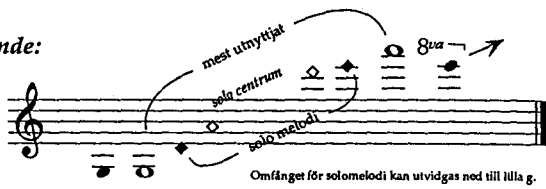


# Violin

ingen transponering

klingande:



Lösa strängar:



Dynamik:



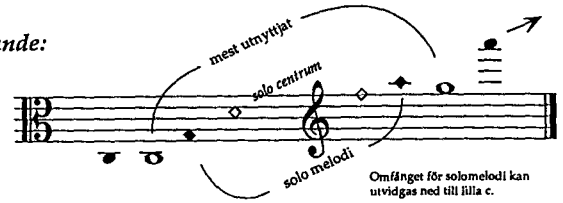
Musikexempel:



# Viola

ingen transponering

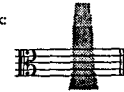
klingande:



Lösa strängar:



Dynamik:



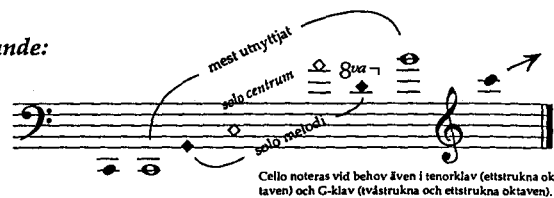
Exempel på melodispel i det lägre registret:



# Cello

ingen transponering

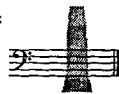
klingande:



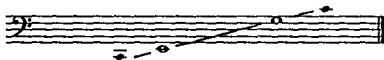
Lösa strängar:



Dynamik:



omfång för basstämma:



Placera huvudparten av basstämman i området mellan de ofyllda noterna, men utöka gärna omfånget uppåt och nedåt vid behov.

Musikexempel:



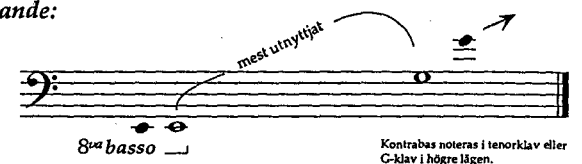
Exempel på basstämma:



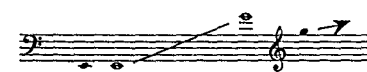
# Kontrabas

noteras en oktav upp

klingande:



noterat:



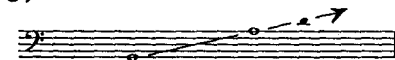
Lösa strängar:



Dynamik:

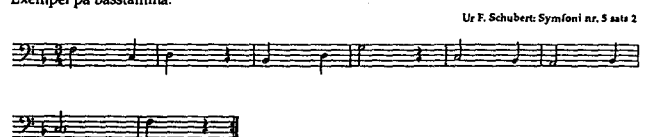


omfång för basstämma:



Placera huvudparten av basstämman i området mellan de ofyllda noterna, men utöka gärna omfånget uppåt och nedåt vid behov.

Exempel på basstämma:




# Strøg og pizzicato

Beskrivelser og betegnelser under systemet: Skal IKKE noteres

## Buen på strengen



1 nedstrøg 2 *v* opstrøg 3 ned/ opstrøg noteres normalt ikke 4 *v* t.3 udføres som vist her = détaché




5 strøgbuer 6 udføres: 7 lurré (portato) 8 staccato



9 tremolo (m.bue) 10 11 12 udføres:




13 tremolo (m.fingre) 14 15 16 17 udføres:




18 specielle dobbeltgreb: 19 tredobbelt/ firdobbelt/ 20 dobbeltgreb

## Buen over/"springer" på strengen



21 spiccato ikke kraftigt eller hurtigt 22 saltando 3 saltando / ricochet / jeté / sautillé m. nedstrøg - hurtige 23 *ff* 24 *p*

