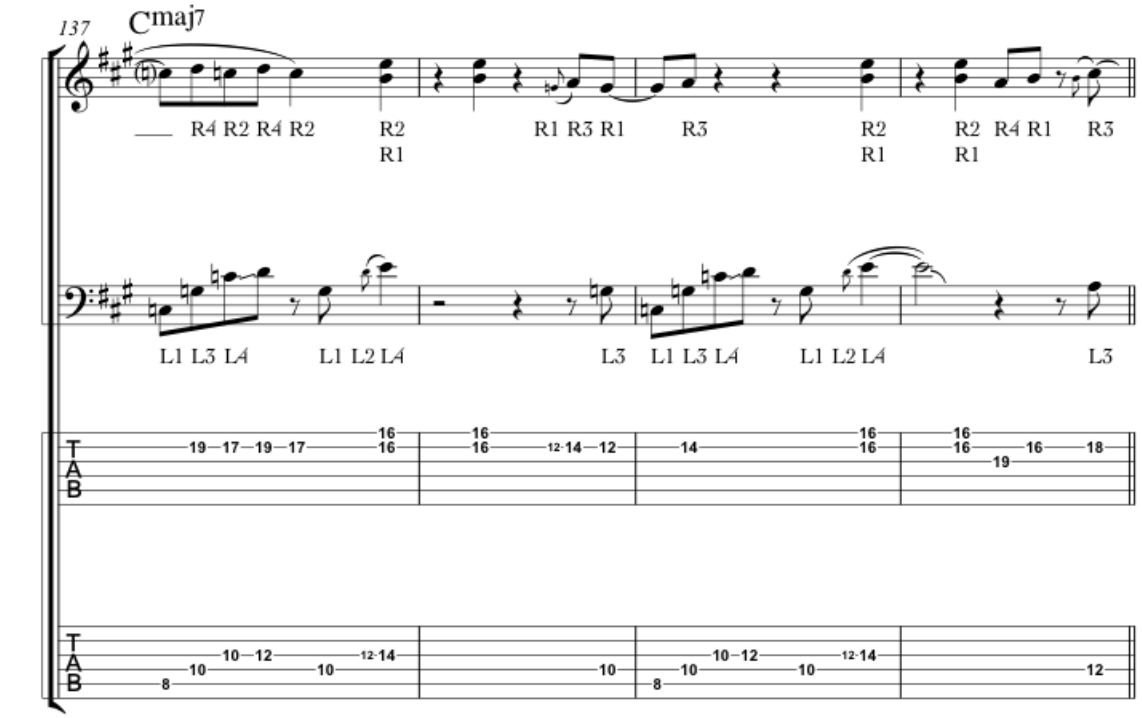

117
Cmaj7
L1 LA L1 L1
LA L1 L3 L1
L1 LA L1 L1
LA L1 L3 L1 L3

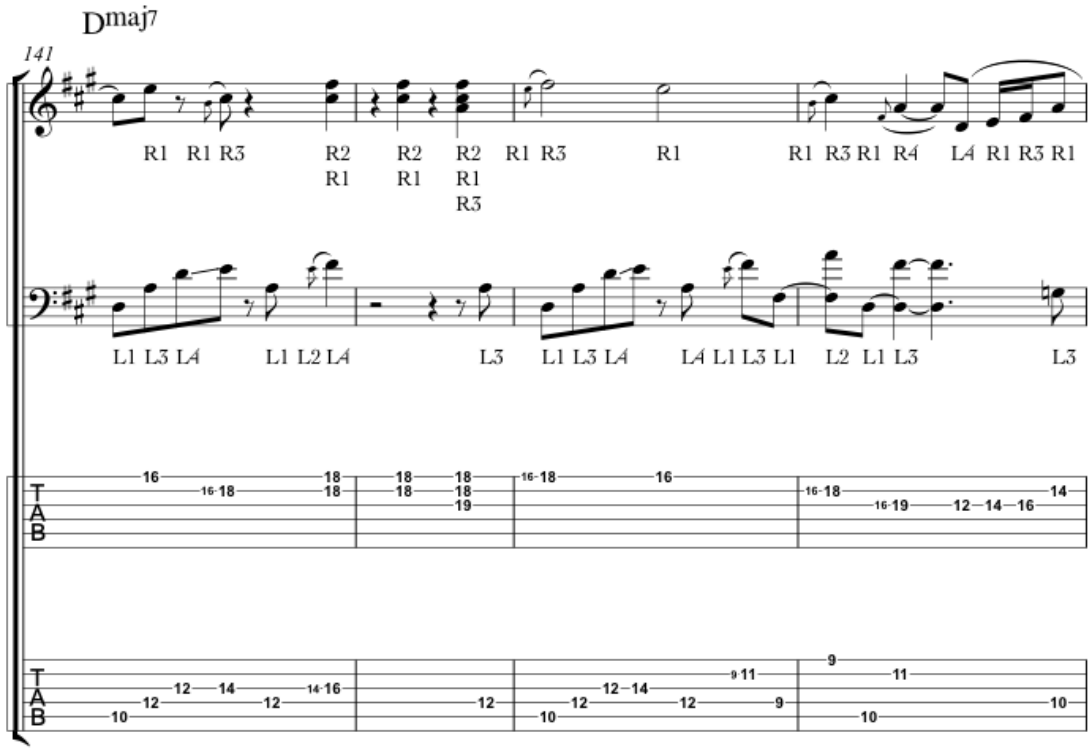

121
Dmaj7
R3
R1
simile...
R1 R3 R1 R3
L1 LA L1 L1
LA L1 L3 L1
L1 LA L1 L1
LA L1 L3 L1

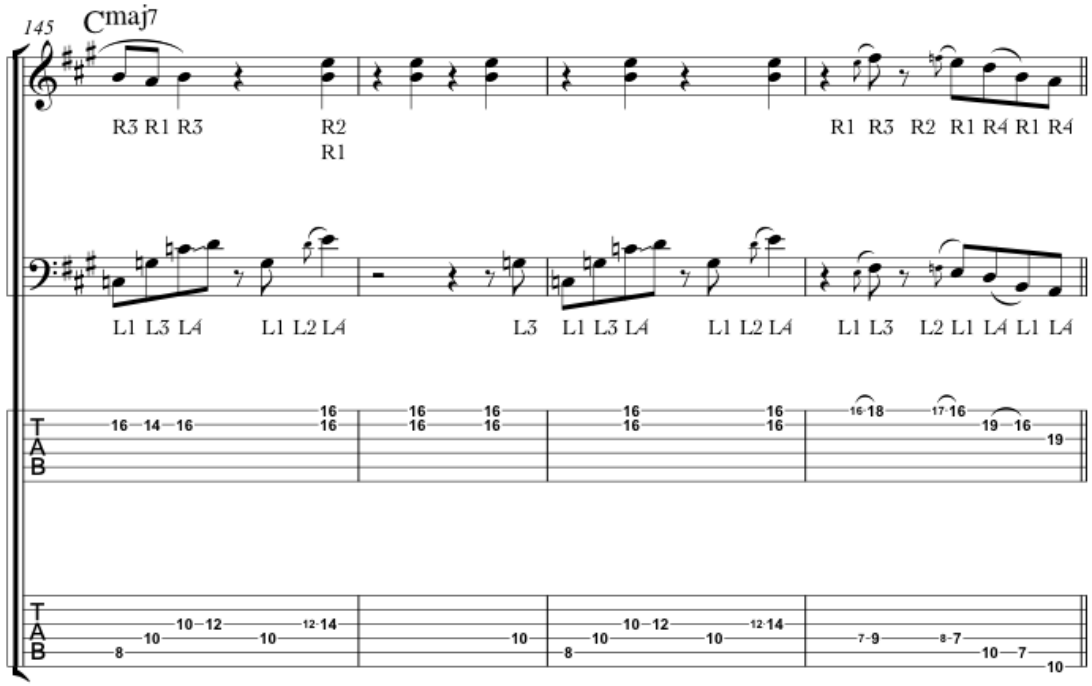

125
Cmaj7
D.S. Al Coda
R1
LA
L2
LA
L2
LA
L2
R2R1 R2R1 R2R1
L1L3 LA L1 R1 R3
L3 L1L3LA L1 R1 R3 R1 R3L1 simile....

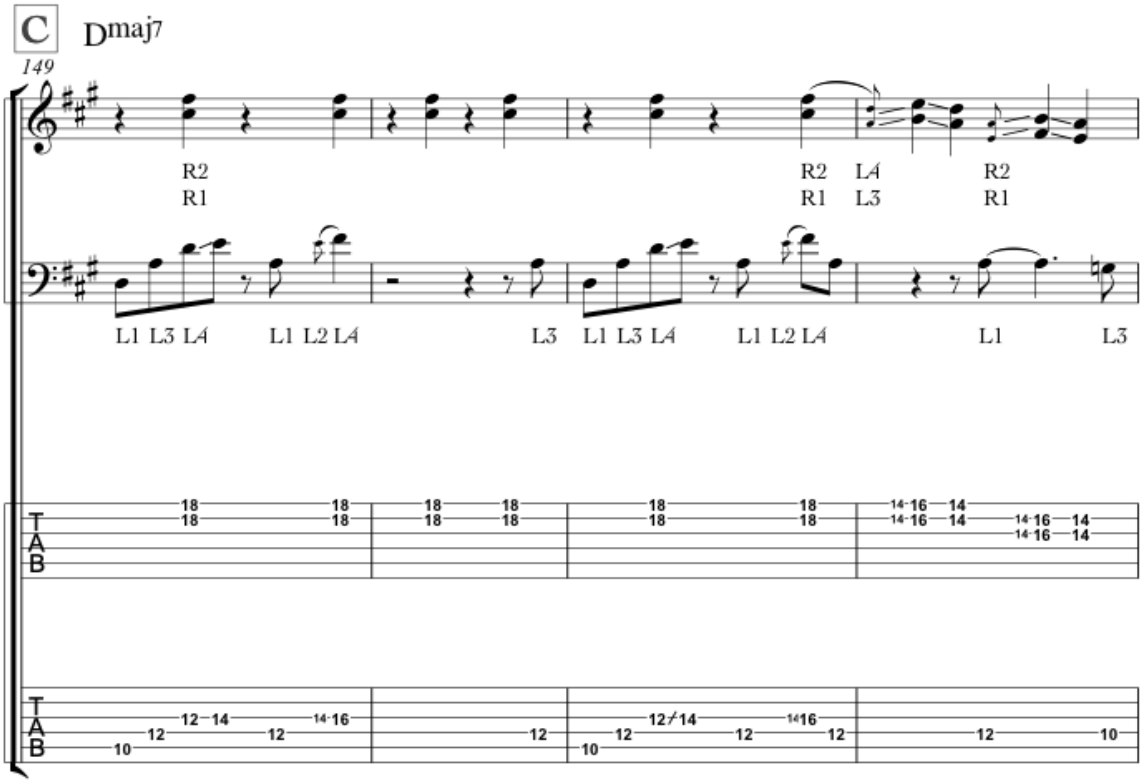

Coda
129
E7(sus4)
R3 R3
R1 R1
R1R3 R2 R1 R4 R1 R4
R4 R4
R1 R1
R4 R1 R1 R3
Indiscrimate slide, up and down on the E-String.
L2 L2
L1 L3 L2 L1 LA L1 LA
L1 L3 L1
L2

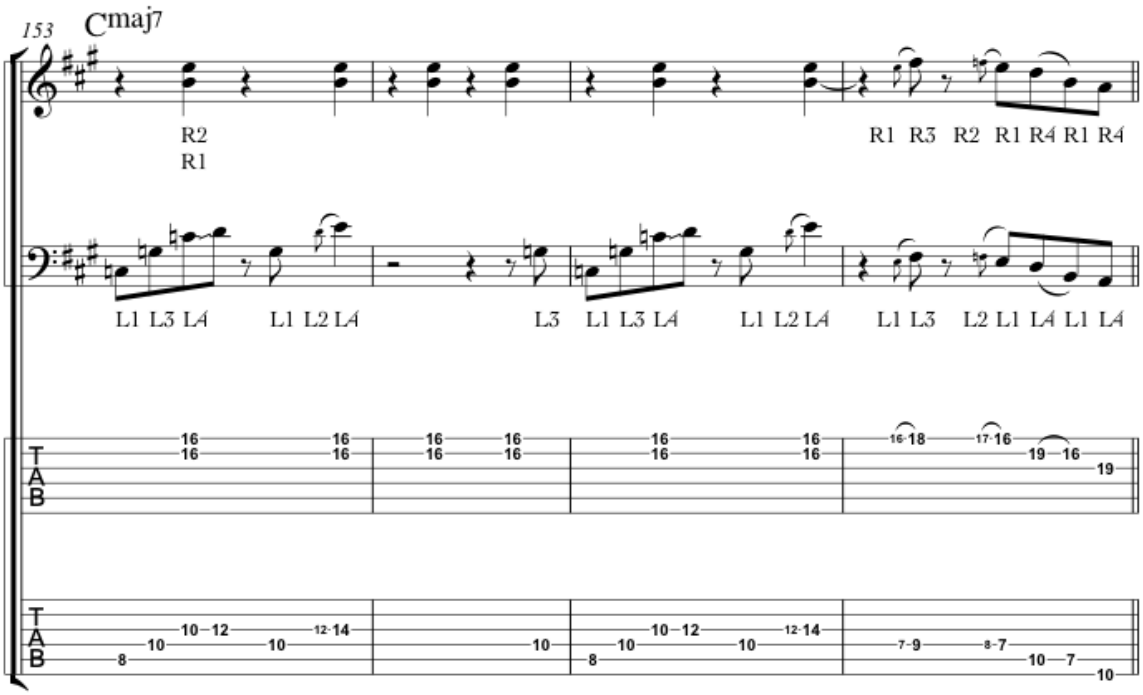

A6
Dmaj7
133
R1 R3 R1 R3 R2 R1 R1 R4 R3 R4 R3 R1 L4 R4 R1 R2
L3
L1 L3 L4 L1 L2 L4 L3 L1 L3 L4 L1 L2 L4 L3
T A B

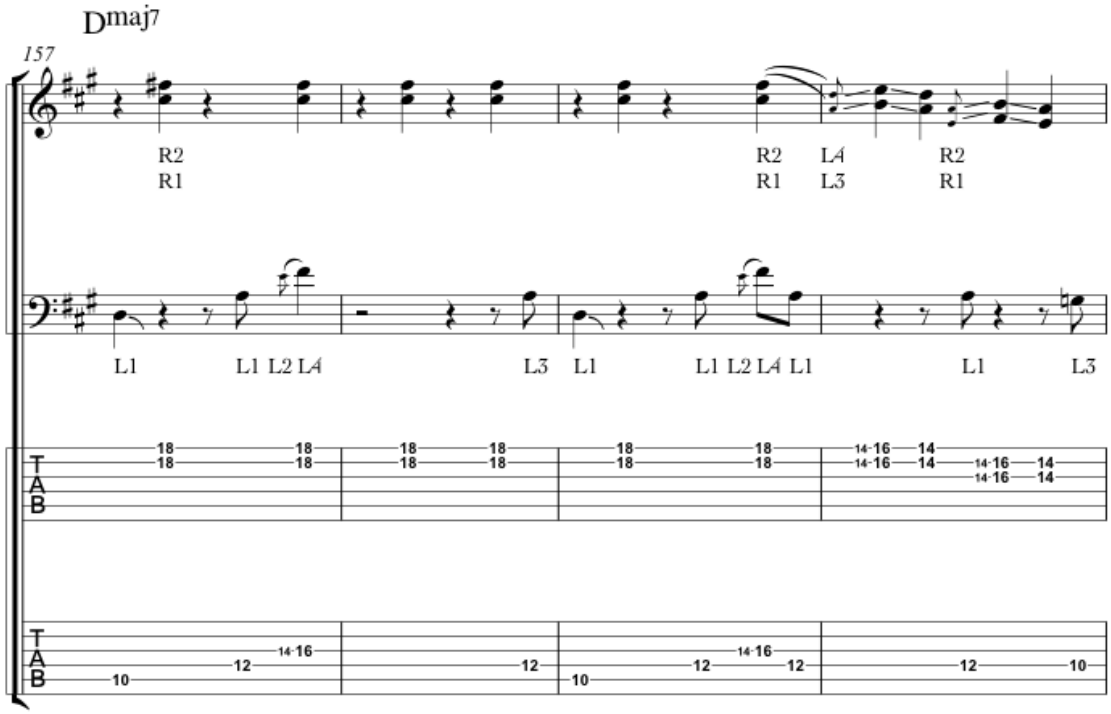

137
Cmaj7
R4 R2 R4 R2 R2 R1 R1 R3 R1 R3 R2 R1 R2 R1 R4 R1 R3
L1 L3 L4 L1 L2 L4 L3 L1 L3 L4 L1 L2 L4 L3
T A B

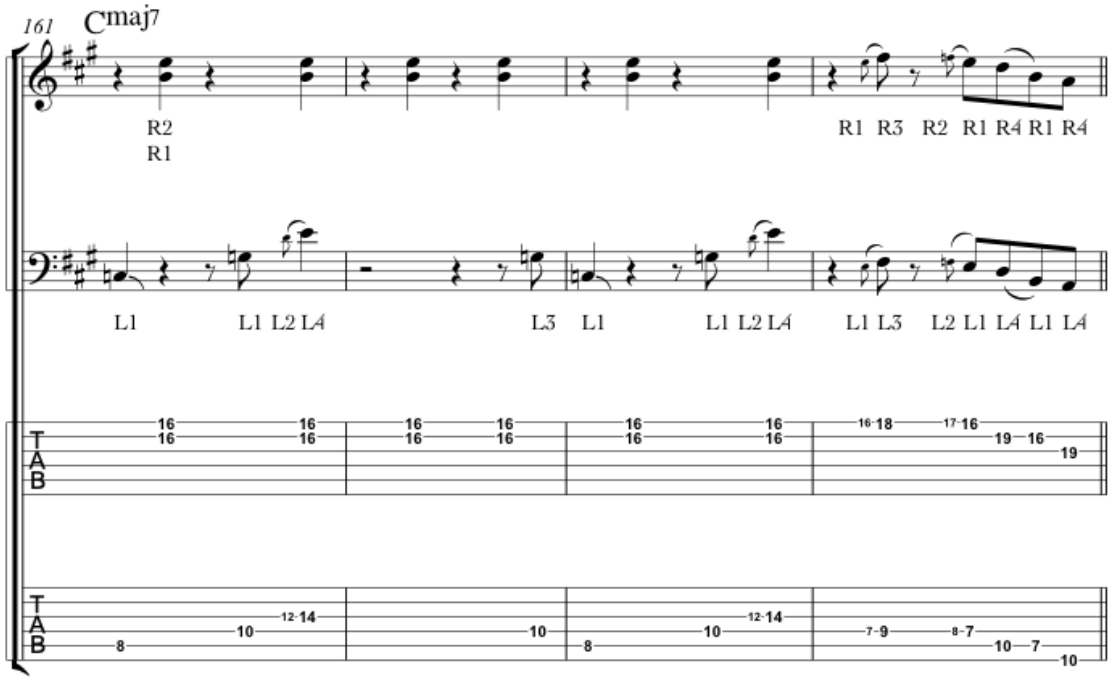

Dmaj7
141
R1 R1 R3 R2 R1 R2 R1 R2 R1 R3 R1 R3 R1 R3 R1 R4 LA R1 R3 R1
L1 L3 LA L1 L2 LA L3 L1 L3 LA LA L1 L3 L1 L2 L1 L3 L3
T A B

