

Cascading Harmonics for Classical Guitarists

The technique of cascading harmonics (or harp harmonics) is a very unique harmonic technique seldom heard in classical guitar playing. Steel-string players use them more frequently. Cascading harmonics have been used very effectively by guitarists such as Chet Atkins, Lenny Breau, and Tommy Emmanuel.

[Watch Tommy.](#)

Tommy Emmanuel describes cascading harmonics as a “waterfalling sound”—the notes trickle down in a stream of sound. In its basic form, it is a sequence (usually fast) of a right-hand harmonic plucked by the thumb followed by a non-harmonic note plucked with the “a” finger. They are most effective when the left hand holds some form of a lush 9th, 13th, diminished, or augmented chord. The basic right-hand sequence may be extended with slurs (hammer-ons and pull-offs), artificial harmonics, and other techniques, all of which I will describe and demonstrate for you in this tech tip.

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[Watch this overview of the basic sequence on an E dominant 9th chord:](#) (Video clip #1)

Example #1 shows the right-hand pattern on open strings:

Example #1

The basic right-hand pattern

[Watch the video of this basic pattern.](#) (Video #2)

Here in example #2 is the chord I was holding in the overview and the right-hand artificial harmonics I played:

Example #2

While holding this E dominant 9th chord:

As the "i" finger lightly touches the indicated string at the designated fret, the thumb plucks the string. This produces an artificial harmonic:

The diagram shows a guitar staff with a treble clef. The first measure contains an E dominant 9th chord (E5, G#5, A5, B5, C#6, D6) with fingerings 4, 3, 2, 1, 2, 3 indicated above the notes. The second measure shows a sequence of artificial harmonics: 19th fret (string 4), 19th fret (string 3), 18th fret (string 2), 19th fret (string 1), 18th fret (string 2), 19th fret (string 3), and 19th fret (string 4). The fret numbers are written below the notes. The third measure shows the fret numbers for the strings: 7, 7, 7, 6, 7, 7, 6.

These are the pitches that come out of the guitar as the artificial harmonics are played:

The diagram shows a guitar staff with a treble clef. The first measure shows the pitches of the artificial harmonics: 19th fret (string 4), 19th fret (string 3), 18th fret (string 2), 19th fret (string 1), 18th fret (string 2), 19th fret (string 3), and 19th fret (string 4). The fret numbers are written below the notes. The second measure shows the fret numbers for the strings: 0, 0, 4, 10, 4, 0, 0. The third measure shows the fret numbers for the strings: 19, 19, 18, 19, 18, 19, 19.

Diamond-enclosed number shows where to play harmonic.
Plain number shows pitch that comes out of the guitar.

[Watch my video #3.](#)

Next, the non-harmonic notes are inserted between each harmonic note:

Example #3

While still holding the E dominant 9th chord with the left hand and plucking the artificial harmonics with the thumb, the non-harmonic notes are inserted, plucked by the "a" finger:

E Dominant 9th Chord:

These are the actual pitches heard while holding the E dominant 9th chord and playing the strings indicated in the example above:

Diamond-enclosed number shows where to play harmonic.
Plain number shows pitch that comes out of the guitar.

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[Watch me demonstrate](#) in video clip #4.

Cascading harmonics are very difficult to execute well. Tommy Emmanuel, a master of the technique, says "it takes years to get this sounding right, i.e., with the right balance between open note and harmonic".

Unfortunately, they are far more difficult to execute on the classical guitar with its high action than on a steel string guitar with its low action. And, the harmonics don't ring as clearly when plucked with the thumbnail on nylon strings as they do when plucked with a thumbpick on steel strings.

So, we classical guitarists have our work cut out for us. Let's get started.

WARNING: Do not proceed with this technique if you have not watched my previous video tech tips on natural harmonics and right-hand harmonics. It is essential that you know and have mastered the detailed information in those videos before attempting cascading harmonics. I am assuming you have all that information under your fingers. In this article, I will mention very little of the underlying techniques required to play these cascading harmonics.