## Pizzicato



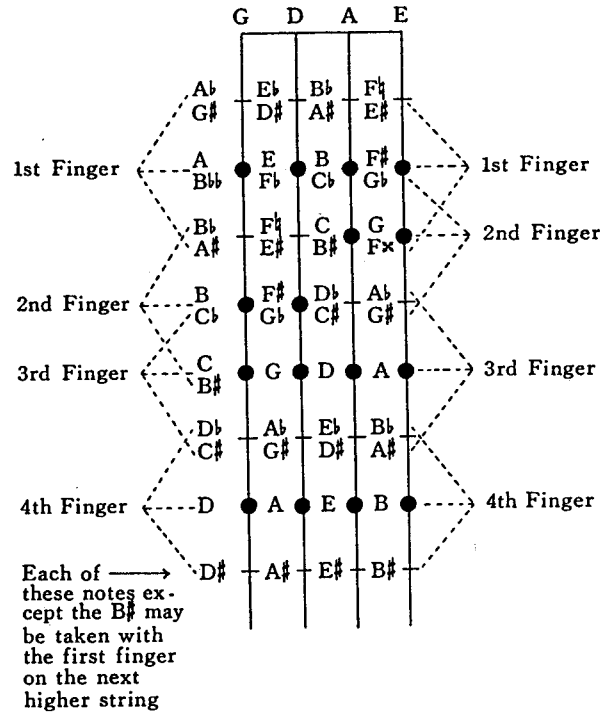
25 pizz. 26 arco 27 pizz. l.v. 28 *φ* *φ* *φ* *φ* 29 30 Bartok pizz. ("slap")

Fingering Chart

FIRST POSITION ON THE VIOLIN

Fingering indications on this side apply to G and D strings

Fingering indications on this side apply to A and E strings



FINGERBOARD OF THE VIOLIN

Double, Triple, and Quadruple Stops

Although the violin is predominantly a single-line instrument, it is capable of playing two, three, or four notes at a time, provided that each note can be taken on a separate string and that the pitches involved can be fingered at once. If any of the notes can be played on open strings, that will make the fingering problem much easier for the player. It is obvious that two pitches

cannot be played at the same time on the same string. ● example,

is impossible as a double stop on the violin because both notes would have to be taken on the G string. But

is quite easy, since the A can be played on the G string and the F# on the D string, the bow being drawn across both strings at once. The double stop

is even easier, because the D can be played on the open D string and the B on the A string. Of course the notes of a double stop must be playable on adjacent strings. The following may be considered practical upward limits for double stops involving intervals up to an octave (practical, that is, for the professional orchestra violinist of average ability):

Ex. 4



Of these intervals, 6ths are probably the most successful as double stops. Octaves, 5ths, and 4ths present a certain problem of intonation, since the slightest deviation from the correct pitch in either note is more apparent to the ear than it would be in such intervals as the 6th and 3rd, where the mathematical ratio between notes is more complex. Perfect 5ths, by the way, are played with one finger stopping both strings (assuming that open tones are not involved). Unisons, though rare, are possible and are sometimes introduced for the sake of added resonance and volume. They almost always involve an open string; that is, they are generally written on one of these

three pitches:

For example, in

would be played on the open A string, the other on the D string. Double stops involving intervals larger than an octave are also possible in certain cases. Sometimes even such widely spaced double stops as

are used. Unwieldy as this may look to the pianist's eye, it is actually very simple, for the A is an open note and the D presents no problems. For purposes of orchestral writing, quick successions of double stops are generally impractical, though short successions of 6ths or 3rds are not

...; however, such passages are better arranged *divisi* (with the string group divided).

As for triple and quadruple stops, those which include at least one open string are the easiest and the most resonant, but certain other chord arrangements that contain no open note are also possible. Because of the curvature of the bridge, four notes cannot be played at exactly the same time. However, in quadruple stops the bow can be drawn so quickly over the strings that the effect is that of a four-note chord only slightly arpeggiated or broken. Examples 7 and 8 show the more commonly used three-note and four-note chords playable on the violin. (According to Forsyth, a complete catalog of all the chords possible on the violin would amount to nearly 1500 combinations!) The method used here in listing chords that contain no open notes may need a word of explanation. Instead of writing out all the possibilities in connection with each chord pattern, we have merely indicated them in the following manner:

Ex. 5



This particular example means that three-note chords arranged in this pattern are playable on every half-step within the limits shown:

Ex. 6

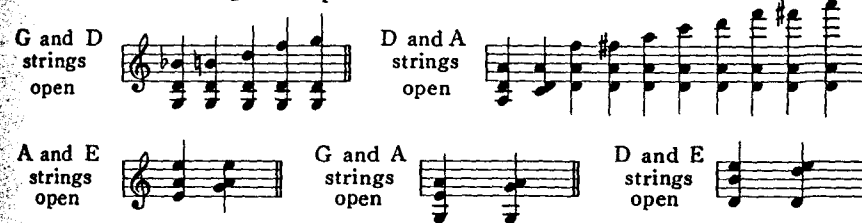


This and other upward limits given must not be thought of as hard and fast points above which the chords become impossible. All the patterns are possible in still higher positions, but at that level they become so difficult as to be impractical for normal orchestral use. The limits shown here are therefore intended merely as guides for practical usage.