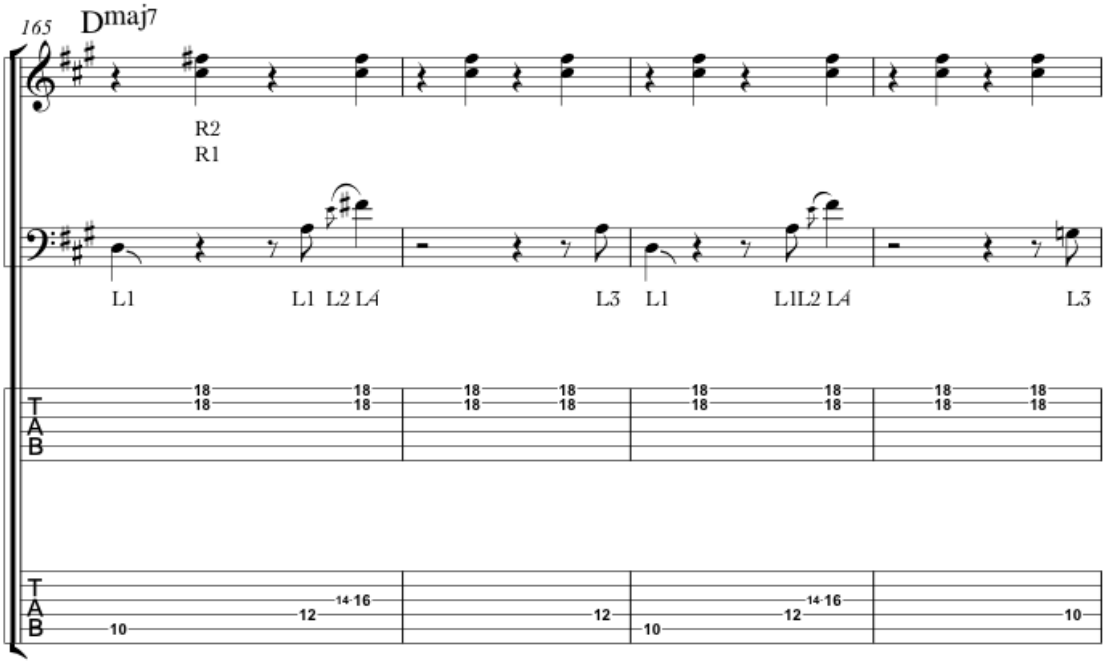

Cmaj7
145
R3 R1 R3 R2 R1 R1 R3 R2 R1 R4 R1 R4
L1 L3 LA L1 L2 LA L3 L1 L3 LA L1 L2 LA L1 L3 L2 L1 LA L1 LA
T A B

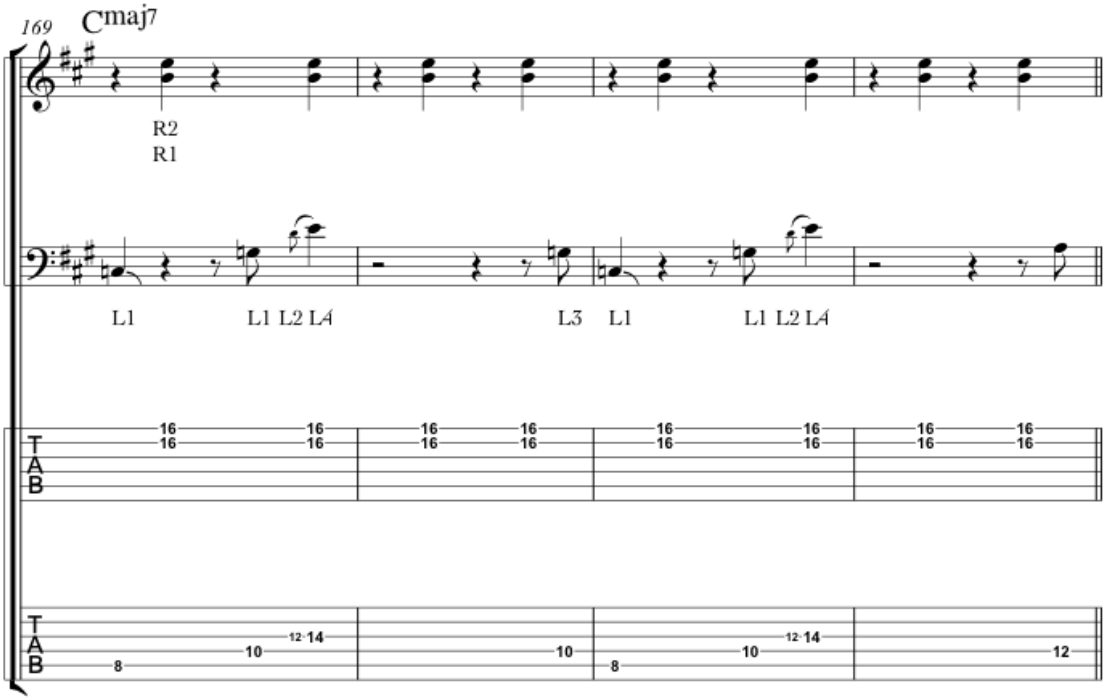

C
Dmaj7
149
R2
R1
R2
R1
LA
L3
R2
R1
L1 L3 LA
L1 L2 LA
L3
L1 L3 LA
L1 L2 LA
L1
L3
TAB

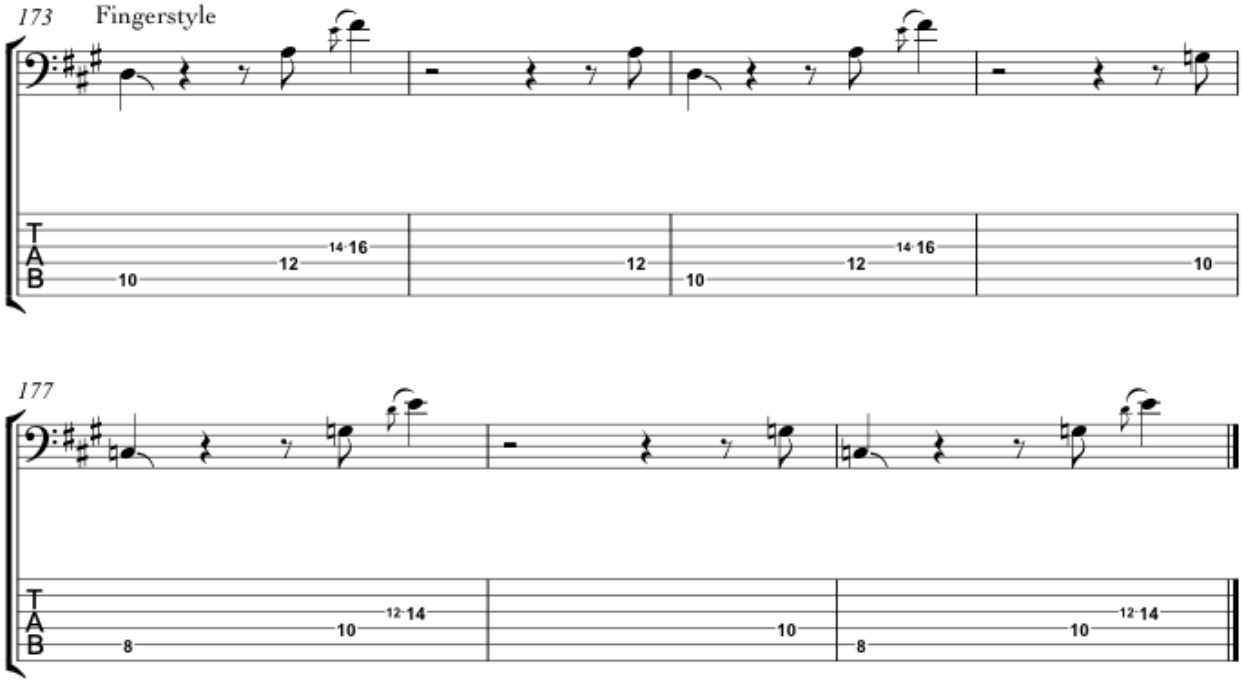

153
Cmaj7
R2
R1
R1 R3 R2 R1 R4 R1 R4
L1 L3 LA
L1 L2 LA
L3
L1 L3 LA
L1 L2 LA
L1 L3
L2 L1 LA L1 LA
TAB


Dmaj7
157
R2
R1
R2
R1
LA
L3
R2
R1
L1
L1 L2 LA
L3
L1
L1 L2 LA L1
L1
L3
T
A
B

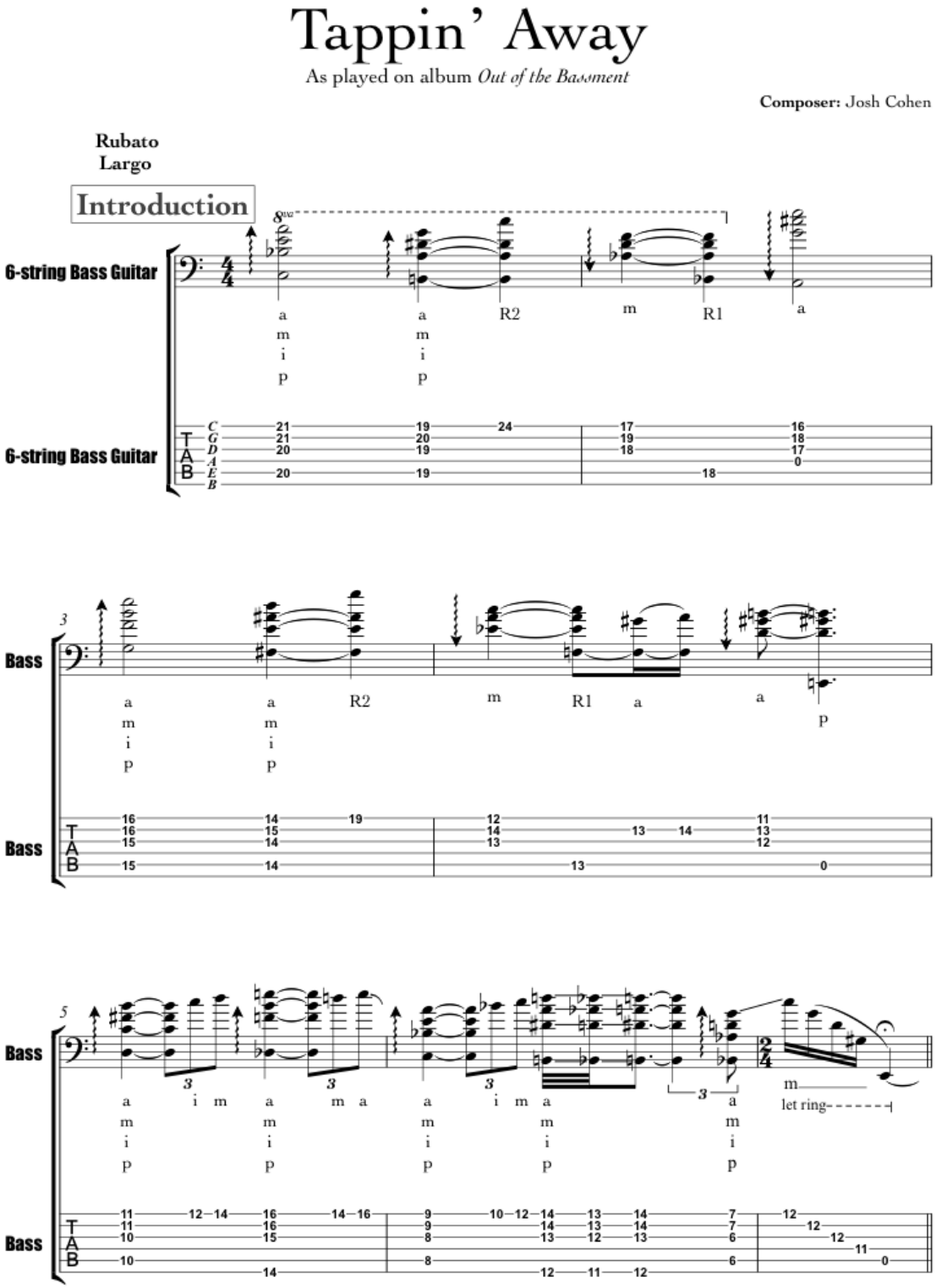

Cmaj7
161
R2
R1
R1 R3 R2 R1 R4 R1 R4
L1
L1 L2 LA
L3
L1
L1 L2 LA
L1 L3 L2 L1 LA L1 LA
T
A
B

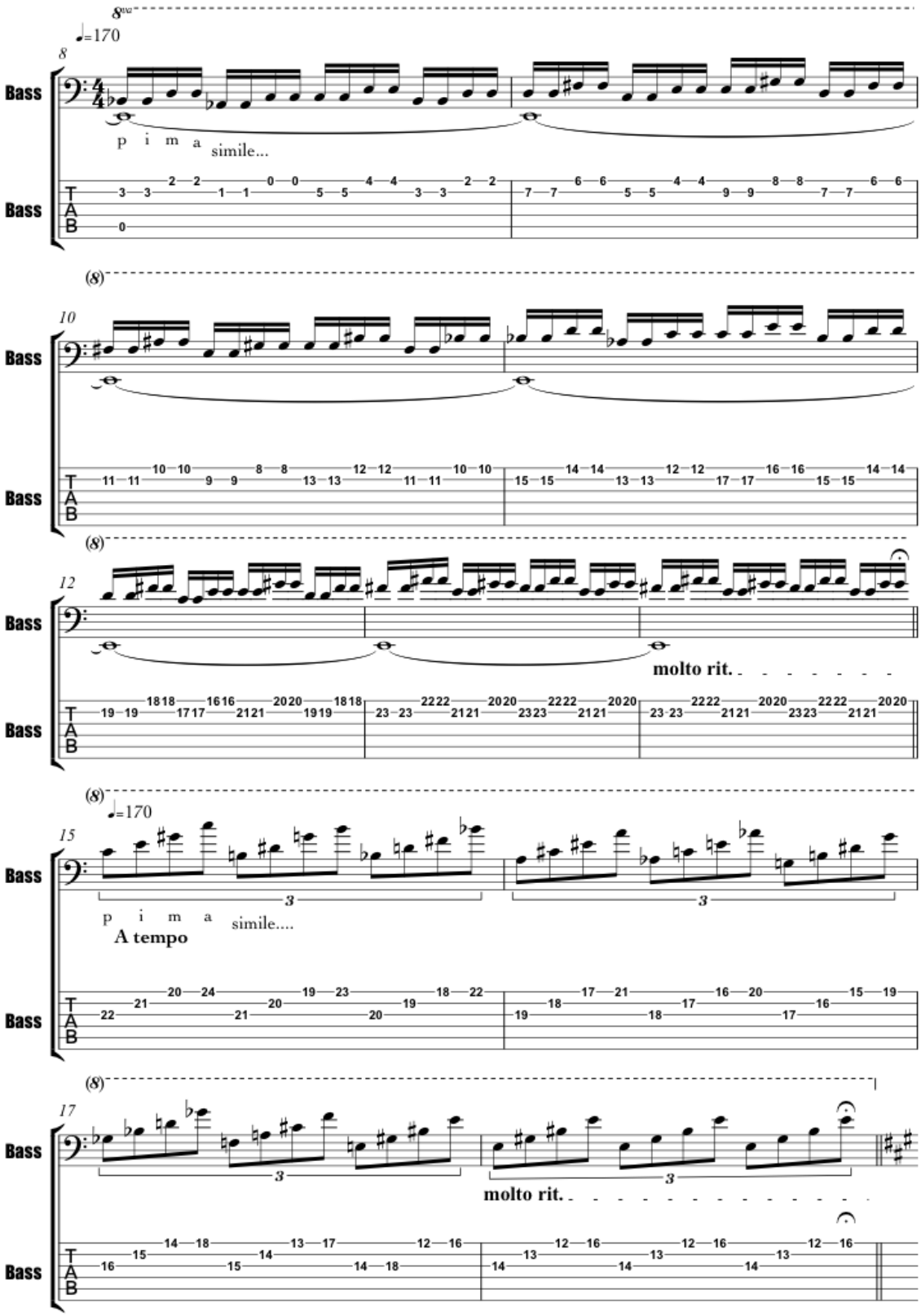

165
Dmaj7
R2
R1
L1
L1 L2 LÁ
L3
L1
L1L2 LÁ
L3

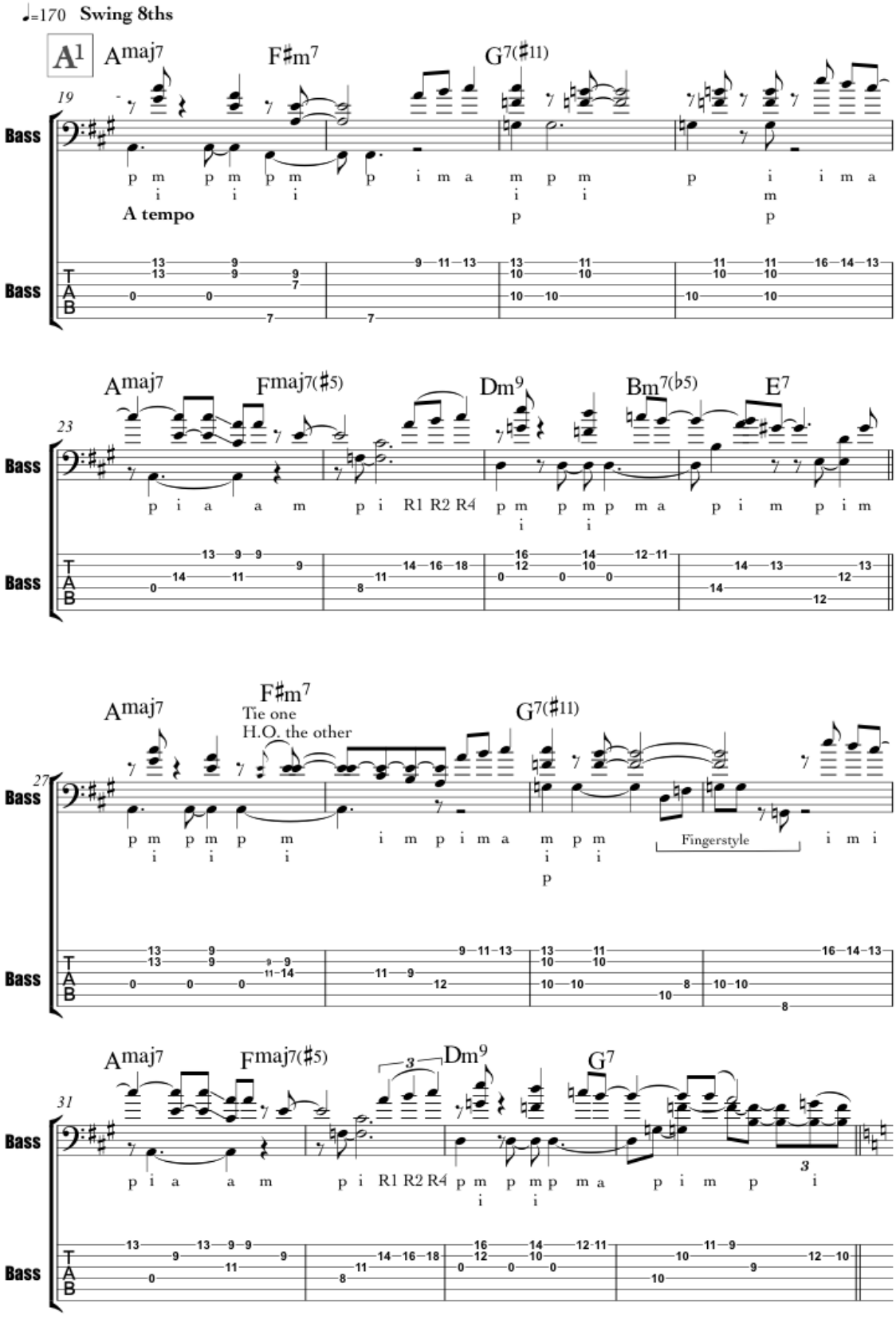

169
Cmaj7
R2
R1
L1
L1 L2 LÁ
L3
L1
L1 L2 LÁ

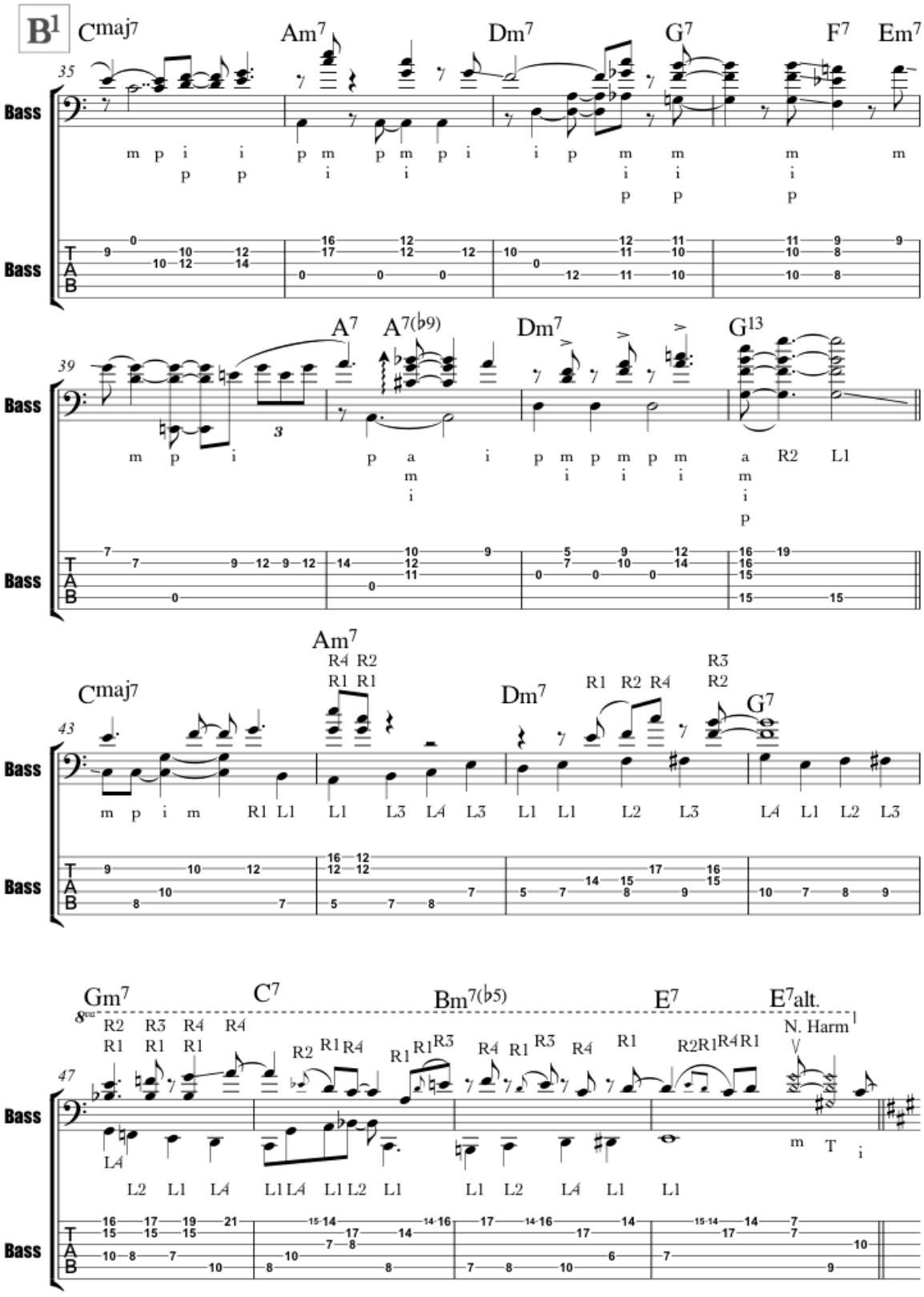

173
Fingerstyle
T
A
B
10
12
14
16
12
10
12
14
16
10
177
T
A
B
8
10
12
14
10
8
10
12
14

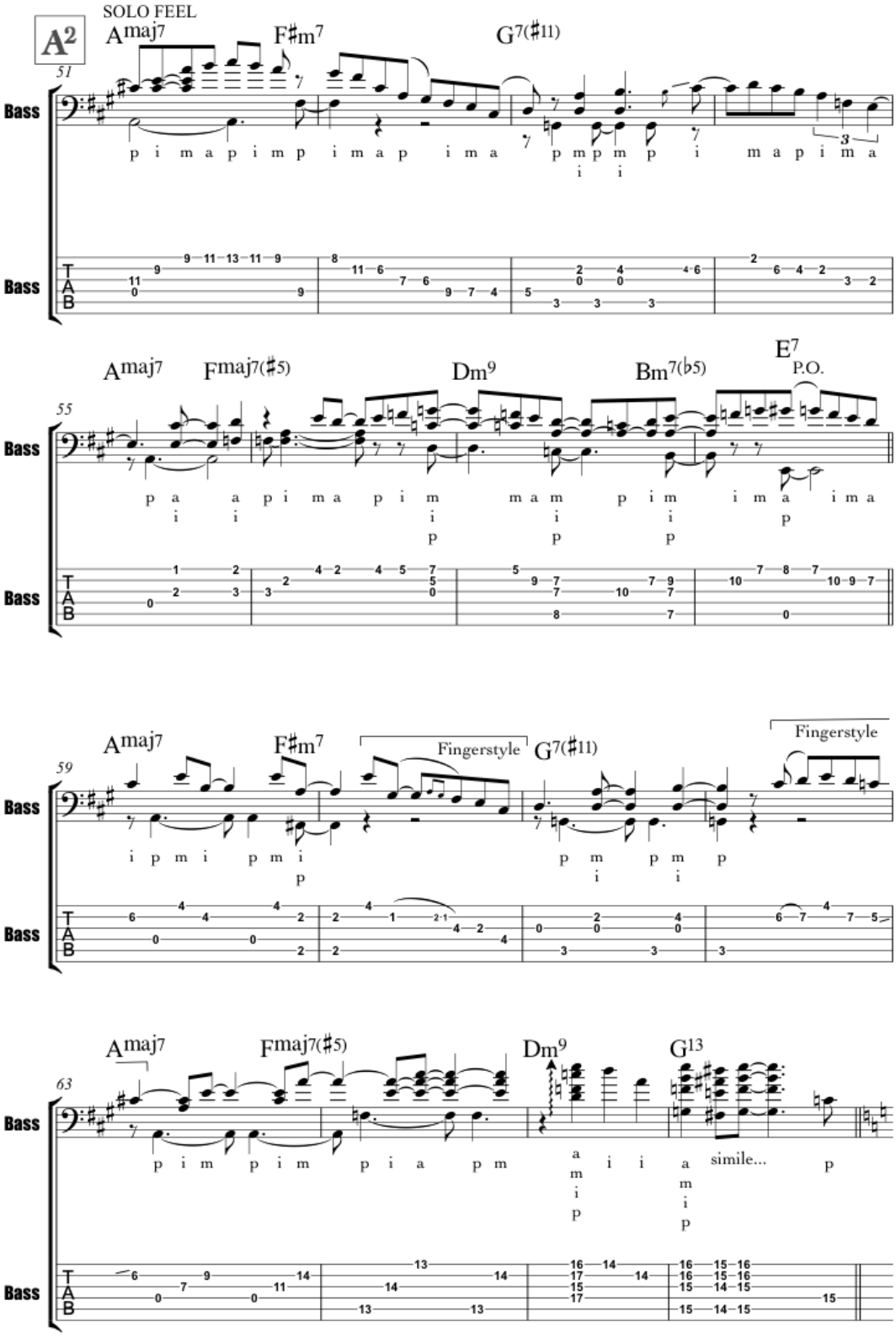
APPENDIX C: "Tappin' Away" Full Score

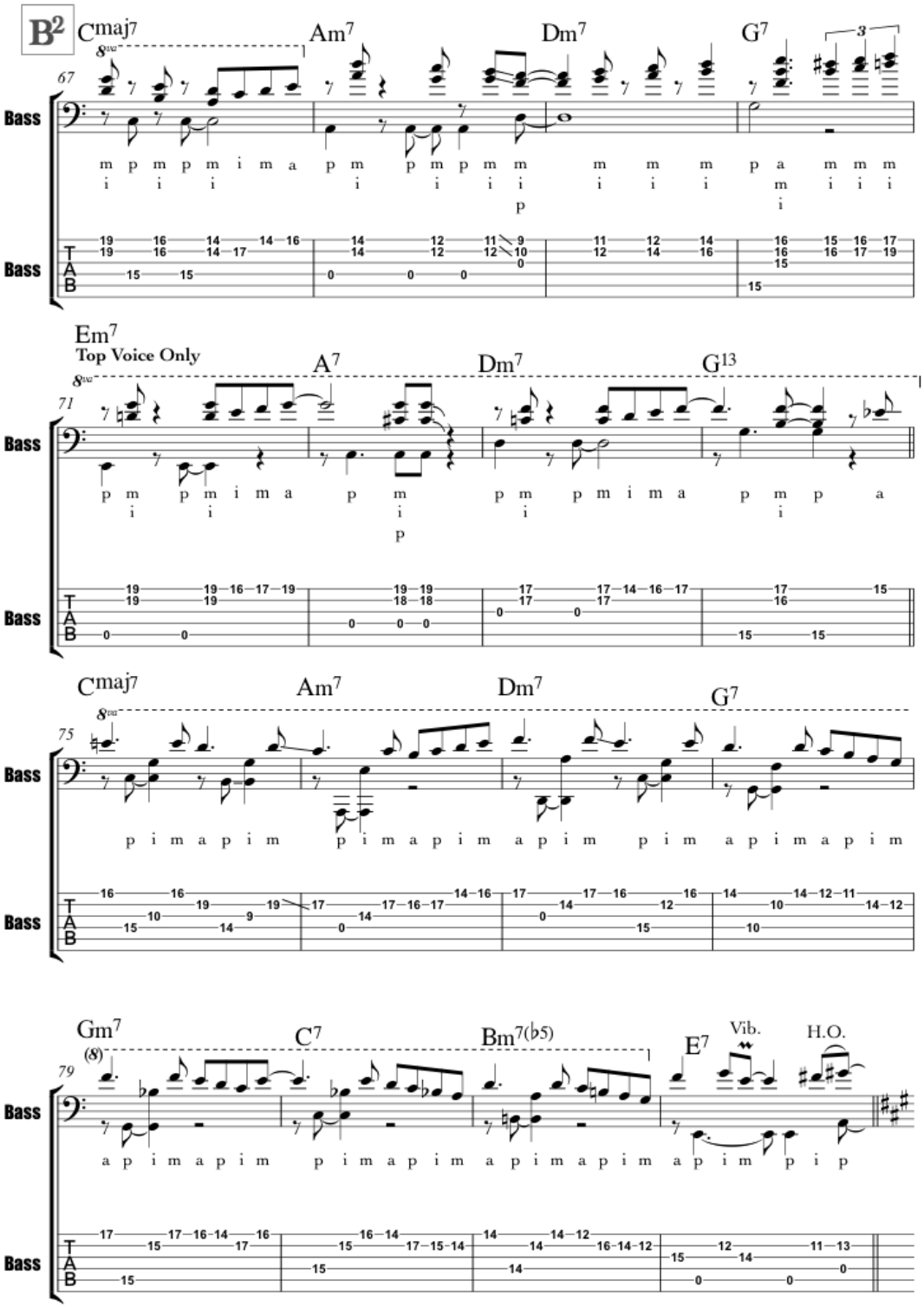


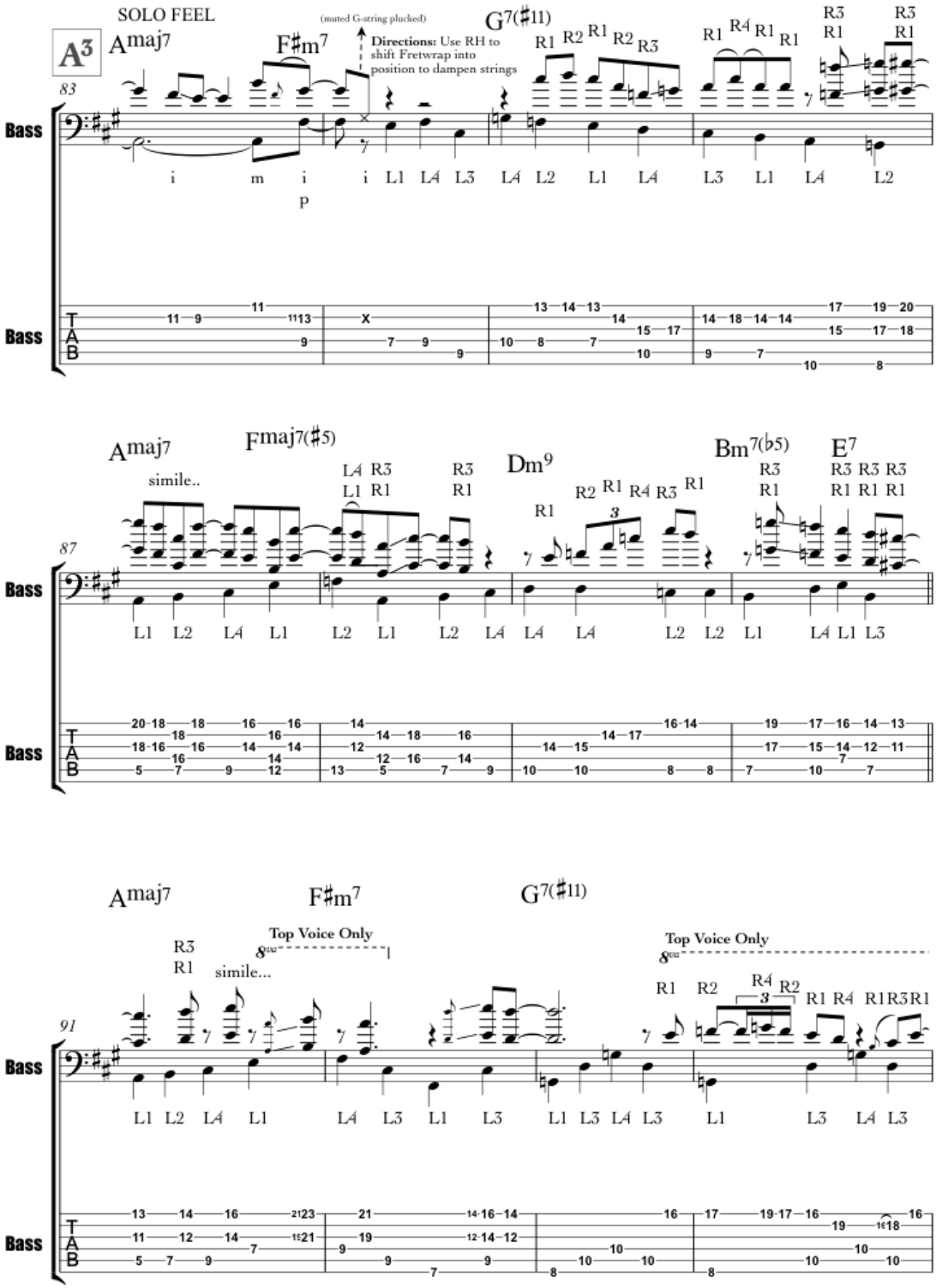

8va
♩=170
8
Bass
p i m a simile...
Bass
(8)
10
Bass
Bass
(8)
12
Bass
molto rit.