Mastering the Right Hand Alone

I recommend learning to play cascading harmonics at the 19th fret. Many books and videos demonstrate them at the 12th fret. For the classical guitarist, practicing at the 12th fret tends to produce right shoulder and arm tension. Practicing at the 19th fret lessens the tendency to tense the right shoulder and keeps the right arm in a fairly normal position.

This is important because you will need to practice endless repetitions of these exercises over a period of months. You do not want to practice and develop a habit of tensing up when you play these harmonics. Plus, you will be able to practice the exercises in a single practice session for a longer period of time with no discomfort if you practice them at the 19th fret.

[Watch video clip #5 on practicing at the 19th fret.](#)

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The Ascending Cascade

In the following video, I demonstrate how to put together the ascending section of a harmonic cascade. I also repeat the importance of practicing your beginning exercises at the 19th fret.

[Watch the video first to get an idea of what you are trying to accomplish.](#) Video Clip #6.

Now, follow the detailed instructions that follow.

We begin by practicing with just the right-hand thumb plucking the 6th string harmonic at the 19th fret followed by the “a” finger playing the open third string (Example #4):

Example #4

Example #4 musical notation shows a sequence of eight notes on a single staff. The notes are grouped into four pairs, each pair consisting of a plucked note (marked with a circled 'p') and an open string note (marked with a circled 'a'). The first pair is on the 6th string at the 19th fret, and the second pair is on the 3rd string. The third pair is on the 6th string at the 19th fret, and the fourth pair is on the 3rd string. The notes are marked with a circled 'p' and a circled 'a' respectively. Below the staff, there are four diamond-shaped markers, each containing the number 19, indicating the fret position for the plucked notes. The open string notes are marked with a circled '0'.

Then, practice the right-hand thumb plucking the 5th string harmonic at the 19th fret followed by the “a” finger playing the open second string (Example #5):

Example #5

Example #5 musical notation shows a sequence of eight notes on a single staff. The notes are grouped into four pairs, each pair consisting of a plucked note (marked with a circled 'p') and an open string note (marked with a circled 'a'). The first pair is on the 5th string at the 19th fret, and the second pair is on the 2nd string. The third pair is on the 5th string at the 19th fret, and the fourth pair is on the 2nd string. The notes are marked with a circled 'p' and a circled 'a' respectively. Below the staff, there are four diamond-shaped markers, each containing the number 19, indicating the fret position for the plucked notes. The open string notes are marked with a circled '0'.

Then, combine those two steps (Example #6):

Example #6

Example #6 shows a sequence of plucked notes on the 8th string at the 19th fret. The notation is as follows:

- Staff 1 (Treble Clef):
 - Measure 1: Plucked note (p) on the 6th line (19th fret), followed by an open first string (a) on the 1st line.
 - Measure 2: Plucked note (p) on the 5th line (19th fret), followed by an open first string (a) on the 1st line.
 - Measure 3: Plucked note (p) on the 6th line (19th fret), followed by an open first string (a) on the 1st line.
 - Measure 4: Plucked note (p) on the 5th line (19th fret), followed by an open first string (a) on the 1st line.
- Staff 2 (Bass Clef):
 - Measure 1: Open 4th string (0).
 - Measure 2: Open 4th string (0).
 - Measure 3: Open 4th string (0).
 - Measure 4: Open 4th string (0).
- Staff 3 (Bass Clef):
 - Measure 1: Diamond symbol with 19.
 - Measure 2: Diamond symbol with 19.
 - Measure 3: Diamond symbol with 19.
 - Measure 4: Diamond symbol with 19.