Notice that the predominant intervals in these chord arrangements are 5ths and 6ths. Notice, too, that four-note chords which contain open notes in the middle with stopped notes on the outside are generally impractical and are therefore not included.

Ex. 7

(Chords containing two open notes)



(Chords containing one open note)



(Chords containing no open note)



Note: Accidentals are written separately for each chord.  
\* This list has been limited to major and minor triads and dominant-type seventh chords (or incomplete forms of these chords).

Ex. 8

(Chords containing three open notes)

G, D and E strings open  G, A and E strings open  D, A and E strings open 

(Chords containing two open notes)

G and D strings open 

A and E strings open 

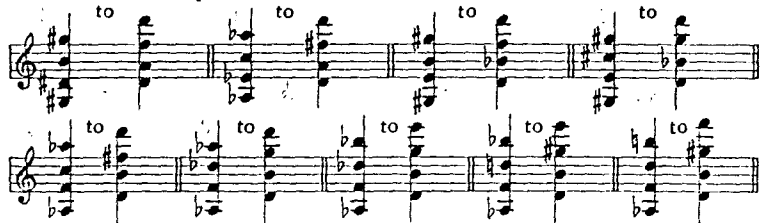
G and E strings open 

(Chords containing one open note)

G string open 

E string open 

(Chords containing no open note)



Note: Accidentals are written separately for each chord.

Although double stops may be used effectively in sustained chords and at a low dynamic level, there is not much point in writing triple and quadruple stops except in fairly loud passages, usually in sharply detached chords where an extra degree of volume or accent is wanted. It is, however, possible to sustain the top note or the two top notes of a three-note or four-note chord:

Ex. 9




Even inner notes may be sustained, though that possibility is not of much practical use. Since the main objective in triple and quadruple stops is usually added resonance, those that contain one or more open tones are ordinarily the most effective, besides being the most comfortable to play.

Certain other string effects, although not technically triple or quadruple stops, depend on the same principle. For instance, in these passages,

Ex. 10

Violin 

the player's fingers remain fixed on the quadruple stop  while

the bow produces the particular effect called for.

Examples 12(b) and (h) at the end of Chapter 3 illustrate the use of "multiple stops" (a term that may conveniently be used to apply to double, triple, and quadruple stops).

EXAMPLES OF PASSAGES FOR THE VIOLIN

Ex. 11

(a) G minor Symphony

Allegro assai

Mozart








THE VIOLA

The same patterns available as multiple stops on the violin are possible on the viola a 5th lower. However, quadruple stops in the higher positions are a bit more difficult and less effective than on the violin and are better avoided. Examples 13 and 14 show the more usable triple and quadruple stops on the viola.

Ex. 13

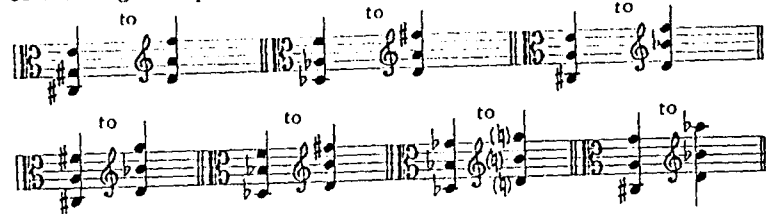
(Chords containing two open notes)

C and G strings open  G and D strings open   
 D and A strings open  C and D strings open  G and A strings open 

(Chords containing one open note)

C string open   
 G string open   
 D string open   
 A string open 

(Chords containing no open note)



Note: Accidentals are written separately for each chord.

\* This list has been limited to major and minor triads and dominant-type seventh chords (or incomplete forms of these chords).

THREE-NOTE CHORDS FOR THE VIOLA (PARTIAL LIST)\*

Ex. 14

(Chords containing three open notes)

G, C and A strings open  C, D and A strings open  G, D and A strings open 

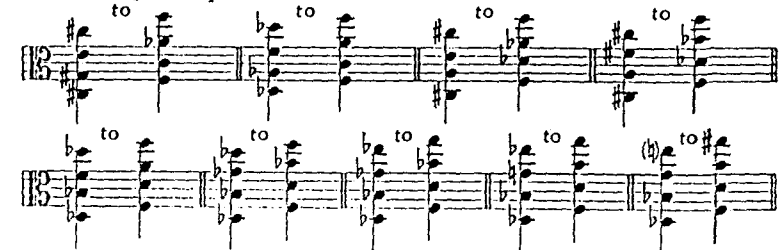
(Chords containing two open notes)

G and C strings open   
 D and A strings open   
 C and A strings open 

(Chords containing one open note)

C string open   
 A string open 

(Chords containing no open note)



Note: Accidentals are written separately for each chord.