Bass
(8)
♩=170
15
Bass
3
3
p i m a simile....
A tempo
Bass
(8)
17
Bass
3
3
molto rit.
Bass

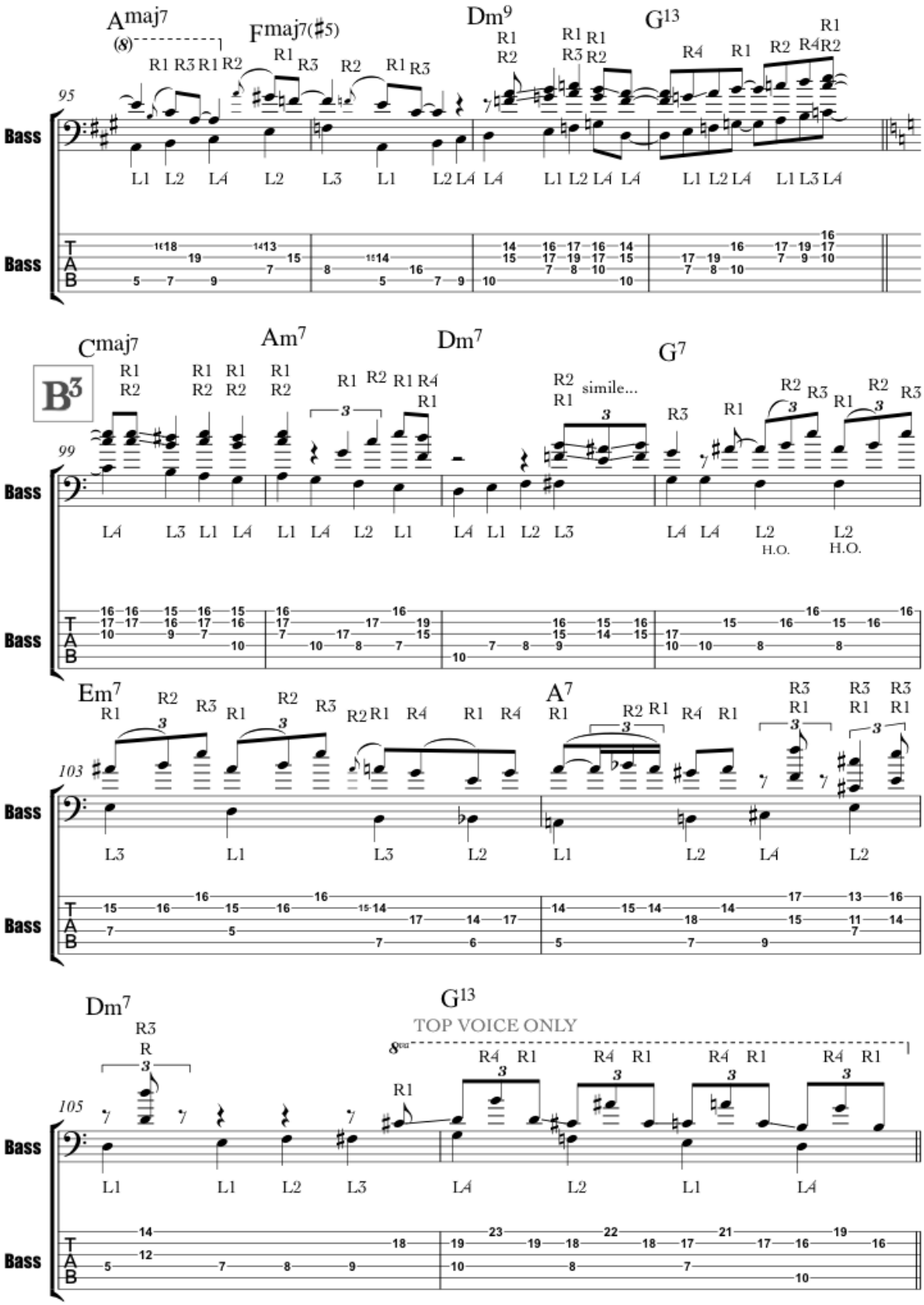

♩=170 Swing 8ths
A1
Amaj7
F♯m7
G7(♯11)
19
Bass
A tempo
Amaj7
Fmaj7(♯5)
Dm9
Bm7(♭5)
E7
23
Bass
Amaj7
F♯m7
Tie one
H.O. the other
G7(♯11)
27
Bass
Fingerstyle
Amaj7
Fmaj7(♯5)
Dm9
G7
31
Bass

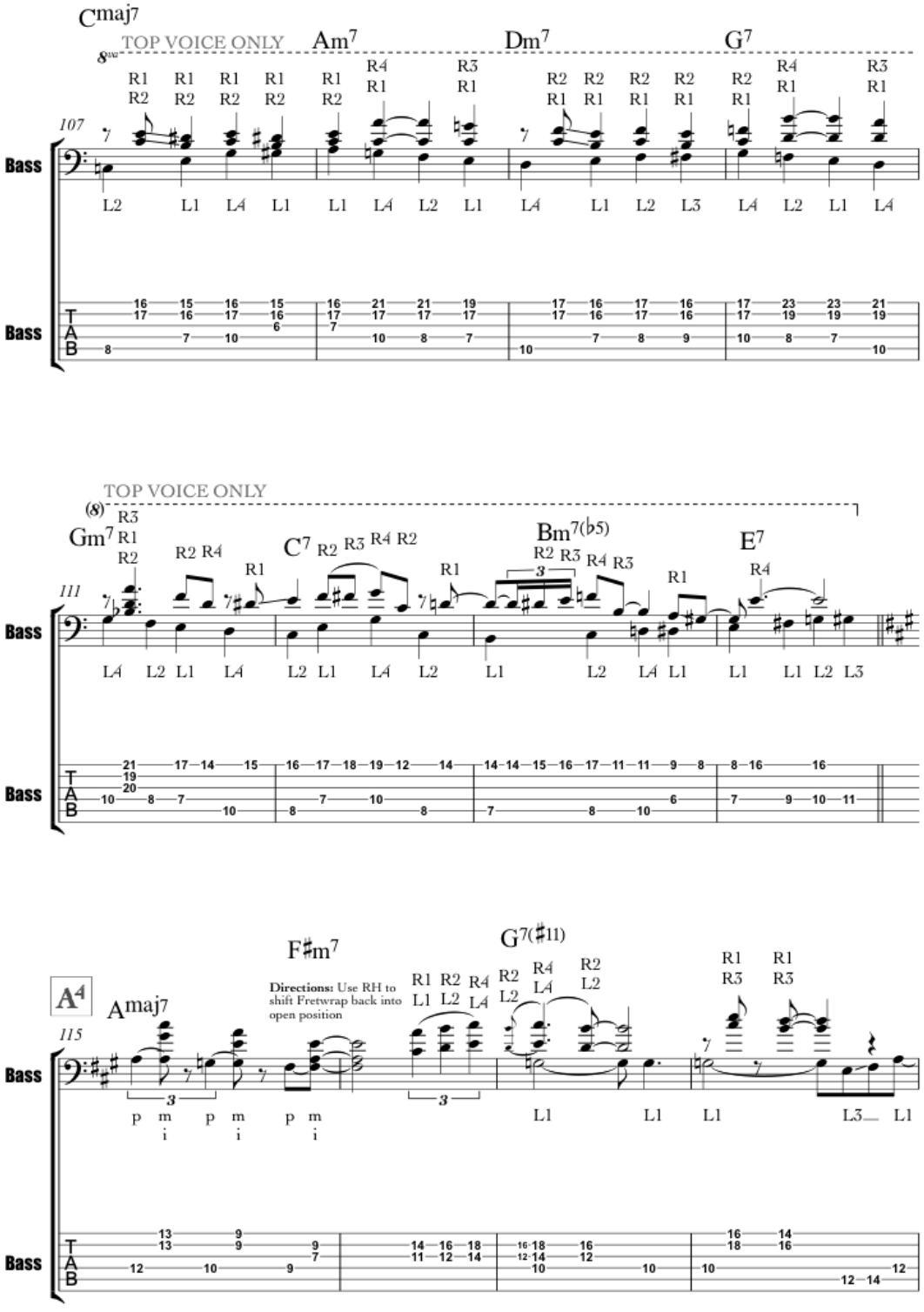

B1
Cmaj7
Am7
Dm7
G7
F7
Em7
35
Bass
A7
A7(♭9)
Dm7
G13
39
Bass
Am7
Cmaj7
Dm7
G7
43
Bass
Gm7
C7
Bm7(♭5)
E7
E7alt.
8va
N. Harm
47
Bass

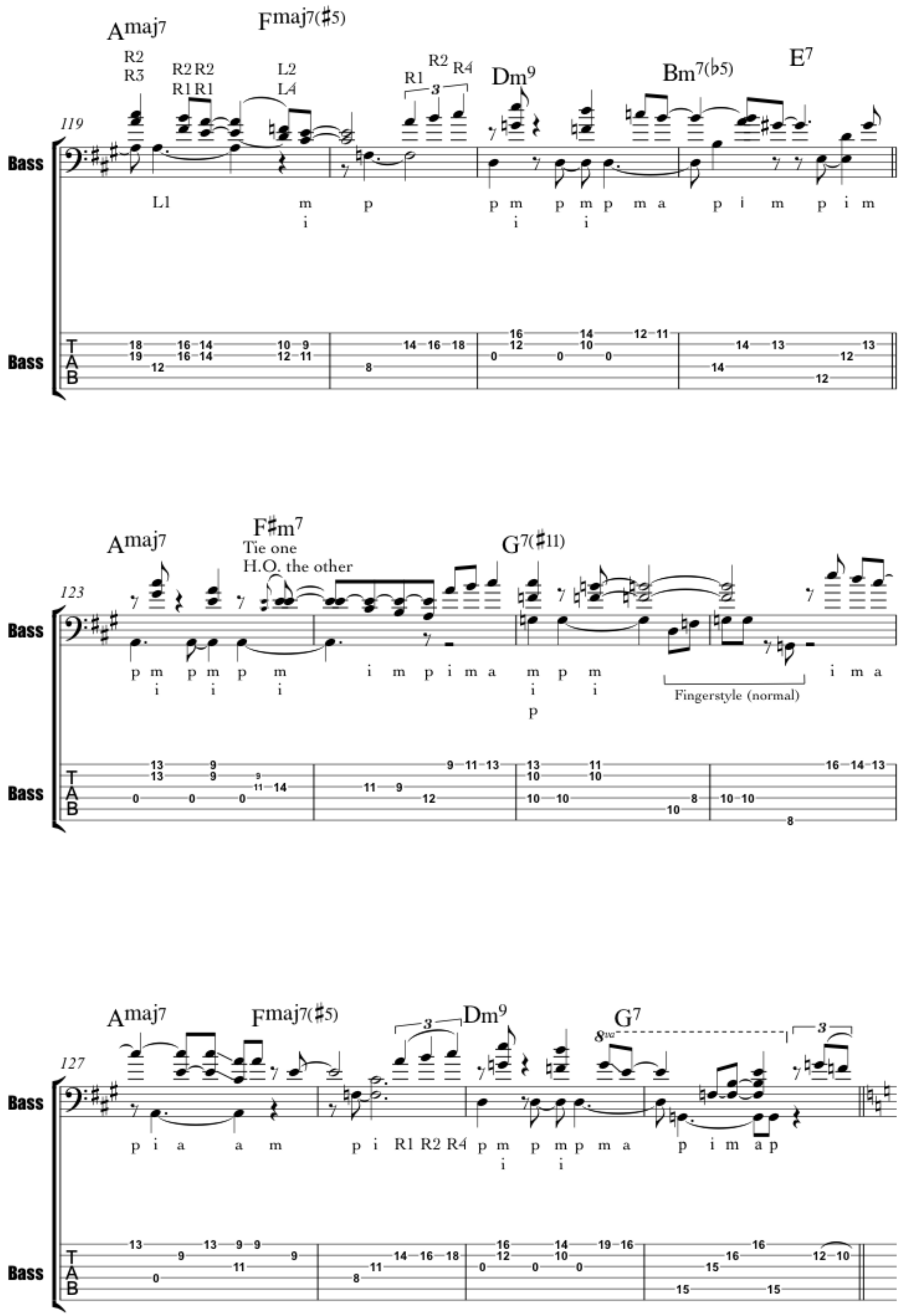

SOLO FEEL
A2
Amaj7
F♯m7
G7(♯11)
51
Bass
Bass
Amaj7
Fmaj7(♯5)
Dm9
Bm7(♭5)
E7
P.O.
55
Bass
Bass
Amaj7
F♯m7
Fingerstyle
G7(♯11)
Fingerstyle
59
Bass
Bass
Amaj7
Fmaj7(♯5)
Dm9
G13
63
Bass
Bass
simile...

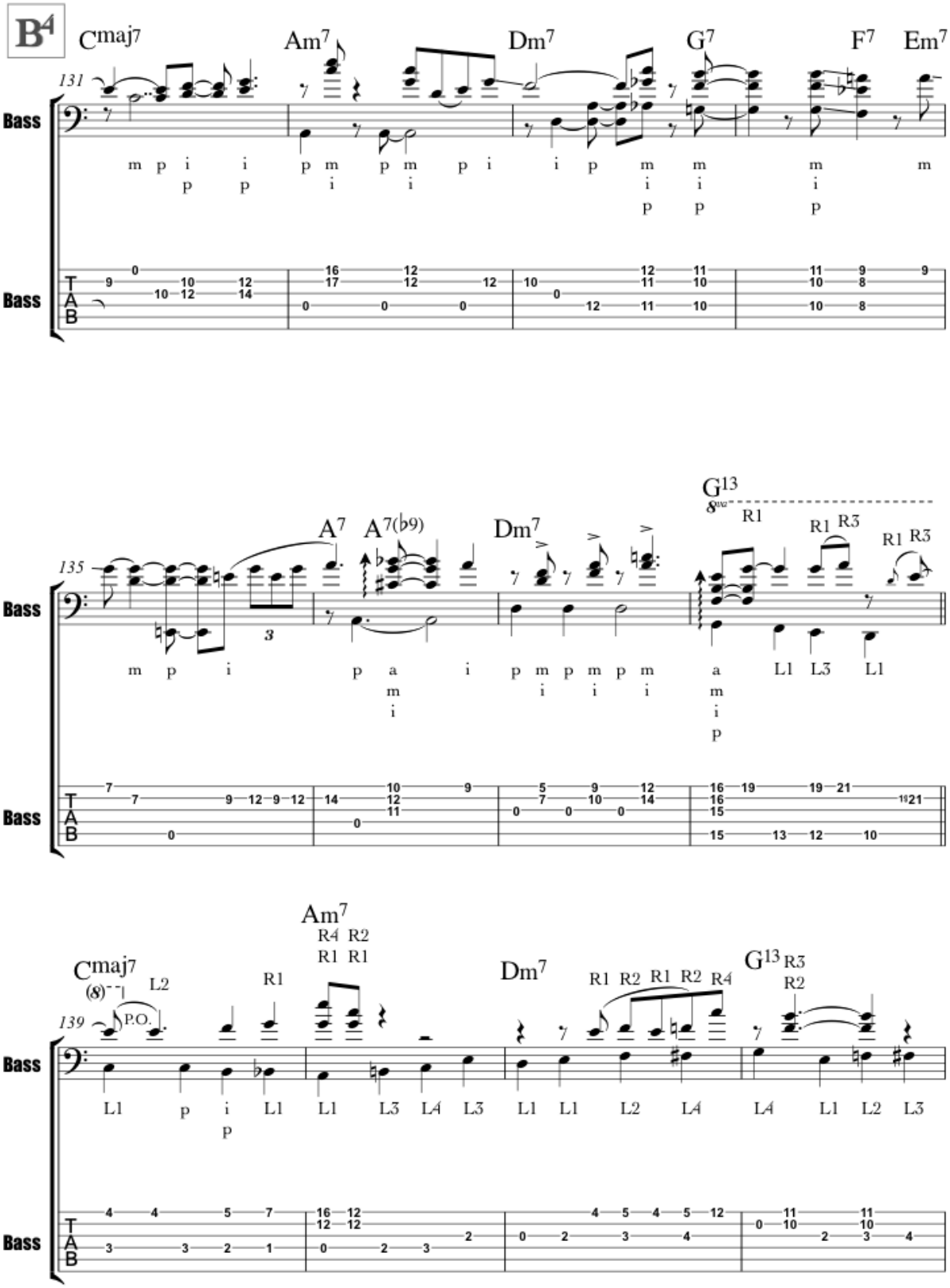

B2
Cmaj7
Am7
Dm7
G7
Em7
Top Voice Only
A7
Dm7
G13
Cmaj7
Am7
Dm7
G7
Gm7
C7
Bm7(♭5)
E7
Vib.
H.O.
Bass
TAB

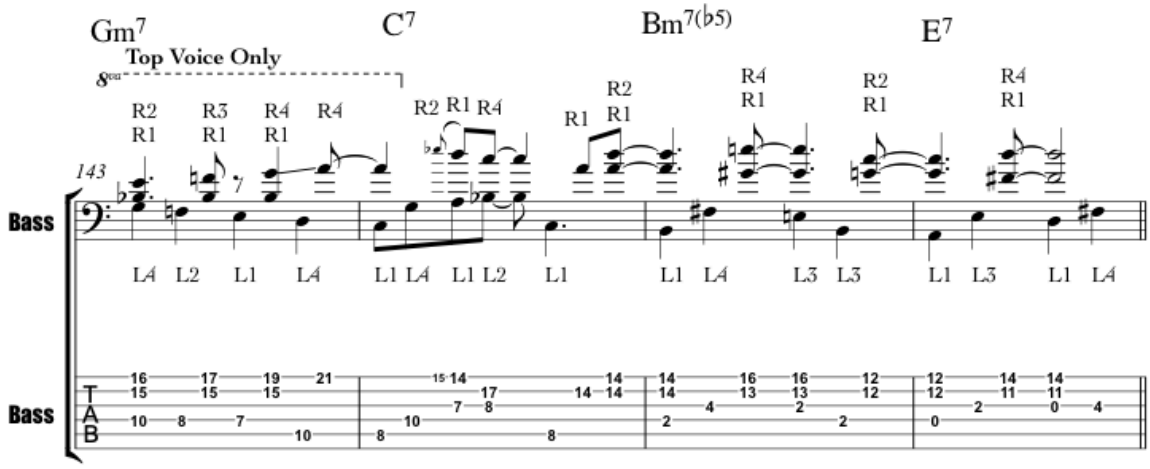

SOLO FEEL
A3
Amaj7
F♯m7
(muted G-string plucked)
Directions: Use RH to shift Fretwrap into position to dampen strings
G7(♯11)
83
Bass
Bass
Amaj7
Fmaj7(♯5)
simile..
Dm9
Bm7(♭5)
E7
87
Bass
Bass
Amaj7
F♯m7
G7(♯11)
Top Voice Only
simile...
Top Voice Only
91
Bass
Bass