Next, practice the right-hand plucking the 4th string harmonic at the 19th fret followed by the “a” finger playing the open first string (Example #7):

Example #7

Example #7 shows a sequence of plucked notes on the 8th string at the 19th fret. The notation is as follows:

- Staff 1 (Treble Clef):
 - Measure 1: Plucked note (p) on the 4th line (19th fret), followed by an open first string (a) on the 1st line.
 - Measure 2: Plucked note (p) on the 5th line (19th fret), followed by an open first string (a) on the 1st line.
 - Measure 3: Plucked note (p) on the 4th line (19th fret), followed by an open first string (a) on the 1st line.
 - Measure 4: Plucked note (p) on the 5th line (19th fret), followed by an open first string (a) on the 1st line.
- Staff 2 (Bass Clef):
 - Measure 1: Open 4th string (0).
 - Measure 2: Open 4th string (0).
 - Measure 3: Open 4th string (0).
 - Measure 4: Open 4th string (0).
- Staff 3 (Bass Clef):
 - Measure 1: Diamond symbol with 19.
 - Measure 2: Diamond symbol with 19.
 - Measure 3: Diamond symbol with 19.
 - Measure 4: Diamond symbol with 19.

Then, combine those two steps (Example #8):

Example #8

Example #8 shows a sequence of notes on a treble clef staff. The notes are: a half note on the 8th fret (marked with a circled 8), followed by a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), and finally a half note on the 19th fret (marked with a circled 19). The notes are marked with dynamic markings *p* (piano) and *a* (accendo). Below the staff are two empty staves with diamond-shaped fret markers labeled 19.

Finally, combine all the steps into a full ascending cascade (Example #9):

Example #9

The full ascending cascade

Example #9 shows a sequence of notes on a treble clef staff. The notes are: a half note on the 8th fret (marked with a circled 8), followed by a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), then a half note on the 19th fret (marked with a circled 19), and finally a half note on the 19th fret (marked with a circled 19). The notes are marked with dynamic markings *p* (piano) and *a* (accendo). Below the staff are two empty staves with diamond-shaped fret markers labeled 19.

Do not be concerned with speed until you have mastered the clarity of the harmonics and can balance the volume between the harmonic notes and the non-harmonic notes.

When it's time to work for speed, begin again with the basic combinations illustrated above. Start each one slowly and then speed up as fast as you can without losing control.

Note in the video that a wide space is maintained between the index finger "shooting" the harmonic, and the thumb plucking the string. Also note the importance of keeping the "a" finger in position very close to the 3rd string.

One of our major goals is to match the volume of the harmonic and non-harmonic notes. The one thing most people get wrong is this: they try to play the harmonic louder to match the volume of the non-harmonic note. It should be the other way around. *Pluck the harmonic with just enough force to make it ring clearly without a percussive thud and play the non-harmonic note with the "a" finger very quietly to match the harmonic. They should sound almost exactly equal.*

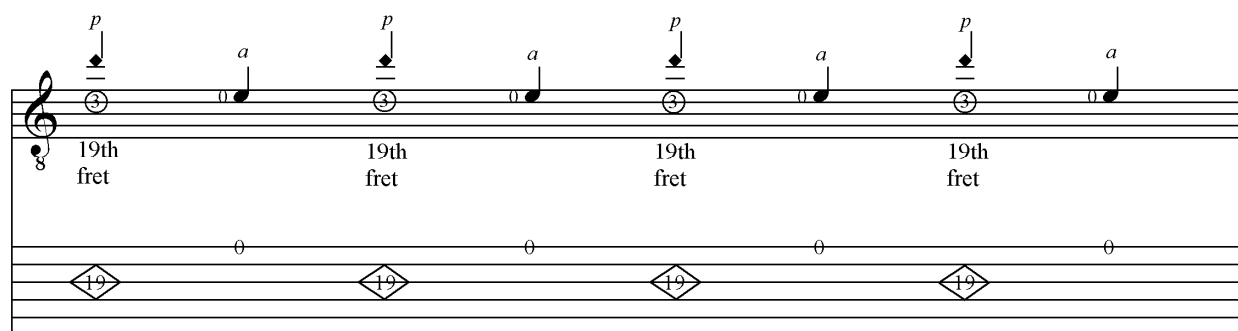
The Descending Cascade

[Watch all the steps on learning the descending cascade and combining the ascending and descending into a full cascade in video clip #7.](#)

Now, follow these detailed instructions.