Example III-56. Double-stops

Example III-56. Double-stops. This musical example shows two staves of music. The left staff is in bass clef and the right staff is in treble clef. Both staves contain double stops, indicated by numbers 1, 2, 3, and 4 on the strings. The notes are written as pairs of eighth notes.

Example III-57. Triple-stops. This musical example shows two staves of music. The left staff is in bass clef and the right staff is in treble clef. Both staves contain triple stops, indicated by numbers 0, 1, 2, 3, and 4 on the strings. The notes are written as groups of three eighth notes.

Example III-57. Triple-stops

Example III-58. Quadruple-stops. This musical example shows two staves of music. The left staff is in bass clef and the right staff is in treble clef. Both staves contain quadruple stops, indicated by numbers 0, 1, 2, 3, and 4 on the strings. The notes are written as groups of four eighth notes.

Example III-58. Quadruple-stops

Example III-59. Quintuple-stops. This musical example shows two staves of music. The left staff is in bass clef and the right staff is in treble clef. Both staves contain quintuple stops, indicated by numbers 0, 1, 2, 3, and 4 on the strings. The notes are written as groups of five eighth notes.

Forsyth calls "the lazy way," and it is not recommended; it saddles the player with the problem of figuring out the most convenient method of producing each harmonic—a problem that is apt to waste time in rehearsal and one that should rightfully have been solved in advance by the arranger. The same objection applies to the practice of indicating all harmonic circles over the notes.

Let us go back, now, and review the process of writing a note as an artificial harmonic. The orchestrator should first see whether the note is playable as a natural harmonic. If it is, that way is usually easier and therefore preferable. If the note cannot be played as a natural harmonic, the following procedure can be adopted for writing it as an artificial harmonic: measure down two octaves from the actual pitch desired and write that note (with the proper time value), then write a diamond-shaped note a perfect 4th higher. (Notice that to make a *perfect* 4th, accidentals must often be added.) For example, if the following passage were to be played in harmonics,

Ex. 24

Ex. 24 (a) Lento. This musical example shows a single staff of music in treble clef. It contains a diamond-shaped note indicating an artificial harmonic. The note is marked with a *p* dynamic.

we would write:

Ex. 24 (b) Lento. This musical example shows a single staff of music in treble clef. It contains a diamond-shaped note indicating an artificial harmonic. The note is marked with a *p* dynamic.

Here the last note, A, could be played as a natural harmonic and would almost certainly be taken that way by the player even though it is written as an artificial harmonic. This substitution of the "artificial" for the "natural" notation when number 3 of the natural harmonics occurs in a series of artificial harmonics is a license that has come to be more or less accepted.

Artificial harmonics other than those involving the stretch of a 4th are possible but are seldom used. To give just one example: if the player touches the string lightly with his fourth finger a perfect 5th above the stopped note a harmonic a 12th higher than the stopped tone results.

Although two artificial harmonics at a time are occasionally called for in virtuoso solo literature for the violin, that arrangement is generally too difficult for orchestral use, with the exception of two artificial harmonics a perfect 5th apart, which can be played as a double stop by pressing two adjacent strings down firmly with the first finger and touching the two strings lightly a perfect 4th higher with the fourth finger.

## NATURAL HARMONICS

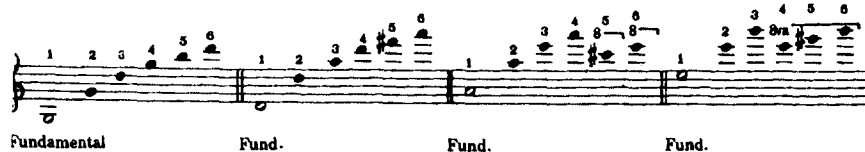
*Armonici* (It.), *Harmoniques* (Fr.), *Flageolettöne* or *Flageolet* (Ger.)

To this point in our discussion, we have dealt with that series of pitches which is produced either by the open string, or those sounded by fingers pressing the string tightly against the finger-board. Two other series of notes exist and can be performed easily on all string instruments. The first series is called *natural harmonics*, which are overtones of an open string produced by touching the string lightly at various points called *nodes*.