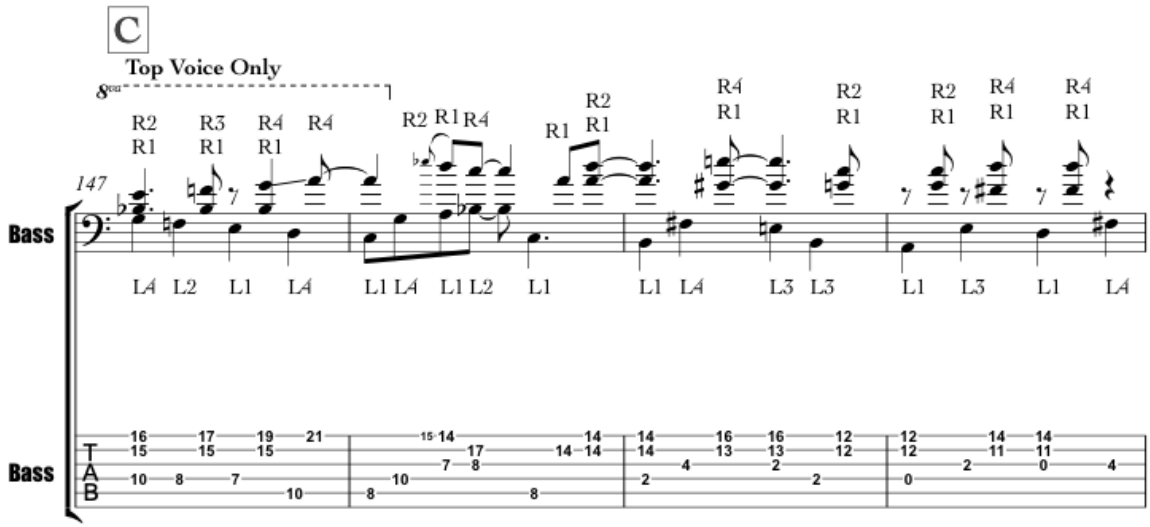

Amaj7
Fmaj7(♯5)
Dm9
G13
95
Bass
Bass
Cmaj7
Am7
Dm7
G7
B3
simile...
H.O.
99
Em7
A7
103
Dm7
G13
TOP VOICE ONLY
105

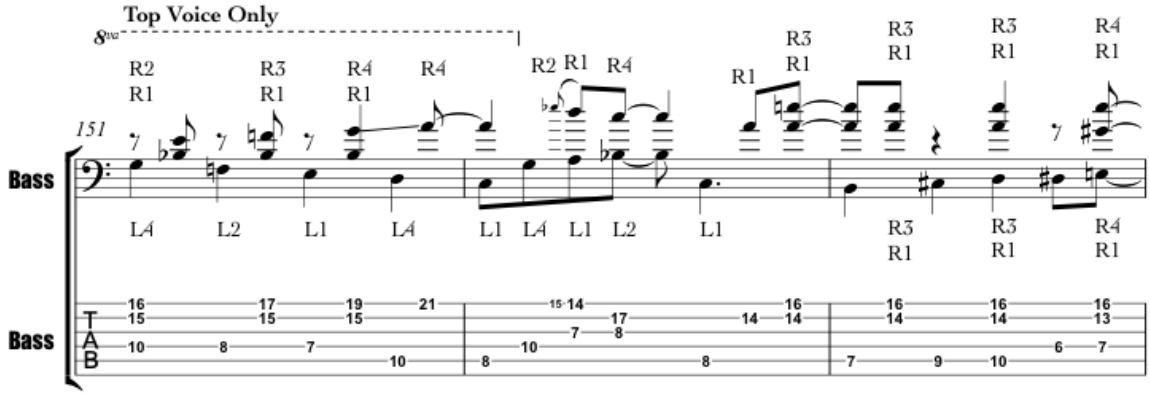

Cmaj7
TOP VOICE ONLY
Am7
Dm7
G7
8va
107
Bass
Bass
TOP VOICE ONLY
(8)
Gm7
C7
Bm7(♭5)
E7
111
Bass
Bass
A4
Amaj7
F♯m7
G7(♯11)
Directions: Use RH to shift Fretwrap back into open position
115
Bass
Bass

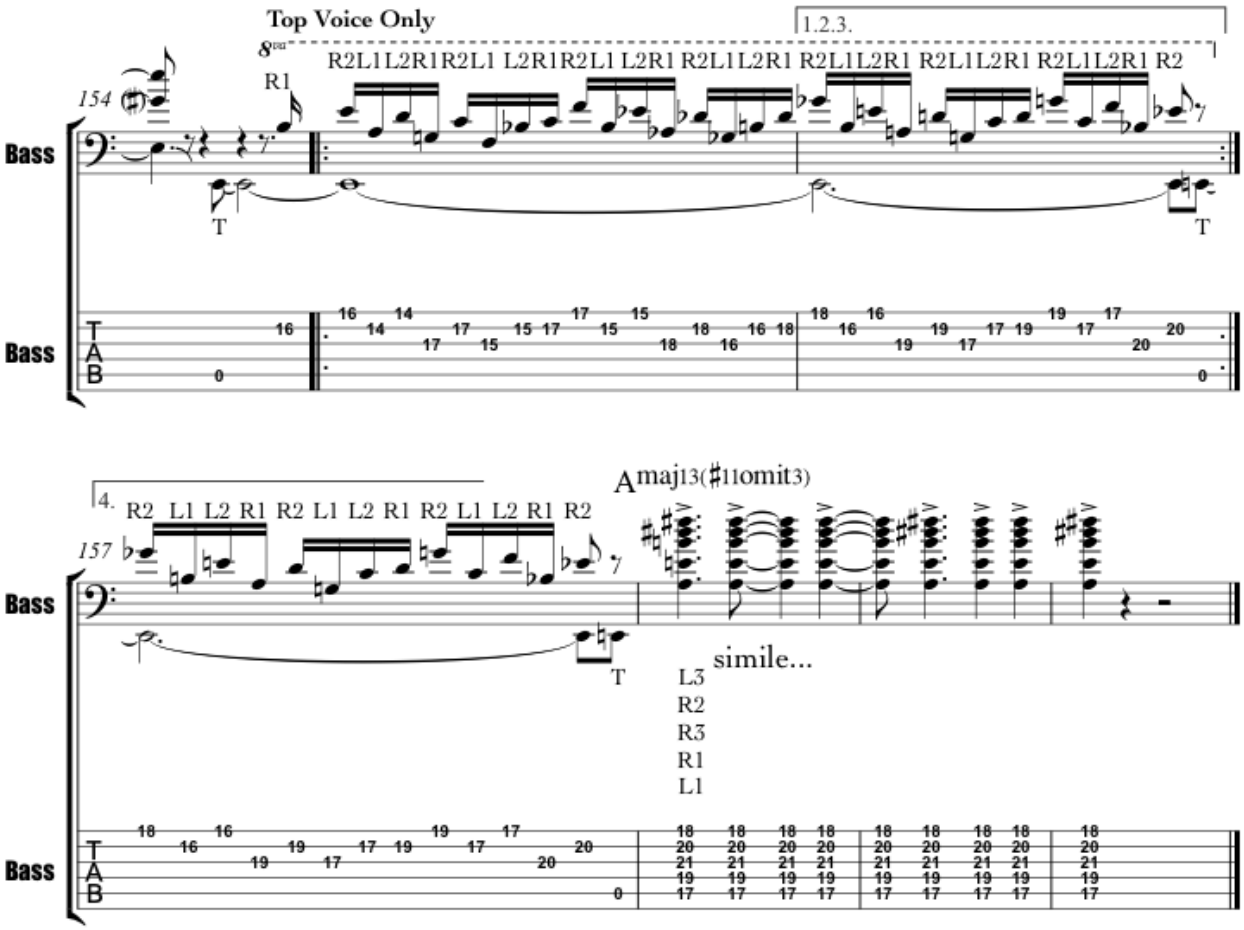

Amaj7
Fmaj7(♯5)
Dm9
Bm7(♭5)
E7
Bass
F♯m7
Tie one
H.O. the other
G7(♯11)
Fingerstyle (normal)
G7


B4
Cmaj7
Am7
Dm7
G7
F7
Em7
131
Bass
Bass
A7
A7(b9)
Dm7
G13
8va
135
Bass
Bass
Am7
Cmaj7
(8)
L2
P.O.
R1
Dm7
G13
139
Bass
Bass

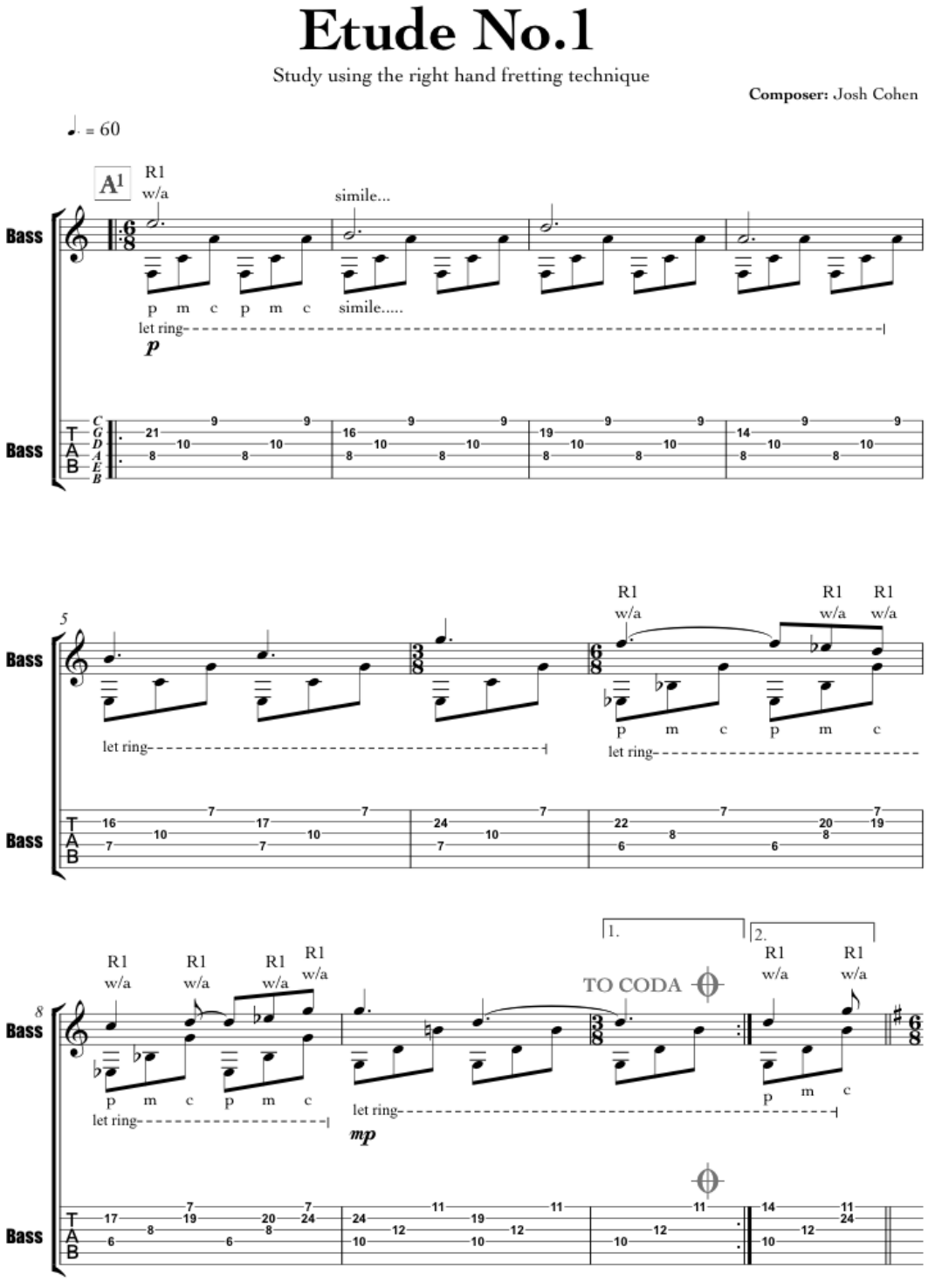

Gm7
C7
Bm7(b5)
E7
Top Voice Only
143
Bass
Bass
TAB

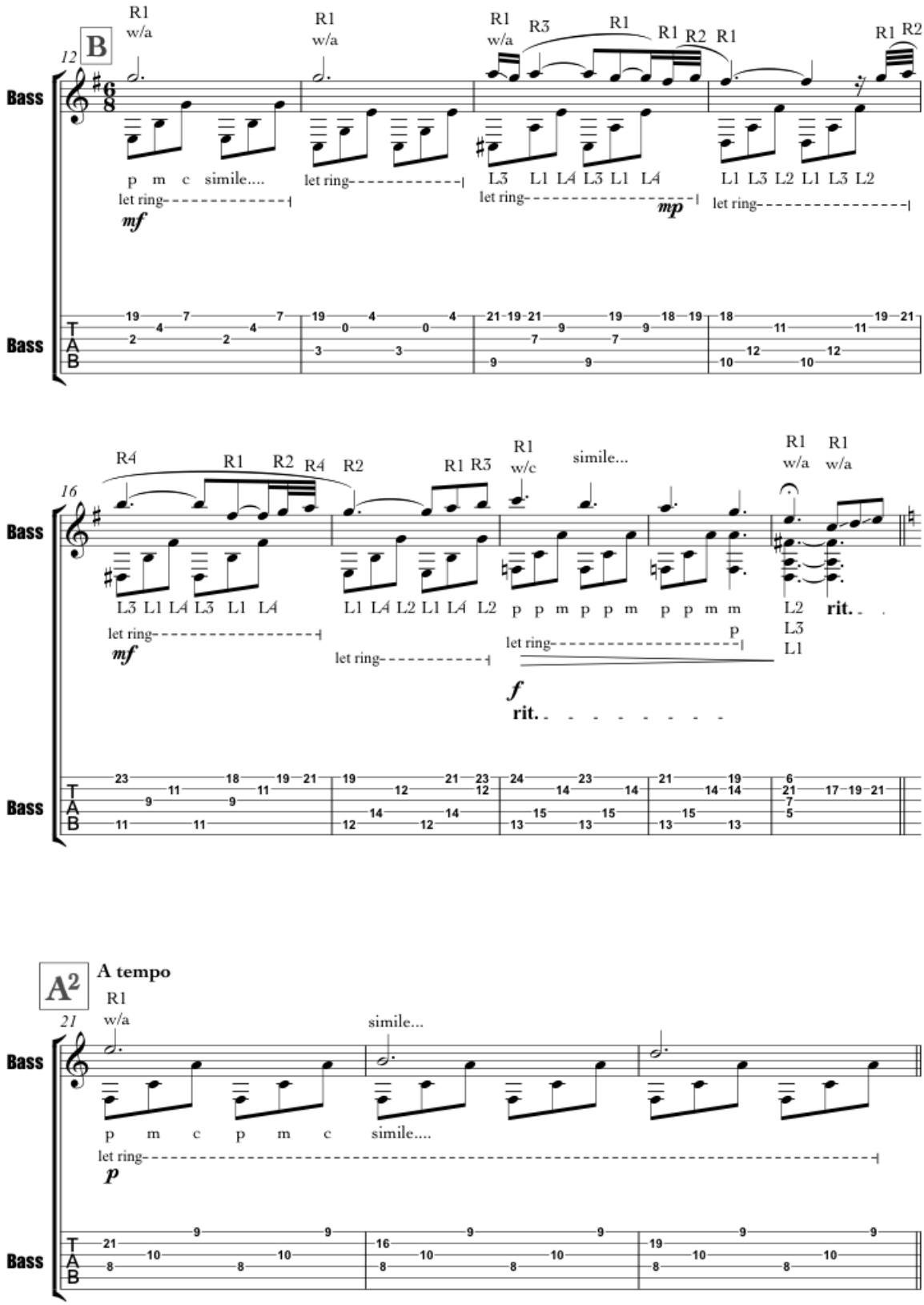

C
Top Voice Only
147
Bass
Bass
TAB

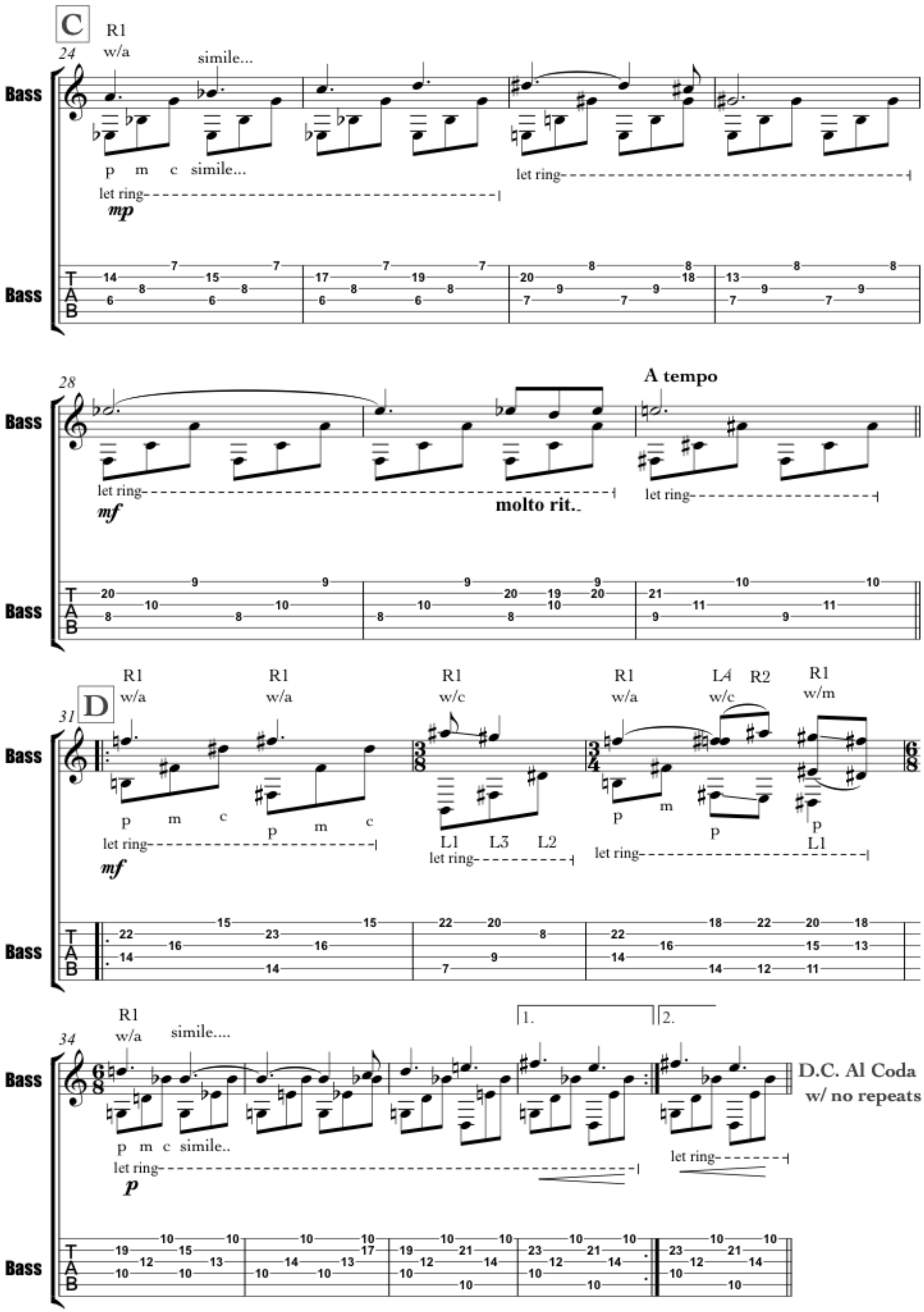

Top Voice Only
151
Bass
Bass
TAB

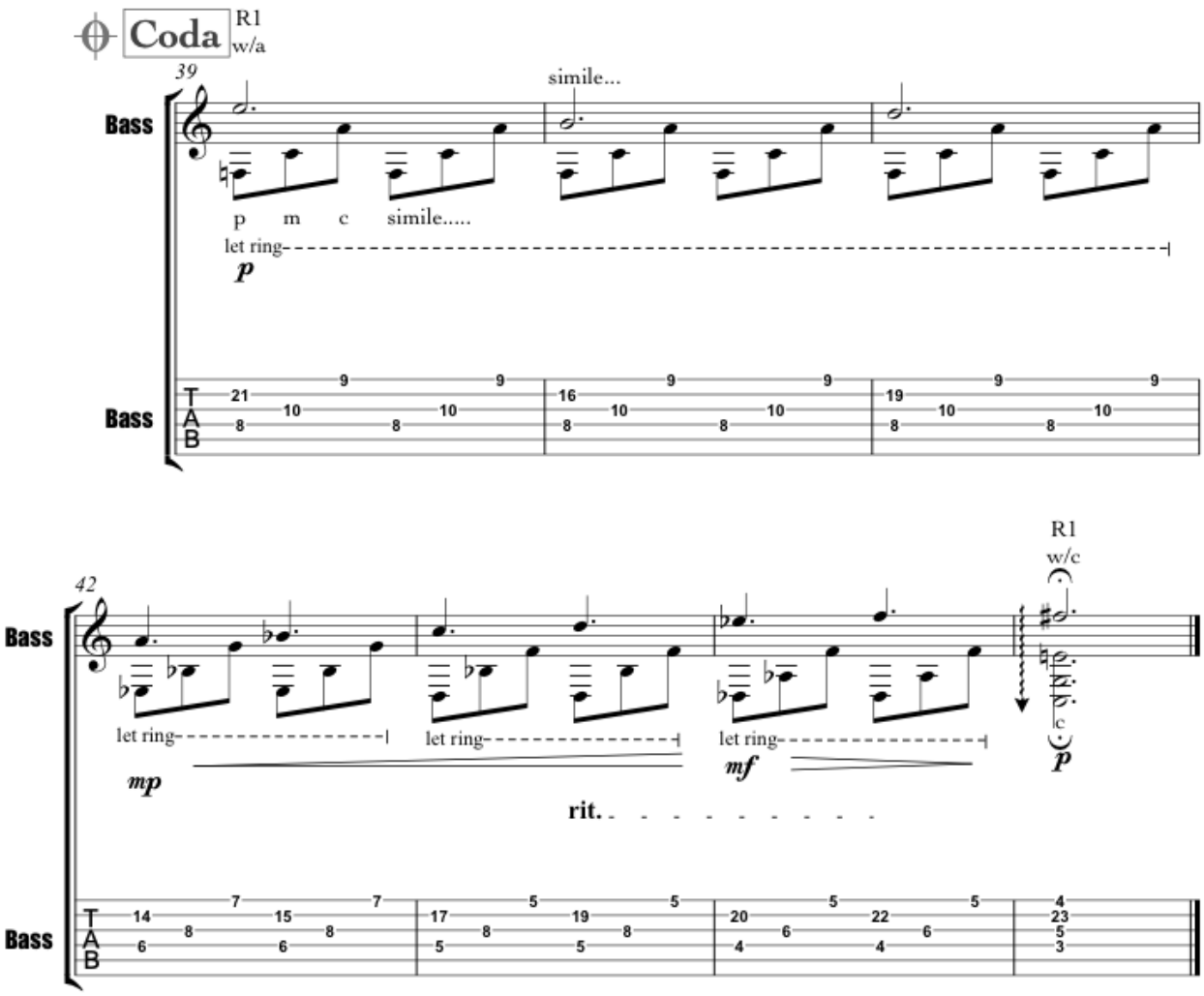

Top Voice Only
1.2.3.
8va
R2L1L2R1R2L1 L2R1R2L1 L2R1 R2L1L2R1 R2L1L2R1 R2L1L2R1 R2
R1
154
Bass
T
T
Bass
TAB
4.
R2 L1 L2 R1 R2 L1 L2 R1 R2 L1 L2 R1 R2
157
Amaj13(♯11omit3)
simile...
L3
R2
R3
R1
L1
Bass
T
Bass
TAB