Begin the descent of the cascade by plucking the third string harmonic at the 19th fret with the thumb followed by the "a" finger plucking the open first string (Example #10):

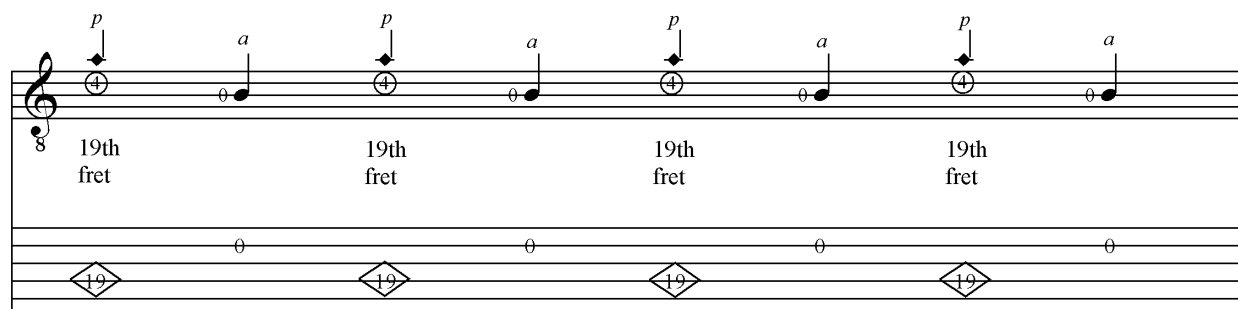
Example #10



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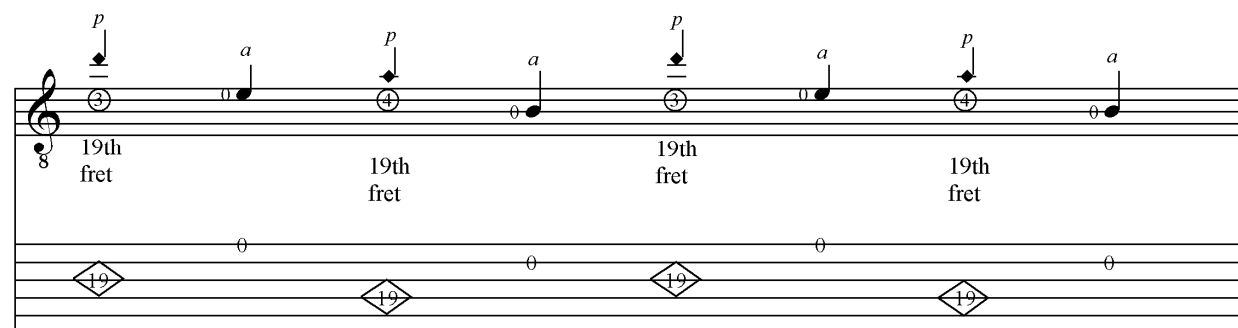
Next, pluck the fourth string harmonic at the 19th fret with the thumb followed by the “a” finger plucking the open second string (Example #11):

Example #11



Then, combine those two steps (Example #12):

Example #12



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Move onto the next combination. Pluck the fifth string harmonic at the 19th fret with the thumb followed by the “a” finger plucking the open third string (Example #13):

Example #13

The musical notation for Example #13 consists of two staves. The top staff is in treble clef and shows a sequence of eight notes. The first four notes are plucked with the thumb (p) and the next four with the 'a' finger. The notes are: 19th fret harmonic (p), open third string (a), 19th fret harmonic (p), open third string (a), 19th fret harmonic (p), open third string (a), 19th fret harmonic (p), and open third string (a). The bottom staff shows the open strings (0) and the 19th fret harmonic (19) for each string, indicating the fretting hand position for the harmonics.

Now, combine those two steps (Example #14):

Example #14

Example #14 shows a sequence of plucked notes on a guitar. The top staff is a treble clef with a key signature of one sharp (F#). The sequence consists of four pairs of notes: a plucked note (*p*) on the 19th fret of the 8th string and an open note (*a*) on the 4th string. The bottom staff shows the fretting hand with diamond-shaped markers for the 19th fret on the 8th, 6th, 4th, and 2nd strings, and open circles on the 5th and 3rd strings.