Every pitch produced on a sounding body, whether a string, as in this case, or a vibrating air column, is a combination of the fundamental and overtones. These are usually heard as a single or composite tone. The overtones, which give individual color or timbre to the fundamental, can be isolated from the fundamental on a string instrument by touching the string lightly at different nodes. Therefore, when we lightly touch the A-string of a viola halfway between the nut and the bridge, we prevent the string from vibrating as a whole. The vibrating lengths are now the two halves of the string, each sounding an octave higher than the string itself (ratio 2:1). It must be noted here that in theory it does not matter whether we draw the bow on the nut or the bridge side of the node, since either half of the string will give us the higher octave result.

On the violin, these natural harmonics can be translated into musical terms thus:

Example II-67



Notice that the fundamental (marked "1") to the sixth partial are given because these are the strongest and most successfully produced harmonics, even though higher harmonics (up to the seventh or eighth partial) are quite easy to obtain on the viola, cello, and double bass, since the strings are longer and thicker.

Here is a table showing where on a given string on each string instrument the various natural harmonics can be produced:

(No. 1 is, of course, the fundamental.)

2. Lightly touching the string halfway between the nut and the bridge:

Example II-68



3. This third partial can be produced in two different ways:  
 a. Lightly touching the string of one-third of its length from the nut or one-third of its length from the bridge.  
 b. Lightly touching the string at two-thirds of its length from the nut or two-thirds of its length from the bridge.

Example II-69



4. The fourth partial can be obtained in two different ways:  
 a. Lightly touching the string at one-fourth of its length from the nut or one-fourth of its length from the bridge.  
 b. Lightly touching the string at three-fourths of its length from the nut or three-fourths of its length from the bridge.

Example II-70



5. The fifth partial may be produced in four different ways, but only the circled ones are secure enough to be employed in orchestral use. The others are used, however, in solo and chamber music.  
 a. Lightly touching the string at one-fifth of its length from the nut (or four-fifths from the bridge).  
 b. Lightly touching the string at two-fifths of its length from the nut (or three-fifths from the bridge).  
 c. Lightly touching the string at three-fifths of its length from the nut (or two-fifths from the bridge).  
 d. Lightly touching the string at four-fifths of its length from the nut (or one-fifth from the bridge).



Violin

Violin musical score showing four staves. Fingerings 2, 3, 4, and 5 are indicated above the notes. Slurs are present over the first four measures of each staff.

Viola

Viola musical score showing four staves. Fingerings 2, 3, 4, and 5 are indicated above the notes. Slurs are present over the first four measures of each staff.

Cello

Cello musical score showing four staves. Fingerings 2, 3, 4, and 5 are indicated above the notes. Slurs are present over the first four measures of each staff.

Double Bass

Double Bass musical score showing five staves. Fingerings 2 through 12 are indicated above the notes. Slurs are present over the first four measures of each staff.

Double Bass

ARTIFICIAL HARMONICS

The second type of harmonics, *artificial harmonics*, produce the same flutey, silvery sound as the natural harmonics, but are manufactured rather than simply stopped on the open strings. On the violin and viola, the way to produce artificial harmonics is by stopping a pitch with the first finger and at the same time lightly touching a node a fourth above with the fourth finger. This produces a pitch two octaves above the stopped pitch. On the cello, this can be accomplished by using the thumb to stop the tone, while the node a fourth above is touched by the third or fourth finger. Double bass artificial harmonics are not recommended, even though some contemporary composers have called for them in solo music. The stretch of the hand makes it most impractical for clean performance. The node a fourth above the stopped pitch has been found to be most practical, and it is suggested that this manner of securing artificial harmonics be adopted for orchestral performance. Other artificial harmonic possibilities will be discussed in the separate chapters on the violin and viola, for they are used in solo and chamber works for those instruments.

Notation of Artificial Harmonics

1. A normal note with a diamond-shaped note one fourth above. One may or may not use the circle over the notes, although that makes it even clearer.

Example II-72

2. A normal note with a diamond-shaped note one fourth above, plus the actual intended note added above at the discretion of the orchestrator.

Example II-73

3. A small circle above the note intended to be heard as a harmonic, leaving the actual method of production to the player. This is chancy, and the orchestrator should use either of the two preceding methods instead, since the responsibility for the method of producing the harmonic should not be shifted to the performer.

Example II-74

A question often asked is how high one can or should write artificial harmonics. While theoretically there is almost no limitation, practically, the following artificial harmonics should be considered a reasonable limit, especially for orchestral use, since the higher ones are insecure and would probably squeak.

Example II-75

Two extended passages with harmonics:

Example II-76. Saint-Saëns, *Violin Concerto*, second movement, last 13 measures