APPENDIX D: “Etude No.1” Full Score

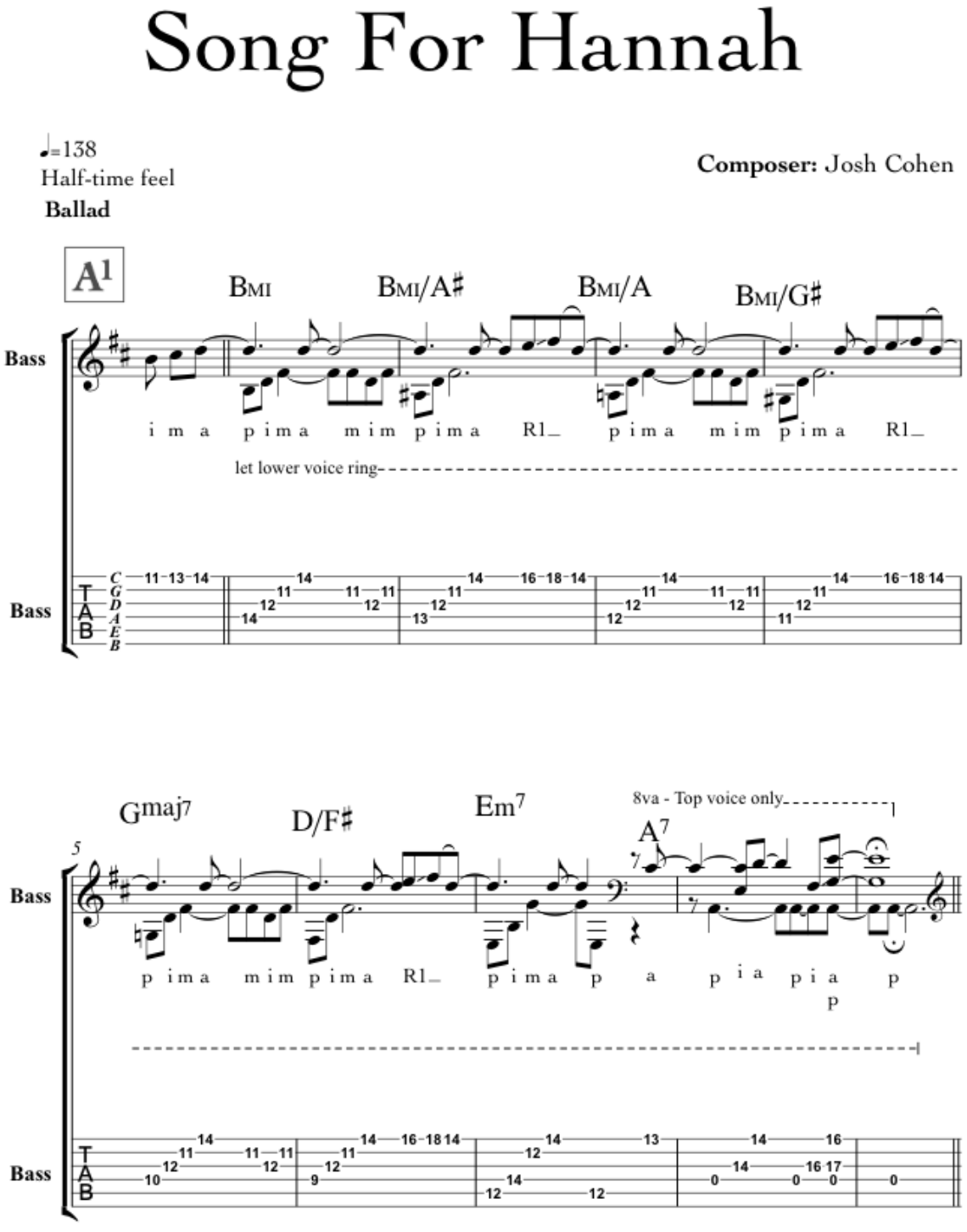


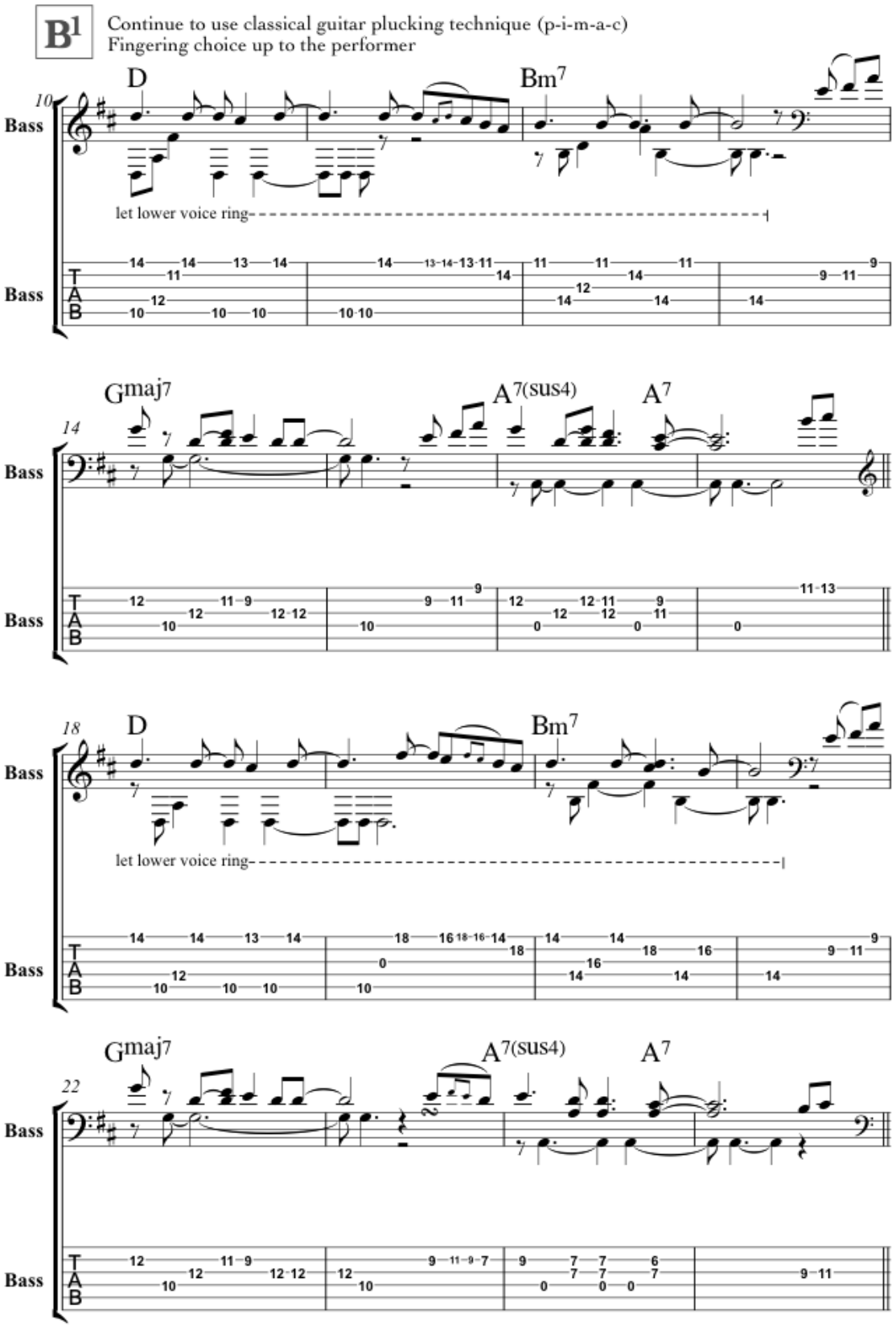

B
12
Bass
R1 w/a
R1 w/a
R1 w/a
R3
R1
R1 R2 R1
R1 R2
p m c simile....
let ring
mf
let ring
L3 L1 LA L3 L1 LA
let ring
mp
L1 L3 L2 L1 L3 L2
let ring
TAB
Bass
16
R4
R1 R2 R4 R2
R1 R3
R1 w/c
simile...
R1 w/a
R1 w/a
L3 L1 LA L3 L1 LA
let ring
mf
L1 LA L2 L1 LA L2
let ring
p p m p p m p p m m
let ring
p
f
rit.
L2
L3
L1
rit.
TAB
Bass
A2
A tempo
21
Bass
R1 w/a
simile...
p m c p m c simile....
let ring
p
TAB
Bass

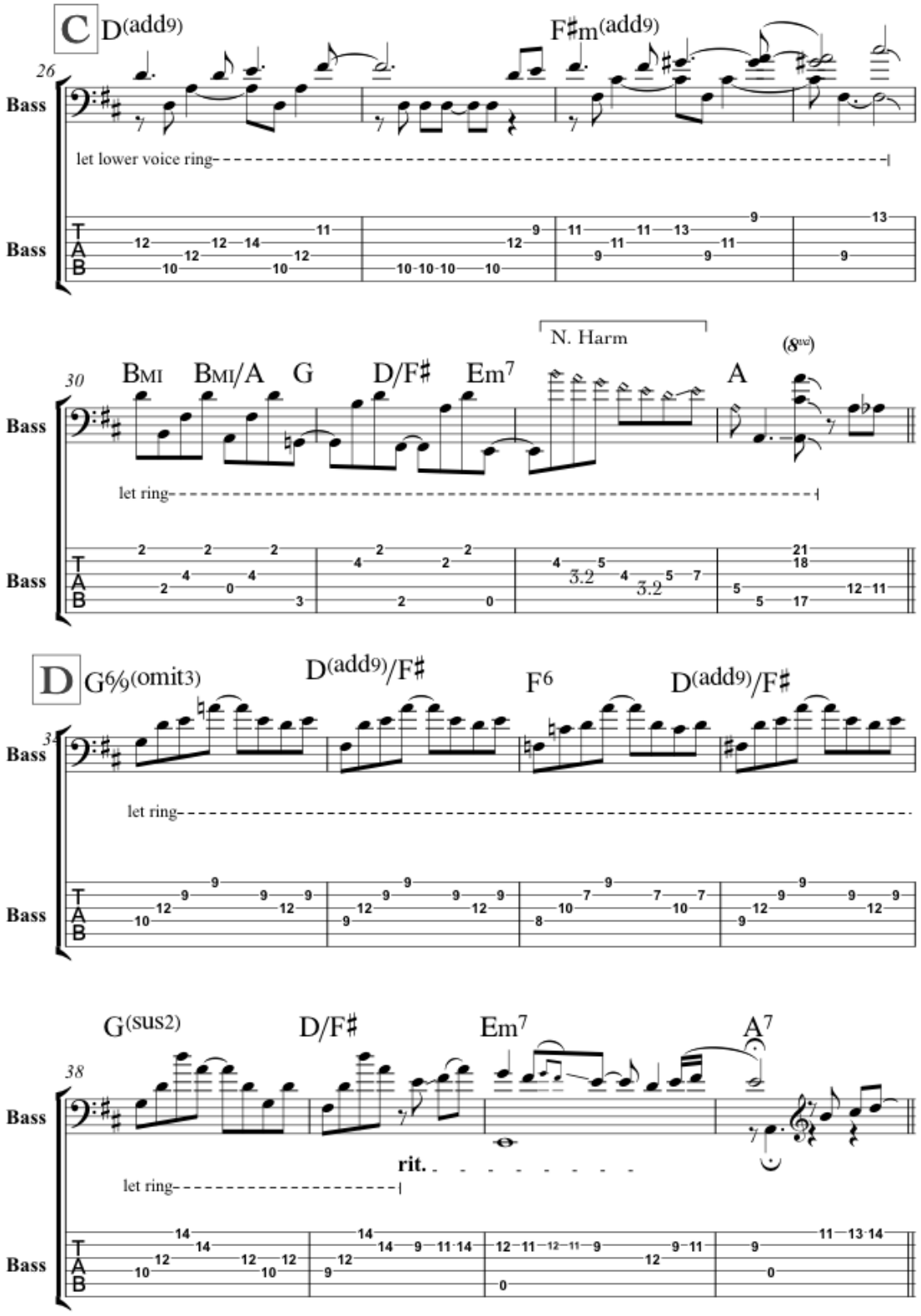

C
R1
w/a
simile...
Bass
p m c simile...
let ring
mp
let ring
A tempo
let ring
mf
molto rit.
let ring
D
R1
w/a
R1
w/c
L4
R2
w/m
p m c
L1 L3 L2
L1
let ring
mf
simile....
p m c simile..
let ring
p
1.
2.
D.C. Al Coda
w/ no repeats

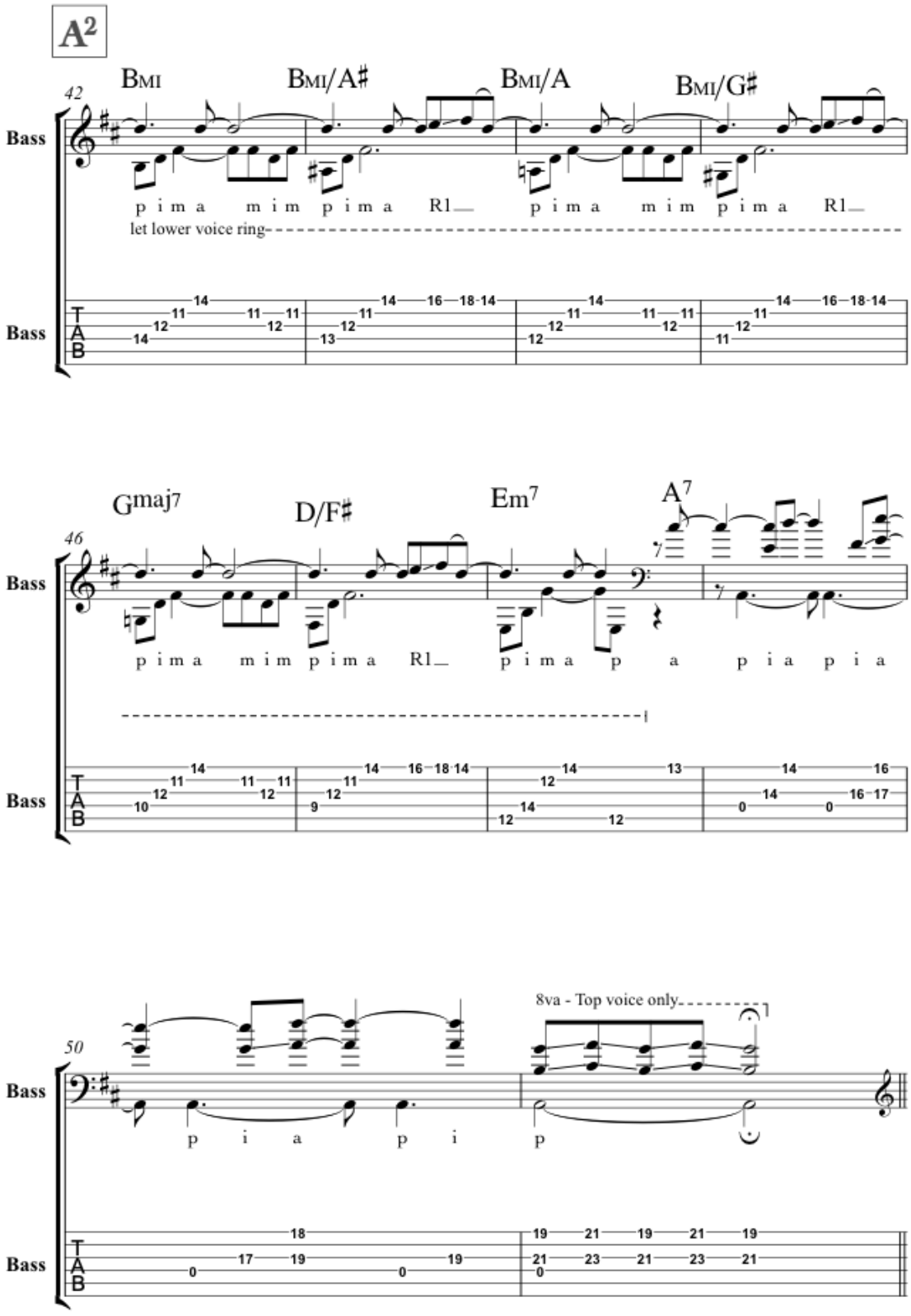

Coda
R1
w/a
39
Bass
simile...
p m c simile.....
let ring
p
Bass
T
A
B
R1
w/c
42
Bass
let ring
let ring
let ring
mp
mf
rit.
p
Bass
T
A
B

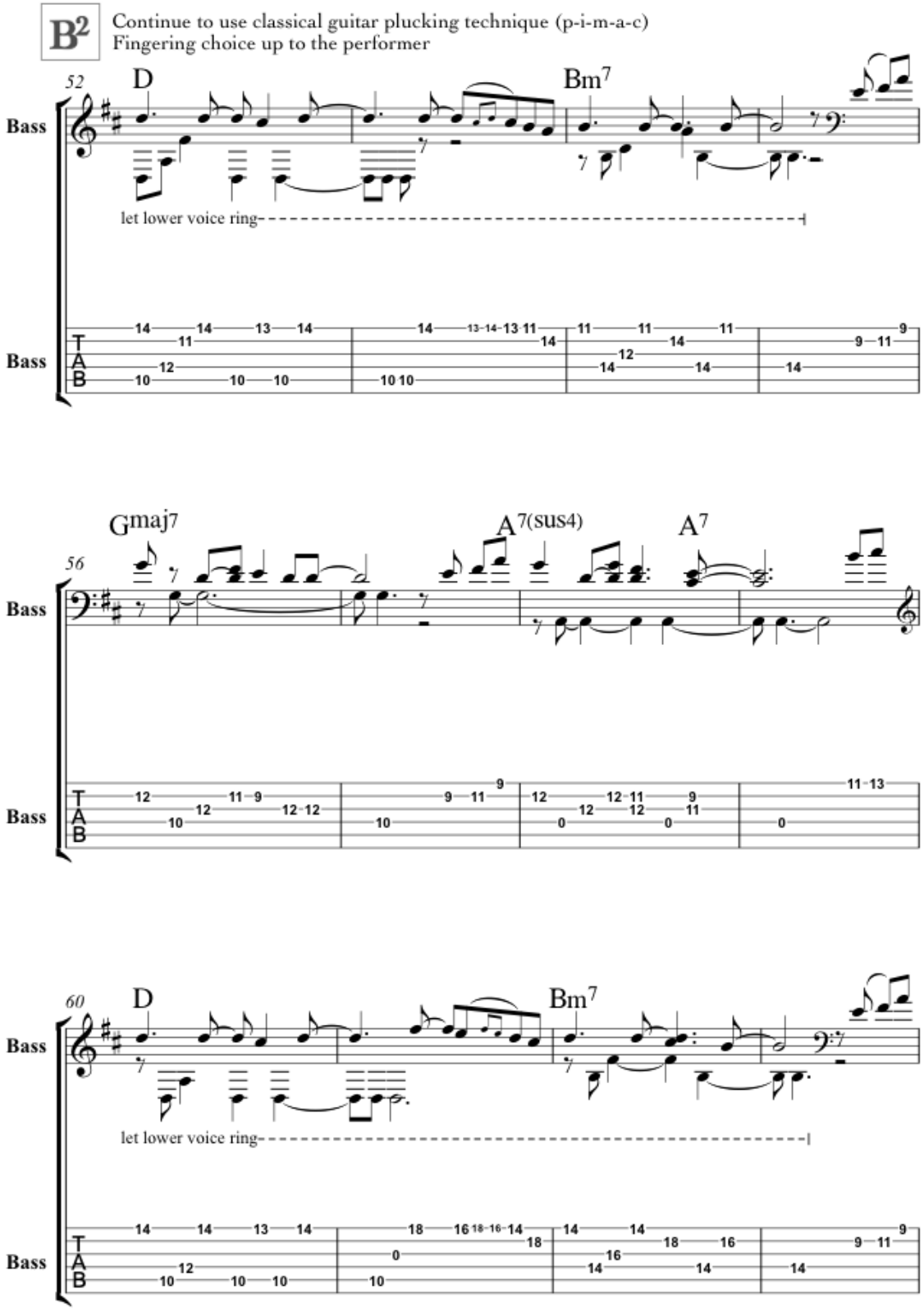
APPENDIX E: "Song For Hannah" Full Score

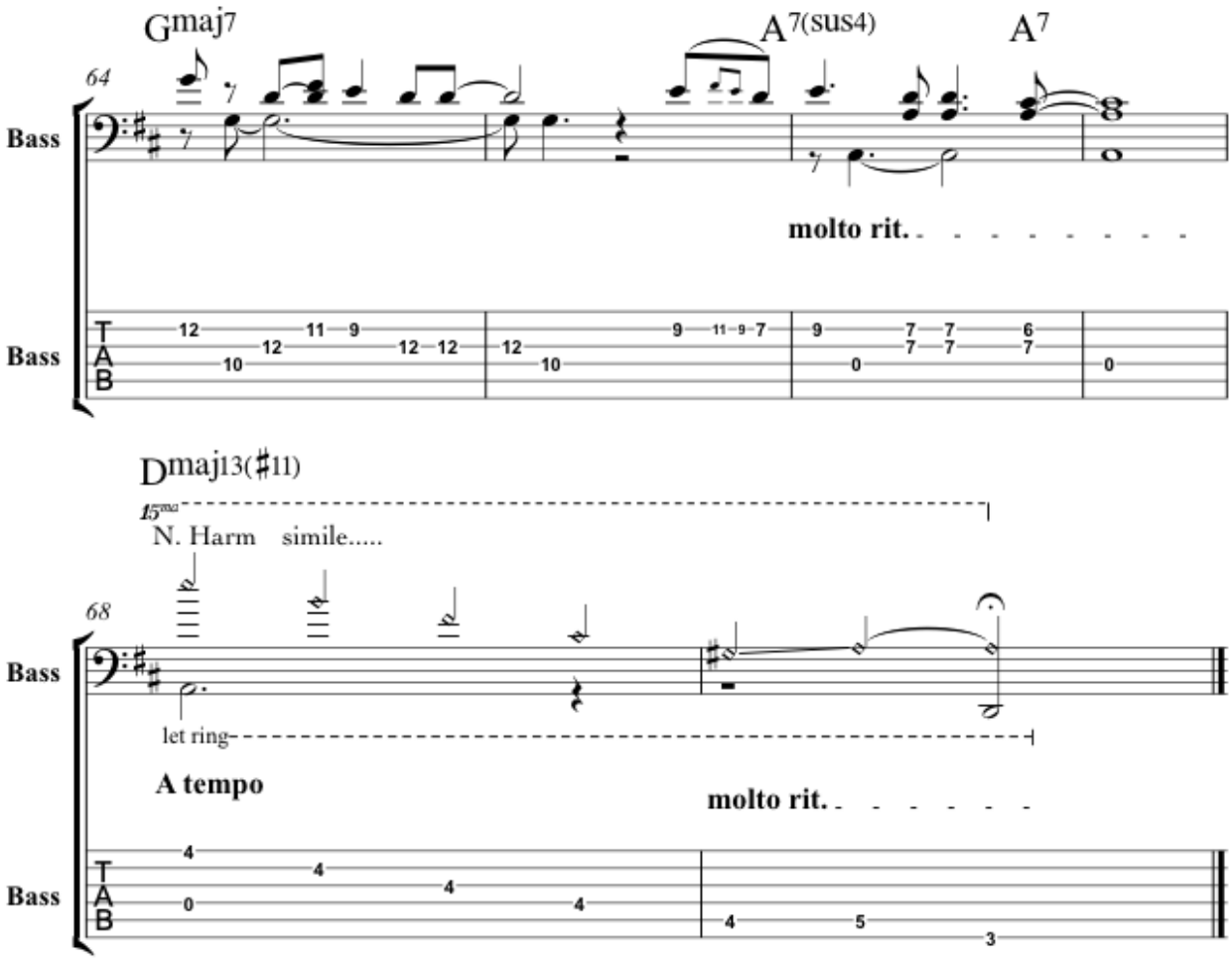



B1
Continue to use classical guitar plucking technique (p-i-m-a-c)
Fingering choice up to the performer
10
D
Bm7
Bass
let lower voice ring
Bass
14
Gmaj7
A7(sus4)
A7
Bass
Bass
18
D
Bm7
Bass
let lower voice ring
Bass
22
Gmaj7
A7(sus4)
A7
Bass
Bass

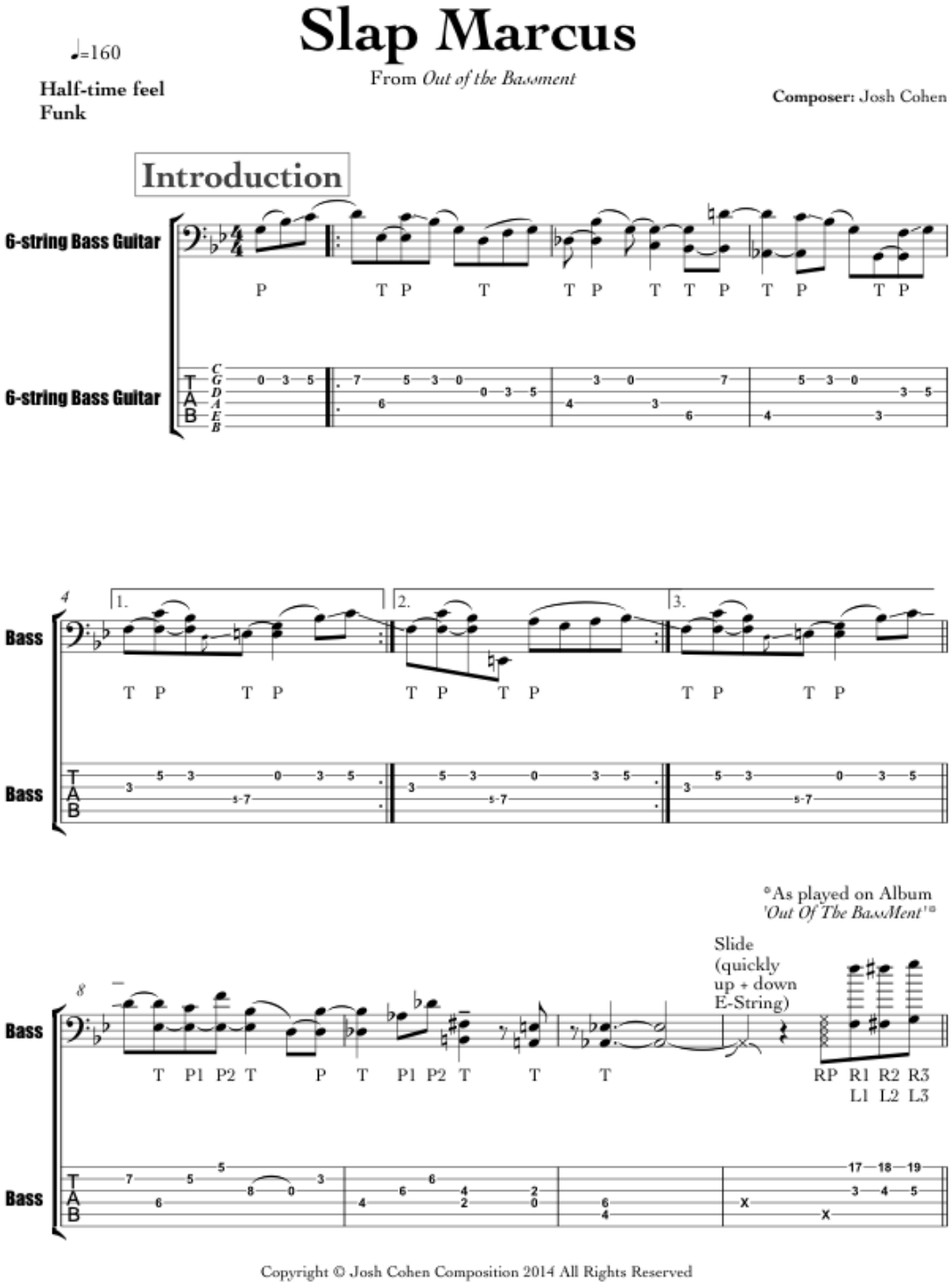

C
D(add9)
F♯m(add9)
26
Bass
let lower voice ring
Bass
N. Harm
(8va)
30
BMI
BMI/A
G
D/F♯
Em7
A
Bass
let ring
Bass
D
G6/9(omit3)
D(add9)/F♯
F6
D(add9)/F♯
34
Bass
let ring
Bass
G(sus2)
D/F♯
Em7
A7
38
Bass
rit.
let ring
Bass