The final combination is to pluck the sixth string harmonic at the 19th fret with the thumb followed by the “a” finger plucking the open fourth string (Example #15):

Example #15

Example #15 shows a sequence of plucked notes on a guitar. The top staff is a treble clef with a key signature of one sharp (F#). The sequence consists of four pairs of notes: a plucked note (*p*) on the 19th fret of the 6th string and an open note (*a*) on the 4th string. The bottom staff shows the fretting hand with diamond-shaped markers for the 19th fret on the 6th, 4th, 2nd, and 1st strings, and open circles on the 5th and 3rd strings.

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You may notice that the “a” finger plucking the open fourth string makes a scratchy sound. That is the fingernail scraping across the windings of the string. You won’t be able to eliminate the noise entirely. Thankfully, when the full cascade is played, the scraping sound is less noticeable.

Now, combine this combination with the previous one (Example #16):

Example #16

Example #16 shows a descending cascade of notes on a treble clef staff. The notes are marked with *p* (piano) and *a* (accents). The fret numbers are 19th, 19th, 19th, and 19th. The bottom staff shows diamond-shaped fret markers labeled 19.

Now, you can practice the entire descending cascade (Example #17):

Example #17

The full descending cascade

Example #17, titled "The full descending cascade", shows a descending cascade of notes on a treble clef staff. The notes are marked with *p* (piano) and *a* (accents). The fret numbers are 19th, 19th, 19th, and 19th. The bottom staff shows diamond-shaped fret markers labeled 19.

Example #19

Same chord as preceding but
with more comfortable fingering

The image shows musical notation for Example #19. It consists of two staves: a treble staff and a bass staff. The treble staff has a treble clef and a key signature of one sharp (F#). It shows four chords with fingerings: 1, 1# (first); 4, 3, 2, 1 (second); 4, 3, 2, 1 (third); 4, 3, 2, 1 (fourth). The bass staff has a bass clef and a key signature of one sharp (F#). It shows four chords with fingerings: 7, 7, 7, 7 (first); 7, 7, 7, 7 (second); 7, 7, 6, 7 (third); 7, 7, 5, 7 (fourth).

[Watch the video demonstration in Video Clip #8.](#)

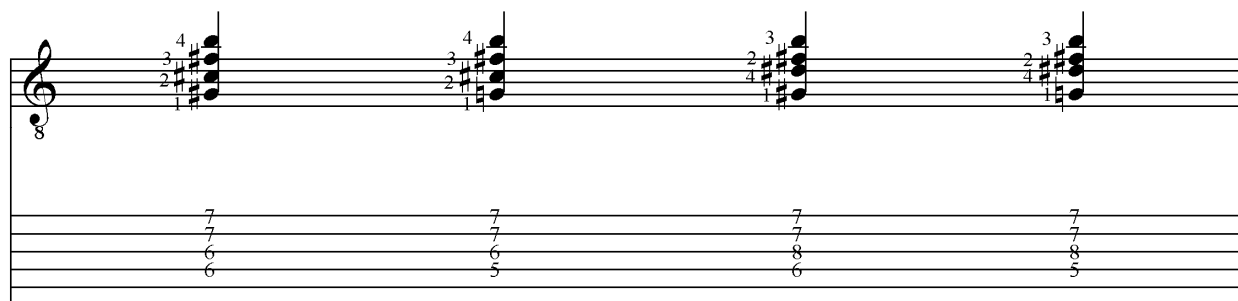
Adapting the right hand technique to the chord held by the left hand. How to practice.

In the next video clip, I demonstrate how the right-hand pattern changes according to what chord you hold with the left hand. I also show in detail how to practice these changes.

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Here are the chords I'm using (Example #20):

Example #20



[Watch how to do this in Video Clip #9.](#)

Extensions of the Cascade

Sometimes you may want to extend the duration of a cascade. This can be done in several ways.