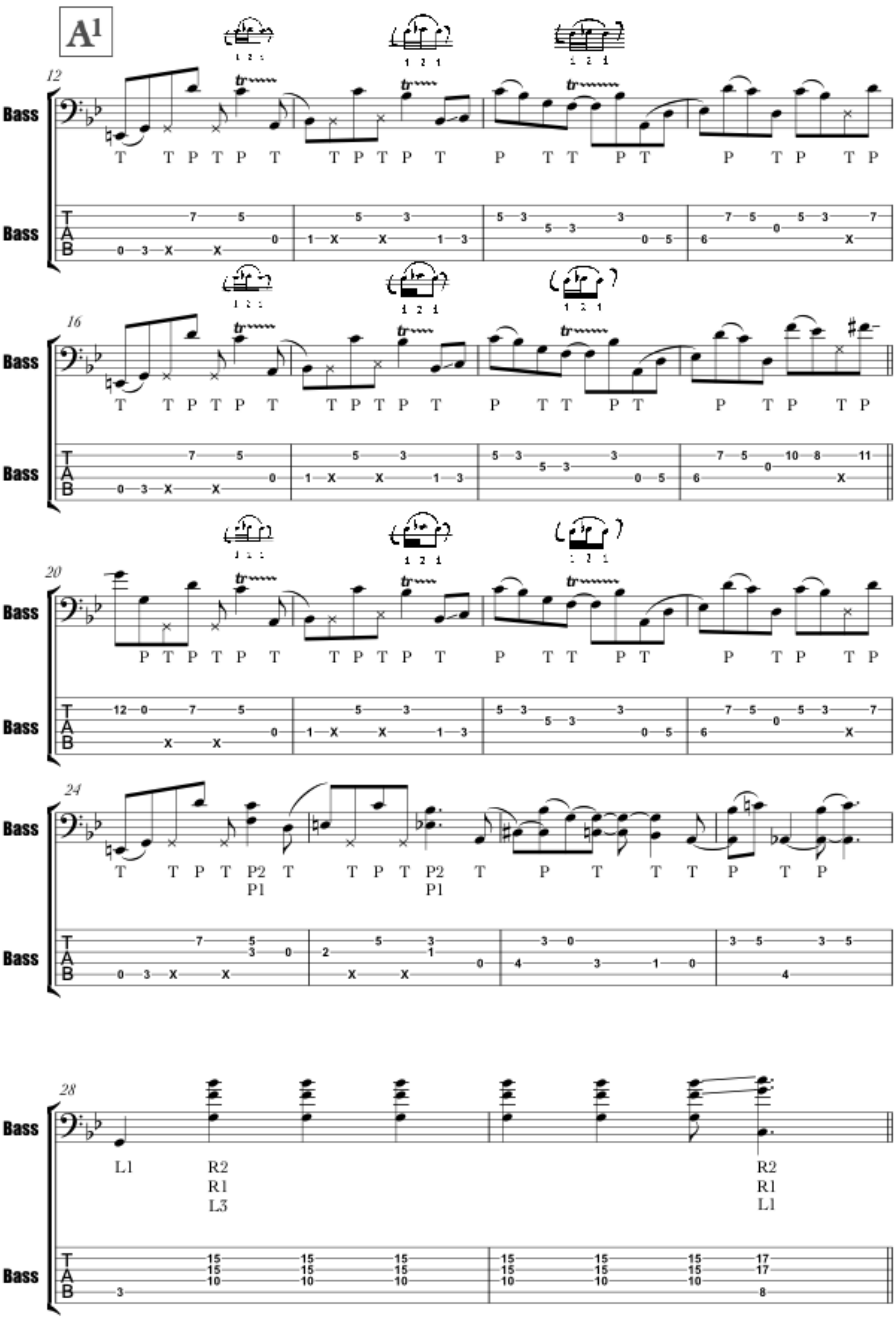

A2
Bmi
Bmi/A♯
Bmi/A
Bmi/G♯
42
Bass
p i m a m i m p i m a R l p i m a m i m p i m a R l
let lower voice ring
Bass
T
A
B
Gmaj7
D/F♯
Em7
A7
46
Bass
p i m a m i m p i m a R l p i m a p a p i a p i a
Bass
T
A
B
8va - Top voice only
50
Bass
p i a p i p
Bass
T
A
B

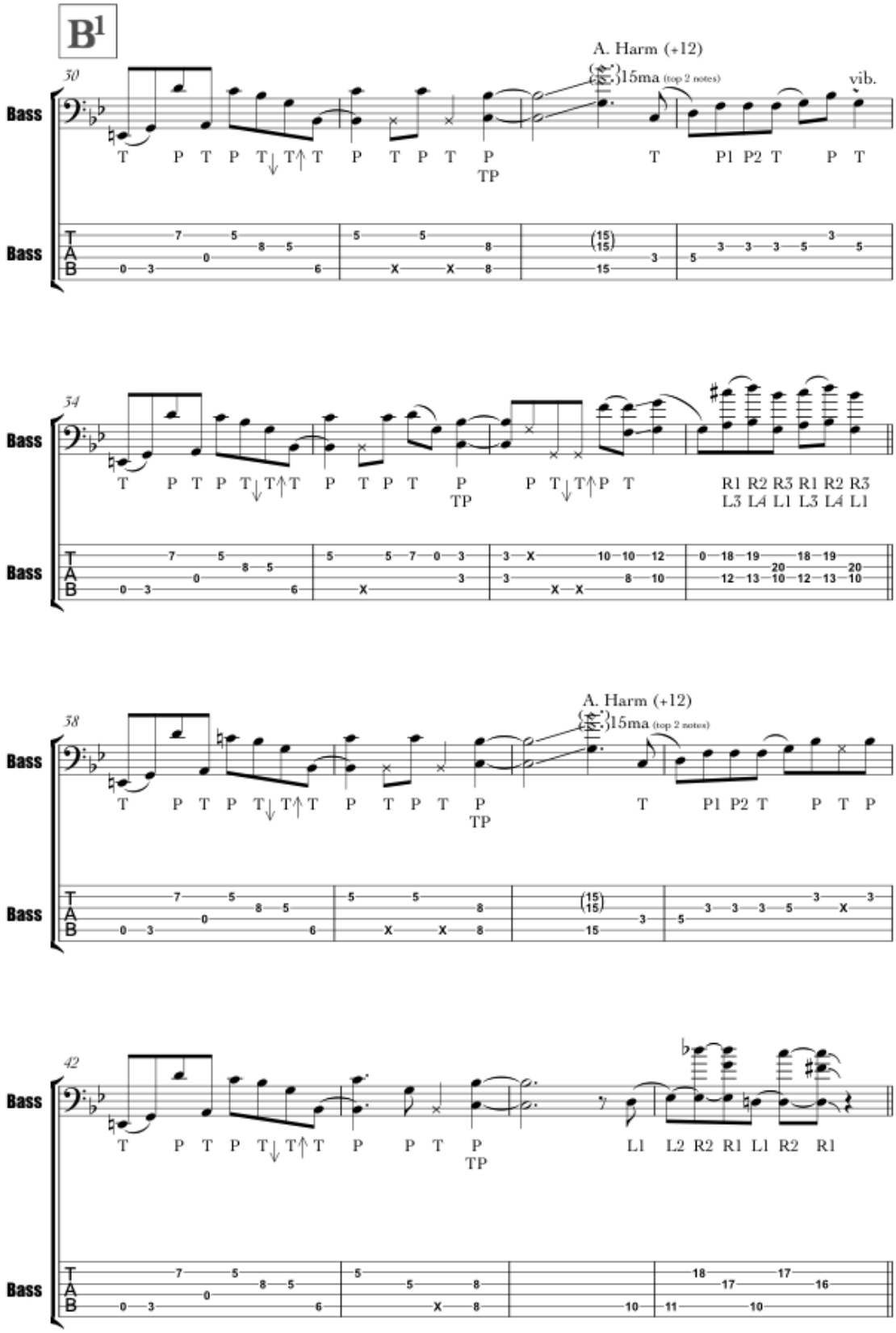

B2
Continue to use classical guitar plucking technique (p-i-m-a-c)
Fingering choice up to the performer
52
D
Bm7
Bass
let lower voice ring
Bass
Gmaj7
A7(sus4)
A7
56
Bass
Bass
60
D
Bm7
Bass
let lower voice ring
Bass

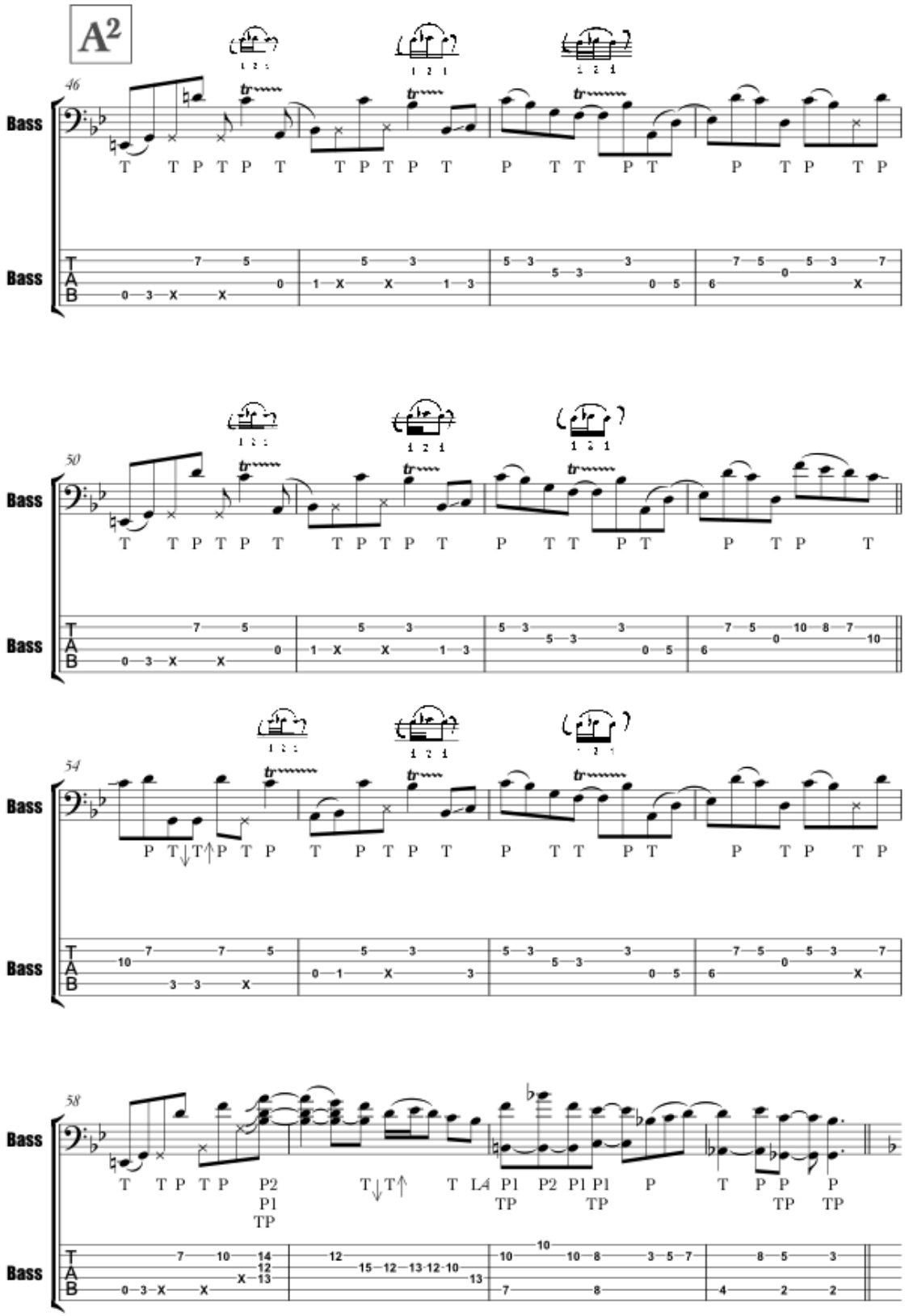

Gmaj7
A7(sus4)
A7
64
Bass
molto rit.
Bass
Dmaj13(♯11)
15ma
N. Harm simile.....
68
Bass
let ring
A tempo
molto rit.
Bass

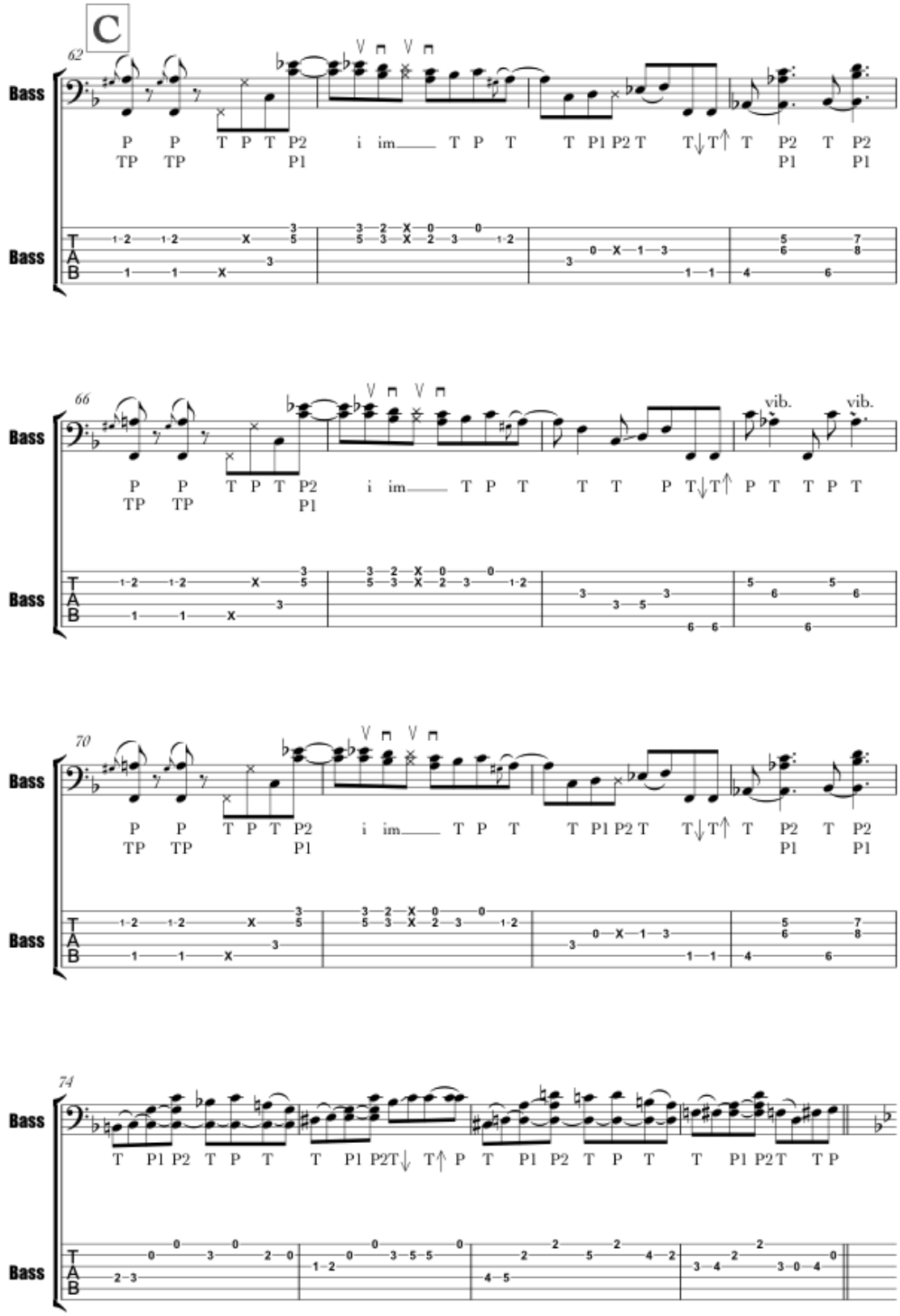
APPENDIX F: “Slap Marcus” Full Score

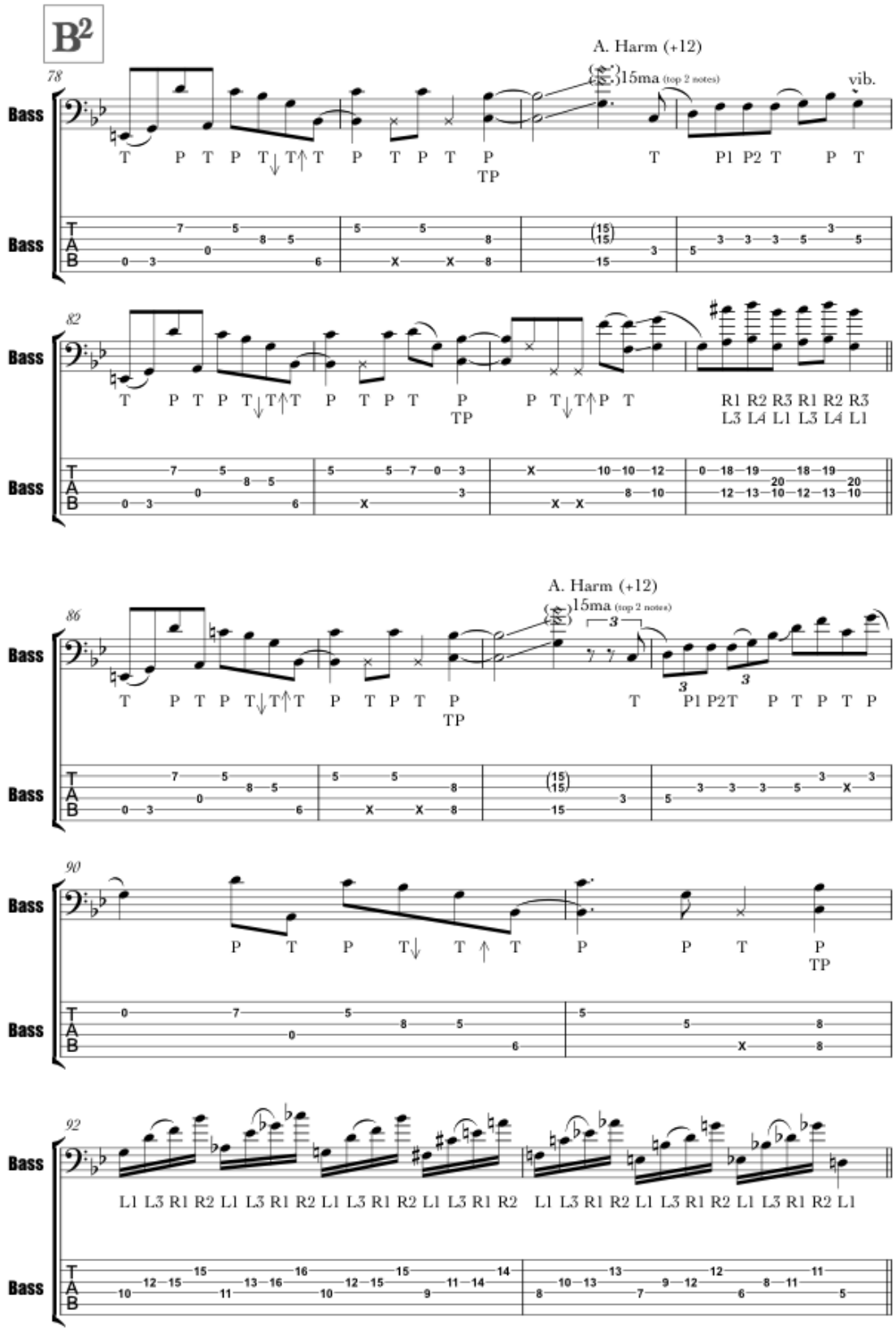


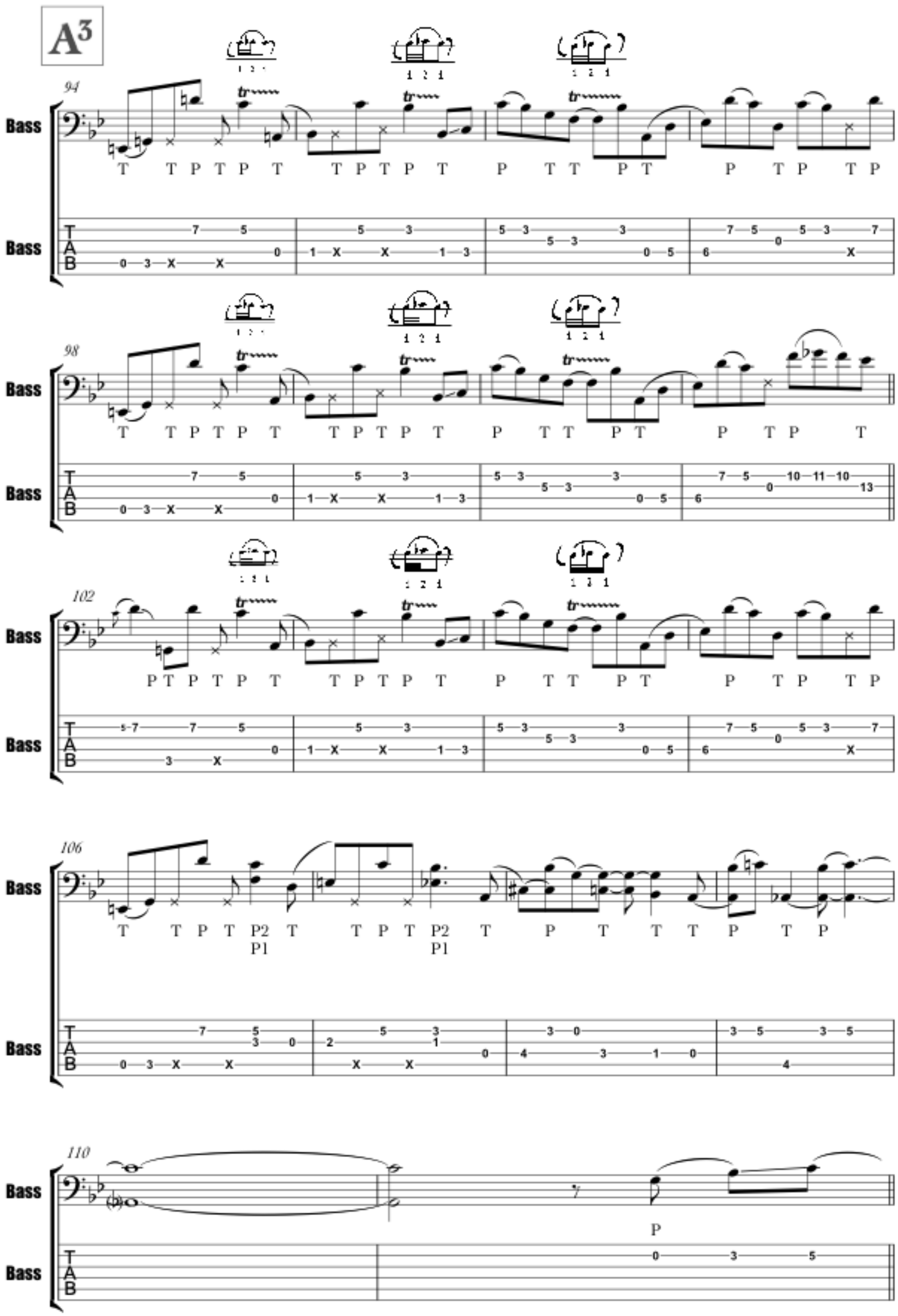

A1
Bass
Bass

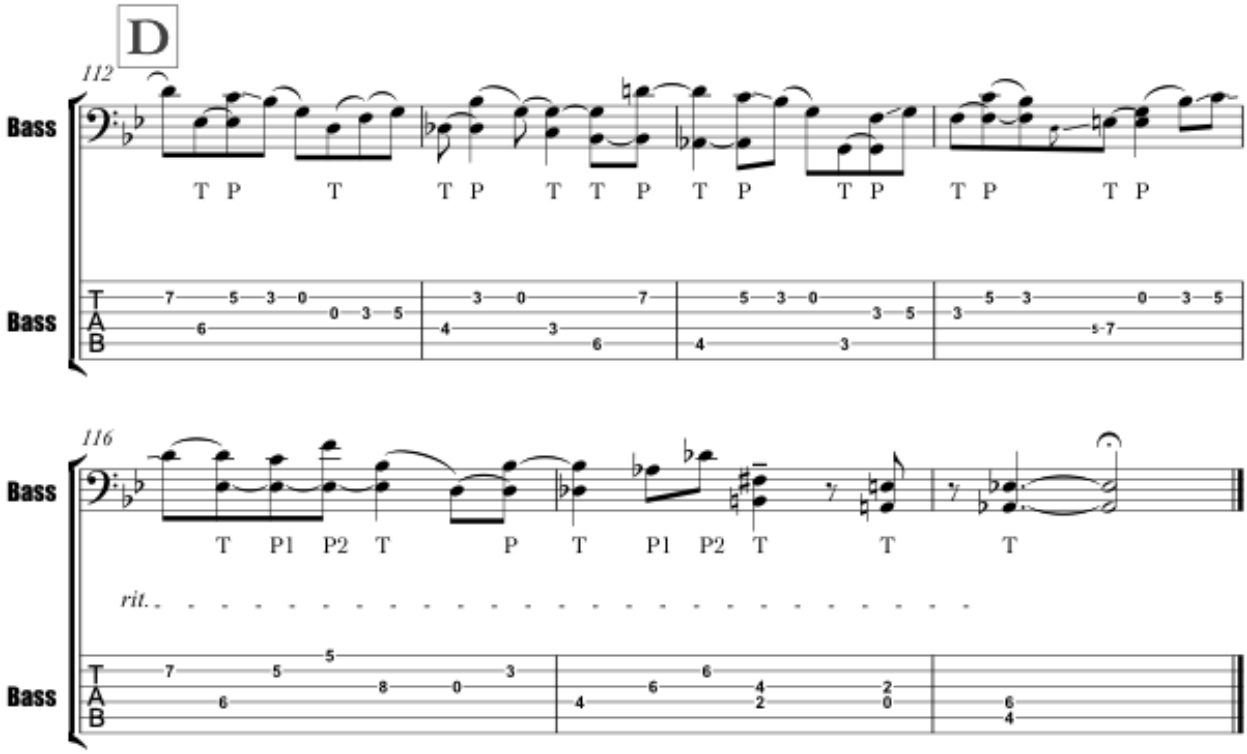

B1
30
A. Harm (+12)
15ma (top 2 notes)
vib.
Bass
T P T P T T T P T P T P TP T P1 P2 T P T
34
R1 R2 R3 R1 R2 R3
L3 L4 L1 L3 L4 L1
38
A. Harm (+12)
15ma (top 2 notes)
42
L1 L2 R2 R1 L1 R2 R1


A2
46
Bass
T T P T P T T P T P T P T T T P T P T P
Bass
50
Bass
T T P T P T T P T P T P T T T P T P T
Bass
54
Bass
P T T P T P T P T P T P T T T P T P T P
Bass
58
Bass
T T P T P P2 P1 TP T T LA P1 TP P2 P1 P1 TP P T P P TP P TP
Bass

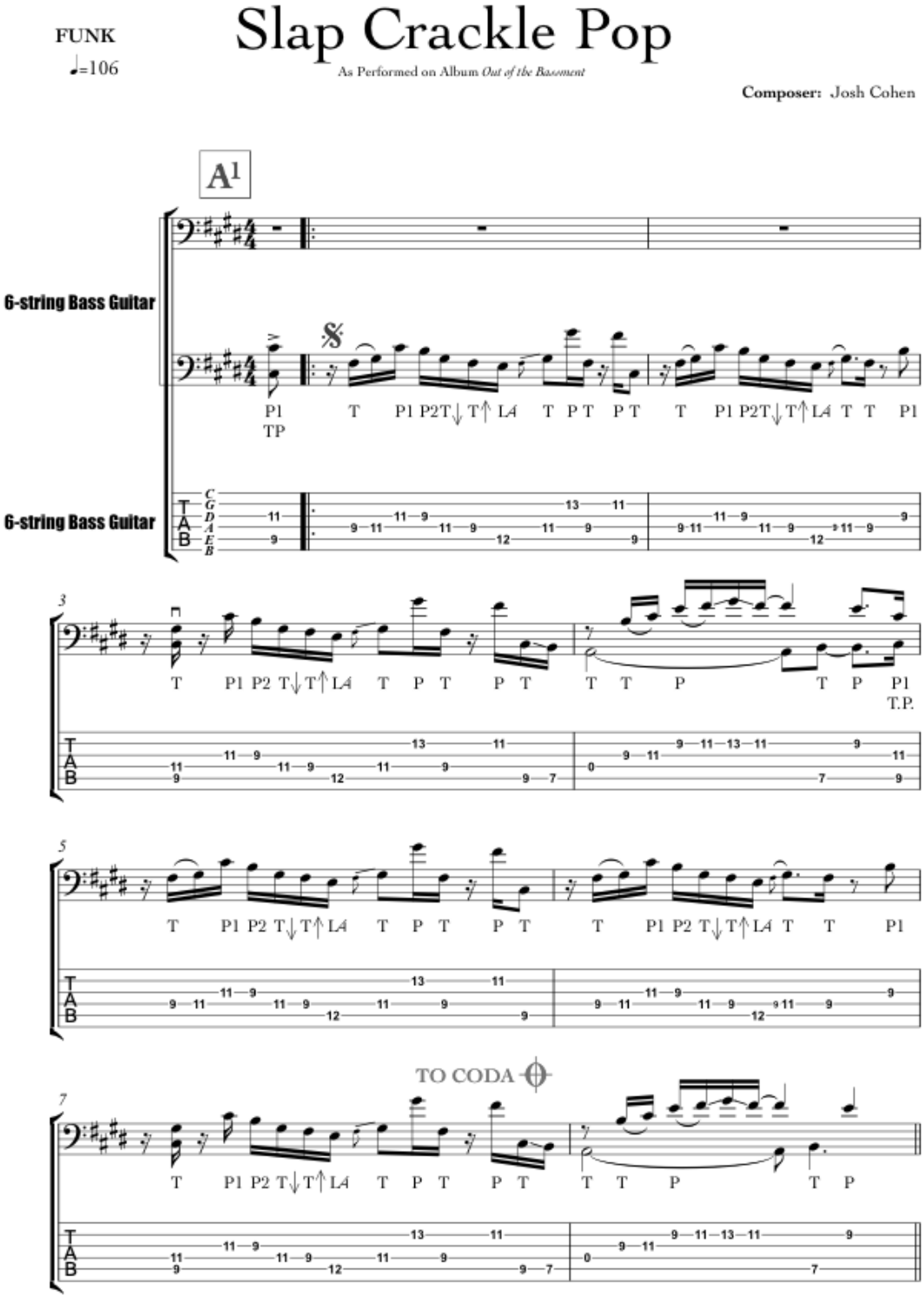

C
62
Bass
P P T P T P2 i im T P T T P1 P2 T T T P2 T P2
TP TP P1 P1 P1
Bass
66
Bass
vib. vib.
P P T P T P2 i im T P T T T P T T P T T P T
TP TP P1
Bass
70
Bass
P P T P T P2 i im T P T T P1 P2 T T T P2 T P2
TP TP P1 P1 P1
Bass
74
Bass
T P1 P2 T P T T P1 P2T T P T P1 P2 T P T T P1 P2T T P
Bass

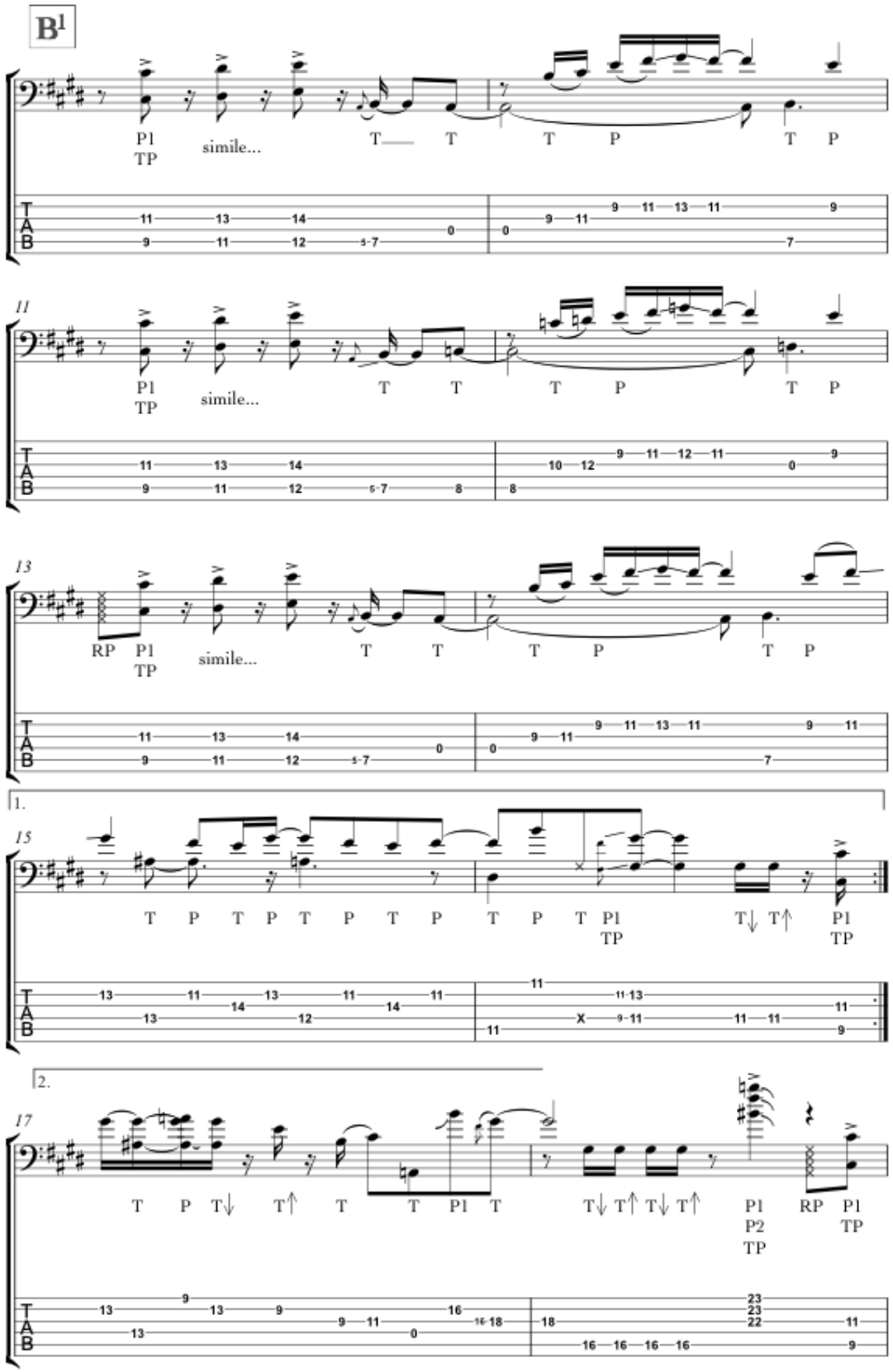

B2
78
Bass
A. Harm (+12)
15ma (top 2 notes)
vib.
T P T P T T T P T P T P TP T P1 P2 T P T
82
R1 R2 R3 R1 R2 R3
L3 L4 L1 L3 L4 L1
86
A. Harm (+12)
15ma (top 2 notes)
T P1 P2T P T P T P
90
P T P T T T P P T P TP
92
L1 L3 R1 R2 L1 L3 R1 R2 L1 L3 R1 R2 L1 L3 R1 R2 L1 L3 R1 R2 L1 L3 R1 R2 L1

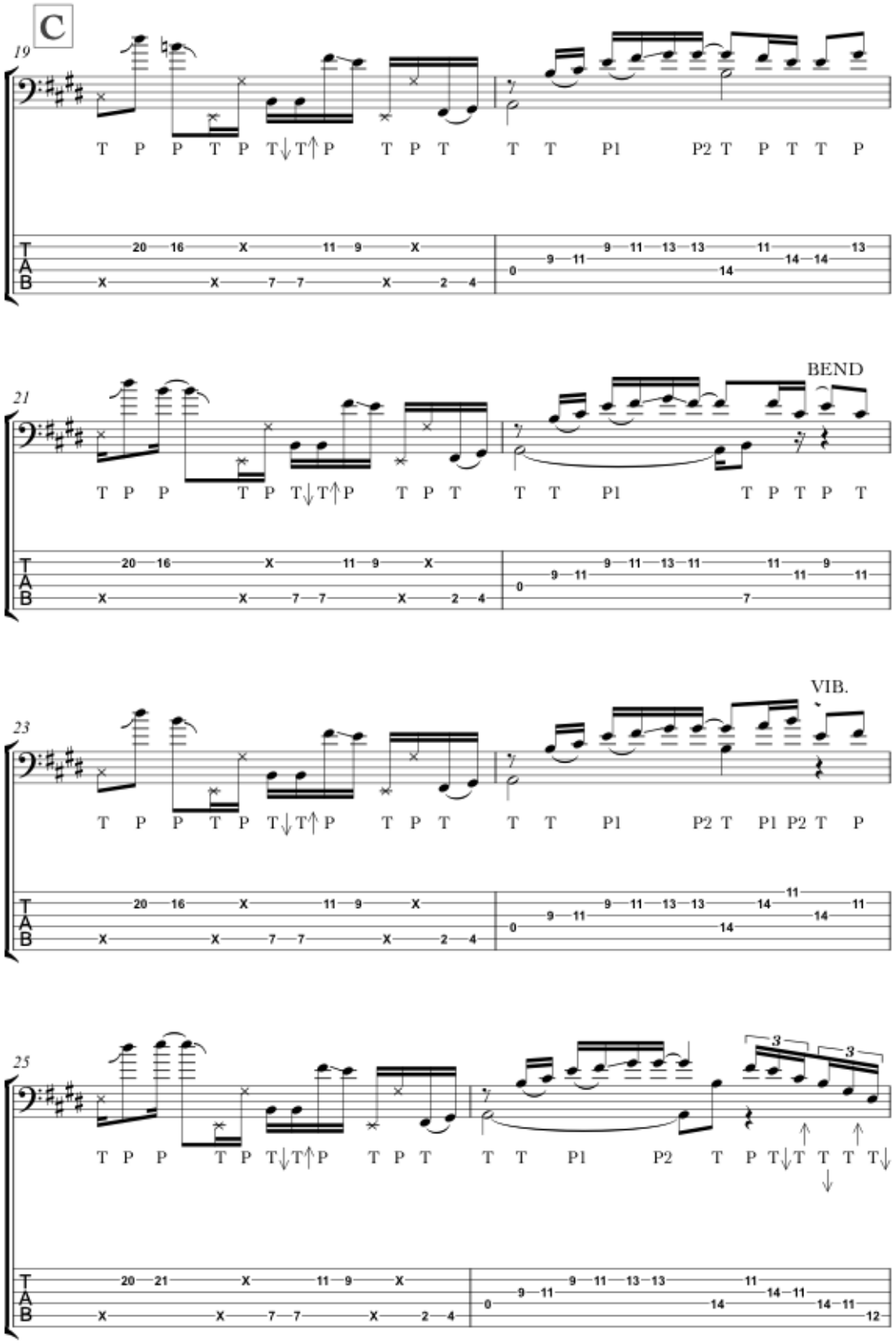

A3
94
Bass
98
102
106
110
T
A
B

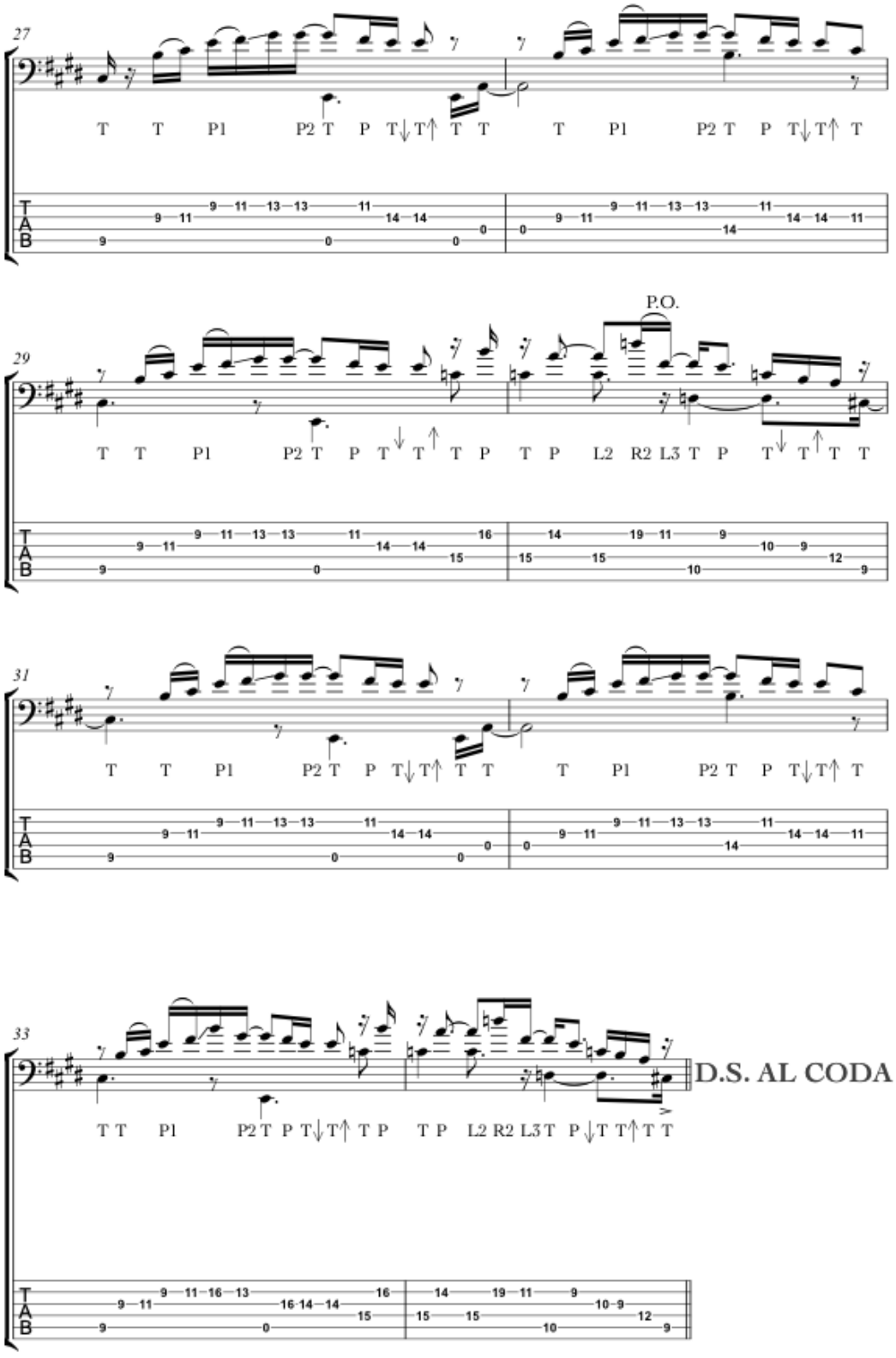

D
112
Bass
T P T T P T T P T P T P T P
Bass
116
Bass
T P1 P2 T P T P1 P2 T T T
rit.
Bass

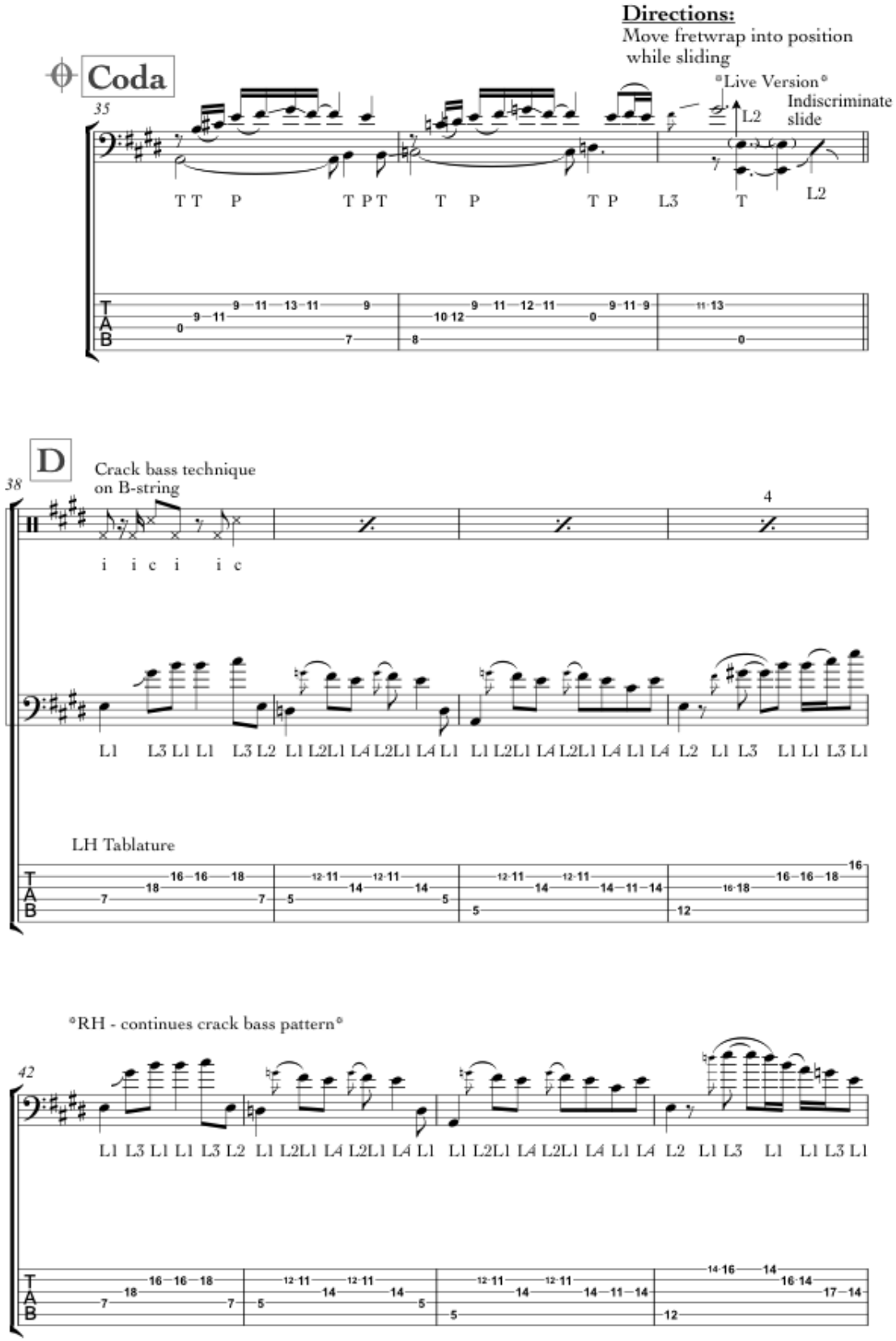
APPENDIX G: “Slap Crackle Pop” Full Score



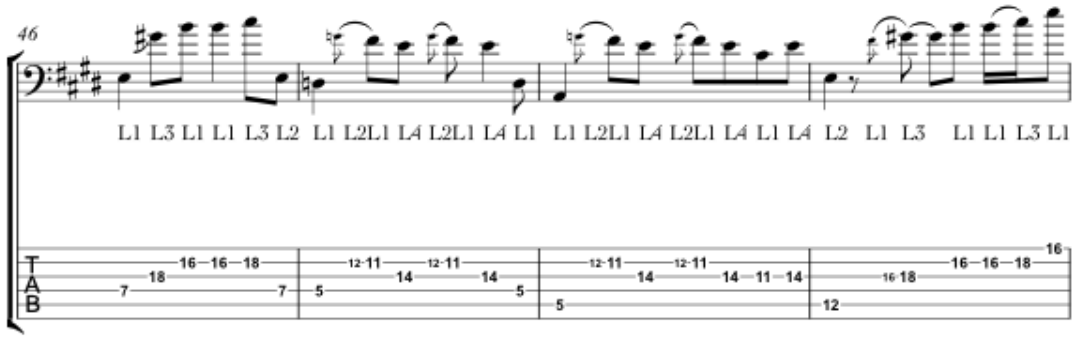

B1
9
P1
TP
simile...
T
T
T
P
T
P
11
P1
TP
simile...
T
T
T
P
T
P
13
RP
P1
TP
simile...
T
T
T
P
T
P
1.
15
T
P
T
P
T
P
T
P
T
P
T
P1
TP
T↓
T↑
P1
TP
2.
17
T
P
T↓
T↑
T
T
P1
T
T↓
T↑
T↓
T↑
P1
P2
TP
RP
P1
TP