[Watch this video as I demonstrate the first two methods of extending a cascade: the three-note roll and the addition of artificial harmonics at the end.](#)

Three-note roll

This is the notation for a three-note roll of the bass string. This is added before the first harmonic is plucked (Example #21):

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Example #21

While holding this E dominant 9th chord:

The notation shows a guitar piece. The top staff is in treble clef, showing a sequence of notes with artificial harmonics (marked 'a' in a circle). The notes are: 19th fret (p), 19th fret (p), 18th fret (p), 19th fret (p), 18th fret (p), 19th fret (p), 18th fret (p), 19th fret (p). The bottom staff shows the fretting hand positions, with diamonds indicating artificial harmonics at the 19th fret. The sequence of frets is: 0, 0, 6, 7, 19, 18, 19, 18, 19, 7, 6.

3-note roll extension

19th fret

19th fret

18th fret

19th fret

18th fret

19th fret

18th fret

19th fret

Adding Artificial Harmonics at the end

[Here is another video view of this technique.](#)

This is the notation for an extension of three artificial harmonics. This is added at the end of the ascent of a harmonic cascade (Example #22):

Example #22

While holding this E dominant 9th chord:

3-note artificial harmonic extension

Repetition of note pairs

A cascade can be easily extended by repetition of note pairs within the cascade.

[Watch me demonstrate this very effective technique in Video Clip #12.](#)

One of the most common examples of this technique repeats the 3rd string harmonic-1st string non-harmonic and 4th string harmonic-2nd string non-harmonic pairs (Example #23):

Example #23

While holding this
E dominant 9th chord:

while holding this
E dominant 9th chord:

The image shows a musical staff with a treble clef and a key signature of one sharp (F#). The first measure contains an E dominant 9th chord (E, G#, A, B, C#, D#) with fingerings 4, 3, 2, 1, 2, 1. The second measure contains a half note G# (19th fret) with a *p* dynamic and a half note A (20th fret) with an *a* dynamic. The third measure contains a half note A (19th fret) with a *p* dynamic and a half note B# (20th fret) with an *a* dynamic. The fourth measure contains a half note B# (18th fret) with a *p* dynamic and a half note C# (19th fret) with an *a* dynamic. Below the staff, there are three measures of a bass line. The first measure contains a whole note G# (19th fret) with a *p* dynamic. The second measure contains a whole note A (20th fret) with an *a* dynamic. The third measure contains a whole note B# (18th fret) with a *p* dynamic and a whole note C# (19th fret) with an *a* dynamic.

Extension of cascade by repetition of note pairs within the cascade

8

19th fret

18th fret

19th fret

19th fret

19th fret

19th fret

18th fret

19th fret

7

7

7

6

7

7

7

19

18

19

In example #25, I keep the ascending slur (hammer-on) and add a descending slur (pull-off):

Example #25

Example #25 is a musical score for guitar, featuring a treble clef and a key signature of one sharp (F#). The score begins with a chord labeled "Hold this chord" (F#m7) and a fret number of 8. The main melody is written on a single staff, with notes marked with fingerings (1, 2, 3, 4) and slurs. The notes are: 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p). The notes are grouped into pairs, with an ascending slur (hammer-on) and a descending slur (pull-off) added to the first pair. The notes are marked with "p" (piano) and "a" (accents). The bass staff shows a 7th fret barre and a 19th fret barre, with a 19th fret barre marked with a diamond and the number 19.

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Or, in example #26, I keep the ascending and descending slurs, plus add a second descending slur:

Example #26

Example #26 is a musical score for guitar, featuring a treble clef and a key signature of one sharp (F#). The score begins with a chord labeled "Hold this chord" (F#m7) and a fret number of 8. The main melody is written on a single staff, with notes marked with fingerings (1, 2, 3, 4) and slurs. The notes are: 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p), 19th fret (a), 19th fret (p). The notes are grouped into pairs, with an ascending slur (hammer-on), a descending slur (pull-off), and an added descending slur (pull-off) added to the first pair. The notes are marked with "p" (piano) and "a" (accents). The bass staff shows a 7th fret barre and a 19th fret barre, with a 19th fret barre marked with a diamond and the number 19.

Adding repeatable triplet note groups

A little trickier extension of a harmonic cascade can be made with triplet note groups, often repeated several times in a row. The triplet note group consists of a harmonic plucked by the thumb, then a non-harmonic note plucked by the “a” finger, followed by a descending slur (pull-off).

[Watch me do it in Video Clip #14.](#)

Here is an example of a basic repeatable triplet figure (Example #27):

Example #27

Hold this diminished shape chord

VI

A Basic Repeatable Triplet Note Group

The musical notation for Example #27 consists of two staves. The top staff is in treble clef with a key signature of one sharp (F#). It begins with a diminished shape chord labeled 'VI' at the 8th fret, indicated by a '3' above the first string and a '2' above the second string. This is followed by four measures of a triplet note group. Each measure starts with a triplet of notes: a harmonic (plucked by the thumb, 'p'), a non-harmonic note (plucked by the 'a' finger), and a descending slur (pull-off). The triplet is marked with a '3' and a slur. The notes are labeled with fingerings: 2, 3, 1. The triplet is repeated four times, each starting at the 19th fret. The bottom staff shows the fretting for the triplet note group, with a diamond-shaped box containing '19' and a slur over the notes 7 and 6, indicating a pull-off from the 7th fret to the 6th fret.

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The same idea can be applied to a second note pair in the chord (Example #28):

Example #28

Hold this diminished shape chord

A Second Repeatable Note Group

The musical notation for Example #28 consists of two staves. The top staff is in treble clef and shows a diminished shape chord (VI) with notes 3, 1, 2, 1, 1# on the strings. Below the staff, the fret number 8 is indicated. The bottom staff is in bass clef and shows a diminished shape chord with notes 7, 6, 7, 6 on the strings. Below the staff, the fret number 6 is indicated. The main part of the example shows four measures of a second repeatable note group. Each measure starts with a diminished shape chord (VI) on the top staff, followed by a triplet of eighth notes on the bottom staff. The triplet notes are 1# (fret 18), 3# (fret 18), and 1# (fret 18). The triplet is marked with a 'p' (piano) and an 'a' (accents) above the notes. The fret number 18th is indicated below the triplet. The bottom staff shows a diminished shape chord with notes 7, 6, 7, 6 on the strings, with a diamond-shaped fret marker containing the number 18 below it.

These two note groups can be combined into a double repeatable triplet note group (Example #29):

Example #29

Hold this diminished shape chord

Double Repeatable Triplet Note Group

The musical notation for Example #29 consists of two staves. The top staff is in treble clef and shows a diminished shape chord (VI) with notes 3, 1, 2, 1, 1# on the strings. Below the staff, the fret number 8 is indicated. The bottom staff is in bass clef and shows a diminished shape chord with notes 7, 6, 7, 6 on the strings. Below the staff, the fret number 6 is indicated. The main part of the example shows four measures of a double repeatable triplet note group. Each measure starts with a diminished shape chord (VI) on the top staff, followed by a triplet of eighth notes on the bottom staff. The triplet notes are 2 (fret 19), 3 (fret 19), and 1# (fret 18). The triplet is marked with a 'p' (piano) and an 'a' (accents) above the notes. The fret number 19th is indicated below the triplet. The bottom staff shows a diminished shape chord with notes 7, 6, 7, 6 on the strings, with a diamond-shaped fret marker containing the number 19 below it.

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Here is an example of a cascade consisting of: the basic ascending and descending cascade, an added ascending slur, a repeated double triplet note group, and the final descent to the end (Example #30):

Example #30

Hold this diminished shape chord VI

The basic harmonic cascade pattern

Added ascending slur (hammer-on)

A double repeatable triplet note group

19th fret, 19th fret, 18th fret, 19th fret, 18th fret, 19th fret, 19th fret

19th fret, 18th fret, 19th fret, 19th fret, 19th fret

Conclusion

Harmonic cascades are rarely used by classical guitarists. But it is a dazzling technique. With experimentation and imagination, harmonic cascades can be used very effectively in newer repertoire, and especially arrangements of popular music for the classical guitar. Although they are more difficult to execute on a classical guitar than a steel string guitar, they are very feasible. It just takes a ton of practice! So what else is new?

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