C
19
T P P T P T↓T↑P T P T T T P1 P2 T P T T P
21
BEND
T P P T P T↓T↑P T P T T T P1 T P T P T
23
VIB.
T P P T P T↓T↑P T P T T T P1 P2 T P1 P2 T P
25
3
3
T P P T P T↓T↑P T P T T T P1 P2 T P T↓T T T T↓

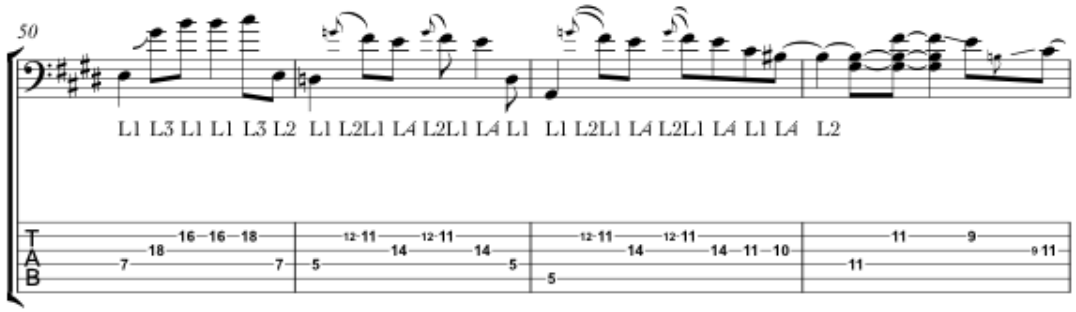

27
T T P1 P2 T P T↓T↑ T T T P1 P2 T P T↓T↑ T
29
P.O.
T T P1 P2 T P T↓ T↑ T P T P L2 R2 L3 T P T↓ T↑ T T
31
T T P1 P2 T P T↓T↑ T T T P1 P2 T P T↓T↑ T
33
T T P1 P2 T P T↓T↑ T P T P L2 R2 L3 T P↓T T↑T T
D.S. AL CODA

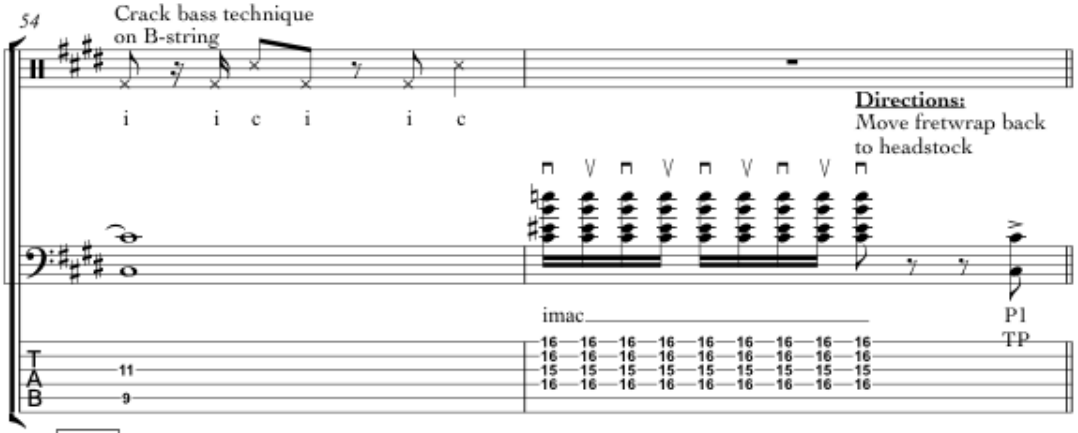

Directions:
Move fretwrap into position while sliding
Coda
35
°Live Version°
Indiscriminate slide
L2
T T P T P T T P T P L3 T L2
D
38
Crack bass technique on B-string
i i c i i c
4
L1 L3 L1 L1 L3 L2 L1 L2L1 L4 L2L1 L4 L1 L1 L2L1 L4 L2L1 L4 L1 L4 L2 L1 L3 L1 L1 L3 L1
LH Tablature
°RH - continues crack bass pattern°
42
L1 L3 L1 L1 L3 L2 L1 L2L1 L4 L2L1 L4 L1 L1 L2L1 L4 L2L1 L4 L1 L4 L2 L1 L3 L1 L1 L3 L1

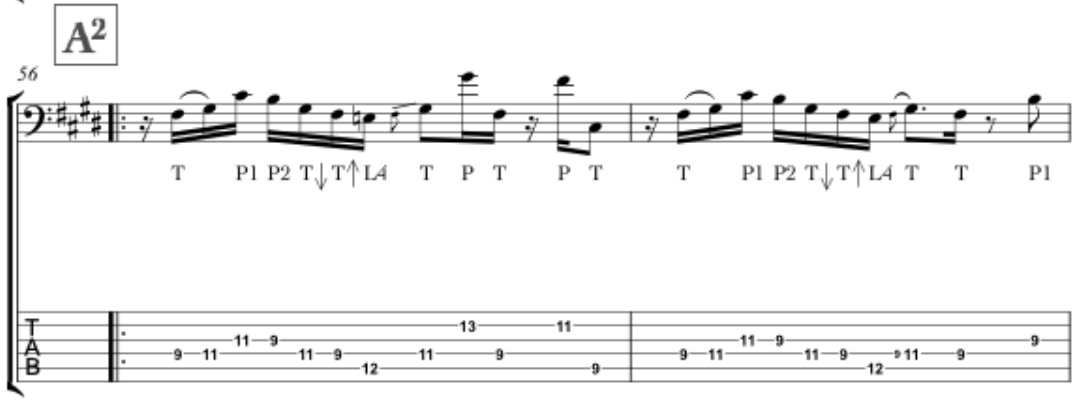
°RH - continues crack bass pattern°

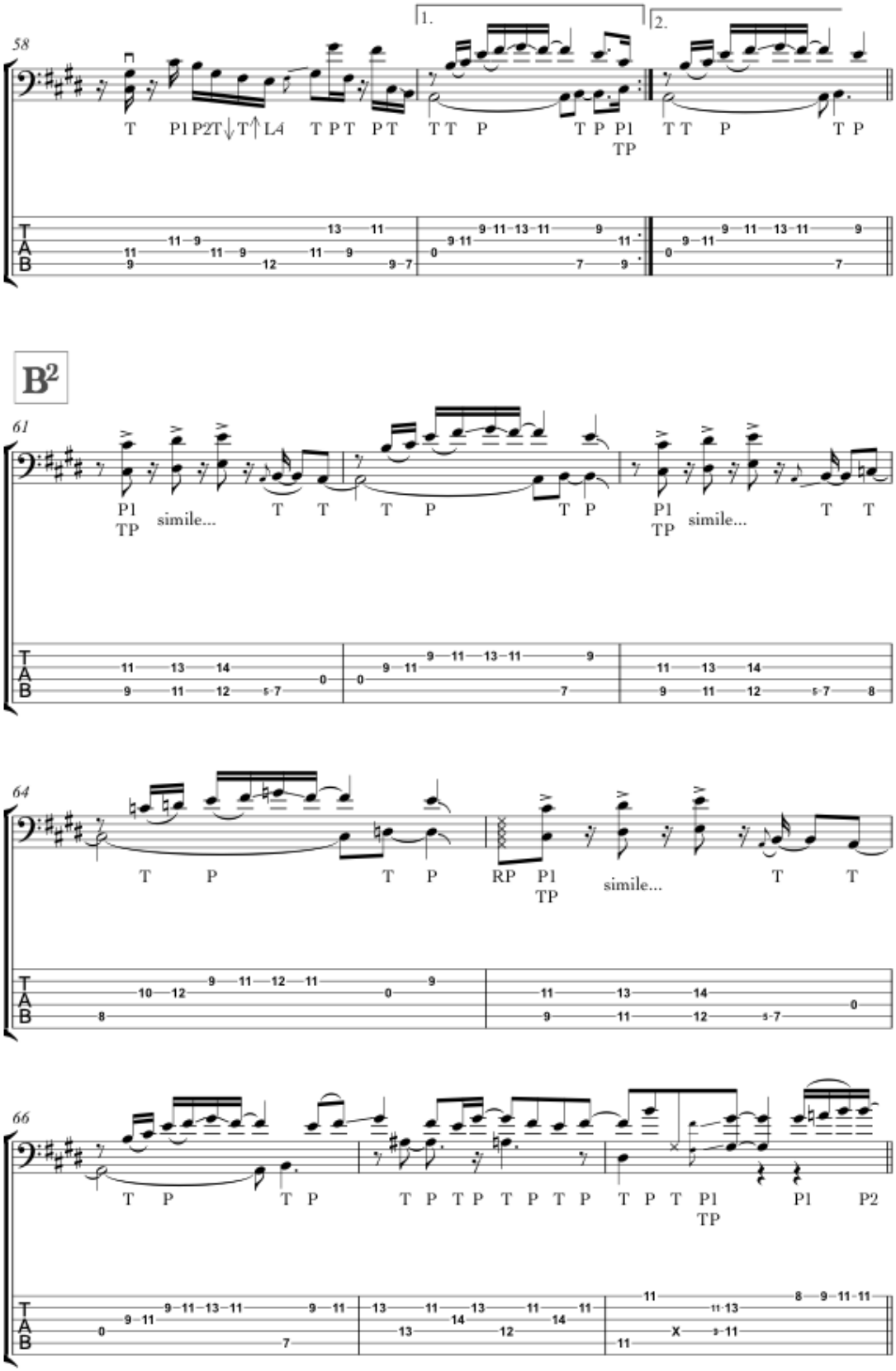


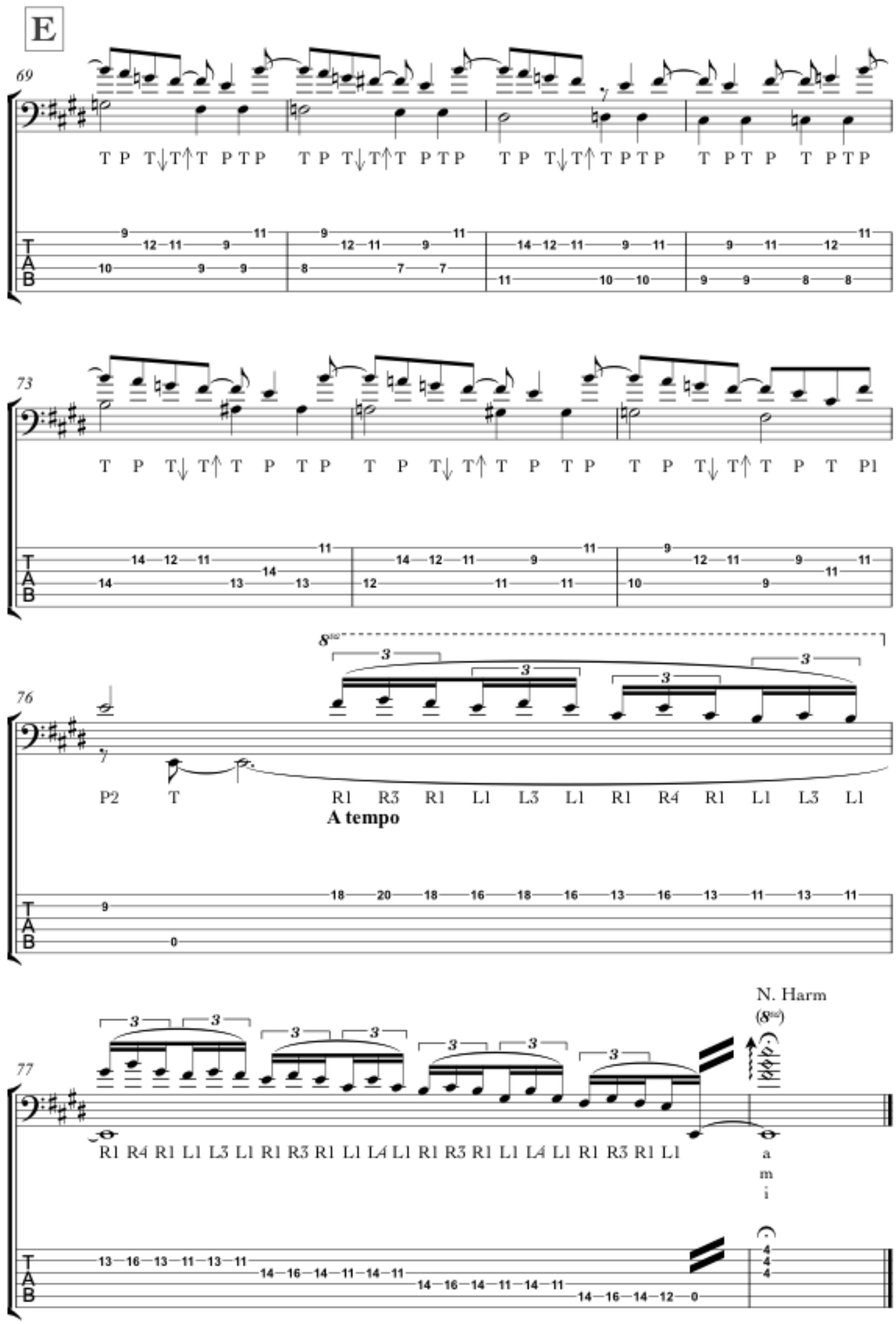
°RH - continues crack bass pattern°



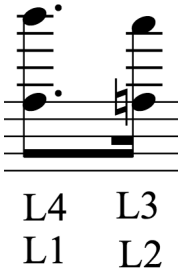
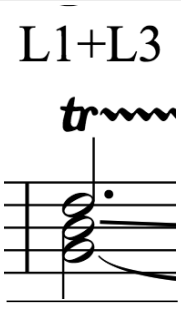


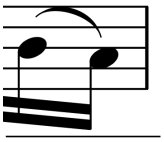
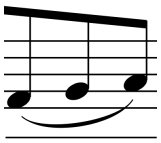
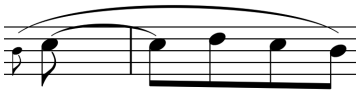
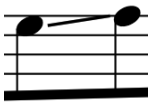


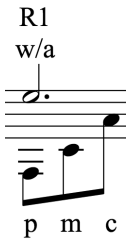
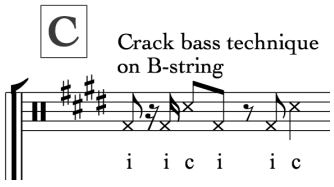

58
1.
2.
T P1 P2T T L4 T P T P T T T P T P P1 TP T T P T P
T A B
B2
61
P1 TP simile... T T T P T P P1 TP simile... T T
64
T P T P RP P1 TP simile... T T
66
T P T P T P T P T P T P T P T P T P1 TP P1 P2

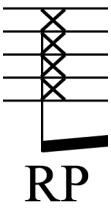
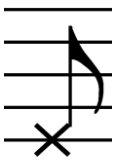

E
69
T P T↓T↑T P T P T P T↓T↑T P T P T P T↓T↑T P T P T P T P T P T P
73
T P T↓ T↑ T P T P T P T↓ T↑ T P T P T P T↓ T↑ T P T P1
76
P2 T R1 R3 R1 L1 L3 L1 R1 R4 R1 L1 L3 L1
A tempo
77
R1 R4 R1 L1 L3 L1 R1 R3 R1 L1 L4 L1 R1 R3 R1 L1 L4 L1 R1 R3 R1 L1
N. Harm
a
m
i
TAB

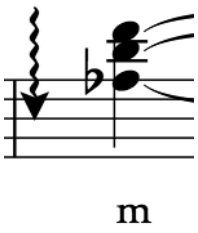
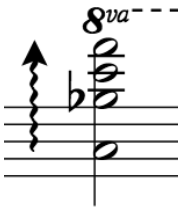
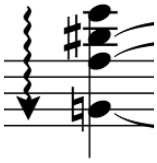
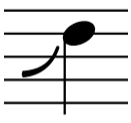
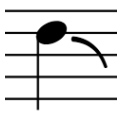
APPENDIX H: Notation Legend

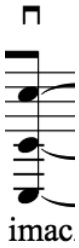
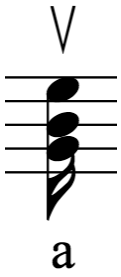
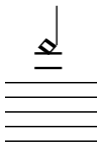
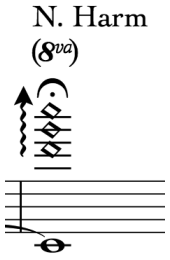
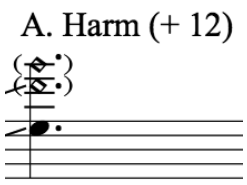
Tapping Techniques		
R1		Tap w/ RH index finger
R2		Tap w/ RH middle finger
R3		Tap w/ RH ring finger
R4		Tap w/ RH pinky finger
L1		Tap w/ LH index finger
L2		Tap w/ LH middle finger
L3		Tap w/ LH ring finger
L4		Tap w/ LH pinky finger
Stacked L4, L3, R1 etc (or any combination)		Assign the fingerings from the top down in accordance with the notes.
L1 + L3 (or any combination of fingers)		Designates which two fingers to use in a trill

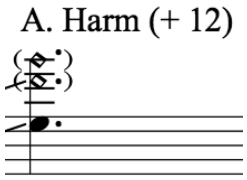
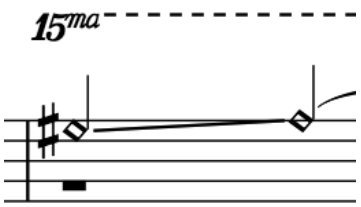
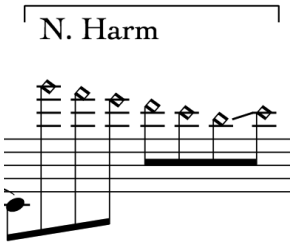
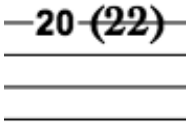
Other Techniques and Combinations of Techniques		
Ascending slur between two notes		Hammer-on
Descending slur between two notes or over passage with 3 or more.		Pull-off(s)
Slur over 3 or more ascending notes		Series of hammer-ons
Slur over 3 or more descending notes		Series of pull-offs
Slur over 3 or more ascending and descending notes		Combination of hammer-ons (when ascending) and pull-offs (when descending)
Ascending line slide between two notes		Slide up
Descending line slide between two notes		Slide down
P.O.		Pull-off (necessary at times when multiple voices are present)

Slide/H.O.		Indicates that a note should partly slide up and partly hammer-on to another note.
Slide/P.O.		Indicates that a note should partly slide down and partly pull-off to another note.
p		Pluck w/ RH thumb
i		Pluck w/ RH index finger
m		Pluck w/ RH middle finger
a		Pluck w/ RH ring finger
c		Pluck w/ RH pinky finger
		Down strum
		Up strum
R1 (or any finger designation) W/a (or any finger designation)		Fret with the finger designated, LH or RH, then pluck with the other designated finger or thumb.
X - note heads on their own staff with fingers designated underneath (p,m,i etc) and "crack bass technique" written on top.		Indicates crack bass pattern.

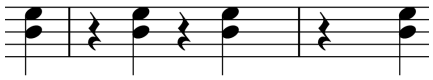
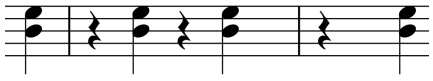
T		Slap (w/ RH thumb). In the case of multiple notes, it is a slap strum.
T↓		Slap w/ thumb downstroke (double-thumping)
T↑		Slap w/ thumb upstroke (double-thumping)
TP		Pop w/ thumb.
P		Pop w/ RH finger
P1		Pop w/ RH index finger specifically
P2		Pop w/ RH middle finger specifically
LS		LH slap (close LH against the strings to create a non-pitched percussive sound)
RS		RH slap (Slap RH against the strings to create a non-pitched percussive sound)
RP		RH palm slap.
X - note head		Dead note played by indicated technique.

	Next to notes w/ "p" (or any other digit) underneath		Use an RH digit (as indicated) to strum (slowly) down from the highest to lowest fretted string.
	Next to notes w/ "p" (or any other digit) underneath	 m	Use an RH digit (as indicated) to strum (slowly) in the direction indicated
	Next to notes with a vertical stack of 2 or more fingers indicated below	 a m i p	Indicates that the stacked notes should be plucked by the finger order stacked below in a rolled fashion and in the direction indicated by the arrow.
	Next to notes with a vertical stack of 2 or more fingers indicated below	 a m i p	Indicates that the stacked notes should be plucked by the finger order stacked below in a rolled fashion and in the direction indicated by the arrow.
	Before a note		Slide up to the note from an indiscriminate pitch
	After a note		Slide down to the note from an indiscriminate pitch (sometimes called "fall-off")

	Before and after a slash note head. Then marked underneath LH-"string name" or RH		Indiscriminate slide up and down the indicated string. In this case (to the left) on the E-string.
	Above notes w/ "p" (or any other digit or combination of digits)		Fast strum down with indicated digit or digits.
	Above notes w/ "p" (or any other digit or combination of digits)		Fast strum up with indicated digit or digits.
Diamond note head			Indicates that the note is a harmonic of some type.
N. Harm			Indicates a natural harmonic
A. Harm			Indicates an artificial harmonic

A. Harm (+ ____)		Specifies how many semitones up, from the fretted location, the artificial harmonic is marked.
Slide between two harmonics (natural or artificial)		This means that the fretting hand slides up or down the fretboard to change the pitch of the harmonic.
8va		Indicates that the harmonics sound one octave higher than written.
15ma		Indicates that the harmonics sound one two octaves higher than written.
A shallow bracket over a passage of notes		Indicates that the notes within the passage share something in common that is indicated in the text within the bracket. The example to left indicates that all the notes are to me played as natural harmonics.
Fingerstyle		Indicates use of standard fingerstyle technique.
Bracketed fret marking in tablature		Indicates that the fret is either used for an artificial or natural harmonic, or indicated the other fret used in a trill, depending on the notation above.

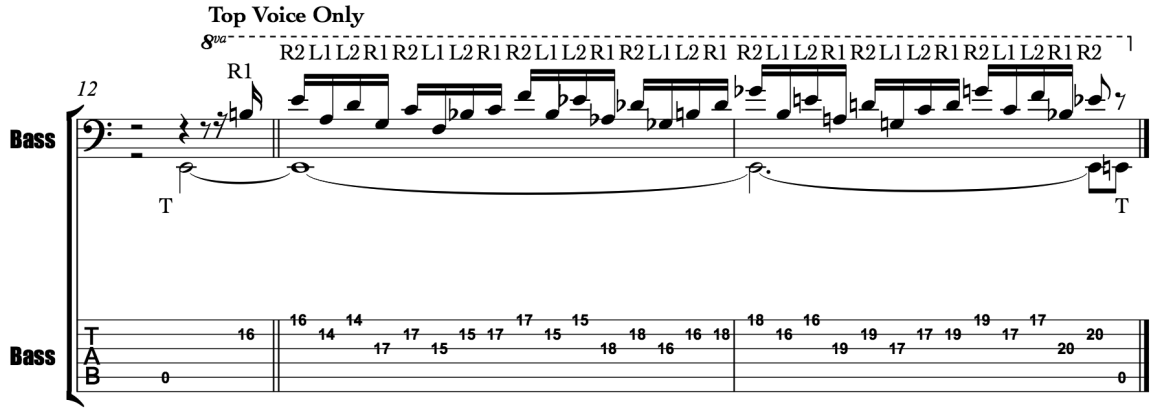
APPENDIX I: List of Specialized Notation Rules

Rules:	Examples:
1) RH or LH fingering is only necessary to be written once if the note or stack of notes continues.	 R2 R1
2) RH or LH fingering with "simile" written after it implies that the same fingering pattern continue until otherwise indicated.	 R2 R1
3) Fingerstyle technique is implied when no other technique is indicated.	N/A

APPENDIX J: Comparison of Notation with and without Tablature

Using tablature along with musical notation makes it easy for the reader to understand where the fingers and hands are to be placed on the fretboard. The resulting double-staffed (sometimes quadruple staffed) score looks like figure 1, shown below.

Figure 1: Musical notation along with tablature



If tablature is not used (see figure 2), position markers, indicating fret position for the first finger of each hand, must be written above the staff. Although this method gets rid of the additional tablature staff, it makes the notation more convoluted and difficult to visualize.

Figure 2: Musical notation without tablature