
BASICS

Intonation

Open-string notes

A great trick that fascinates not only children but adults is to play a note on the violin while holding down the sustaining pedal on a piano (which frees the strings from the dampers). The note resonates through the piano because the string with the same pitch as the one you played vibrates 'in sympathy'. It's quite magical, but only the very beginning of the subject of vibration. The vibrations of even the quietest note played in a concert hall affect every cell of every person (and every seat, every carpet fibre) in the hall.

Watch the open strings on the violin vibrate sympathetically in just the same way as the strings on the piano do. Adjust the tuning of each stopped G, D, A or E to find the widest possible movement of the open strings.

The image displays four musical staves, each representing a different open string on the violin: G, D, A, and E. Each staff is labeled with its respective string name (SuI G, SuI D, SuI A, SuI E) and contains a sequence of notes. The notes are placed on the staff to show their relationship to the open string. For example, the G staff shows notes at the 2nd, 3rd, 4th, 5th, and 6th positions. The E staff includes a dashed line and a note labeled 'SuII' to indicate a higher octave. The notes are marked with horizontal lines underneath, likely indicating fingerings or specific intonation points.

Pausing on each note, adjust the finger microscopically sharper and flatter until you are sure that you are right in the centre of the pitch, and the amplitude (the sideways swinging from side to side) of the sympathetically-vibrating open string is the widest. Listen to the great resonance that fills the violin when the stopped notes are exactly in tune with the open strings. Notice the hard edge that comes into the note when it is fractionally sharper or flatter to the true pitch.

Sharps and flats

The next step is to add the accidentals around the open-string notes. On a keyboard $C\sharp$ and $D\flat$ are the same note, which is called 'tempered intonation'. On a string instrument the sharps can be sharpened and the flats flattened, so that $G\sharp$ is then somewhat higher than $A\flat$. The Catalan-Spanish cellist Pablo Casals called this 'expressive intonation'. Casals used the term 'gravitational attraction' to describe how, say, $A\flat$ seems to want to move down towards G, and $G\sharp$ seems to want to move up towards A.

In the following exercise think of sharps as 'leading notes' to the natural a semitone above, like the seventh degree of the scale wanting to resolve into the tonic (marked as an up-arrow). Think of flats as 'leading notes' in the opposite direction, as though they wish to resolve down a semitone to the natural below (down-arrow). Tune the open-string notes to the open strings (marked below as \oplus). Tune C as a perfect fourth (P4) above G.

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The image shows a musical score for violin intonation exercises. It consists of five staves of music, each starting with a key signature and a tempo marking of $\text{♩} = 60$. The staves are labeled with key signatures: A^b , B^b , D^b , E^b , and F . Each staff contains a sequence of notes with various fingerings and bowing directions indicated by arrows and circled symbols. The notes are grouped into sets of four, and the exercises progress through different intervals and positions, including P4 (Perfect Fourth) and P5 (Perfect Fifth) intervals. The notes are: A^b , B^b , D^b , E^b (Staff 1); B^b , A^{\sharp} , D^b , C^{\sharp} (Staff 2); D^b , C^{\sharp} , F^{\sharp} , E^{\sharp} (Staff 3); E^b , D^{\sharp} , F^{\sharp} , E^{\sharp} (Staff 4); F , E^{\sharp} , A^{\sharp} , G^{\sharp} (Staff 5).

Use every possible fingering, and also continue up into the top octave. For example, the second group can be played on the G string and the D string, each starting on the 1st, 2nd and 3rd finger. The third group can be played with two fingerings on the E string, and with three fingerings on the A, D and G strings.

When we play the violin with the piano (or in much orchestral playing), some notes may be tuned expressively but many will be played tempered, so it is useful to play the exercise with piano intonation as well, ignoring the pitch directions indicated by the arrows.

Uniform intonation exercises

These have a remarkable effect on the intonation. Uniform intonation means that the pitch is even: the same letter-names in the different octaves are in tune with each other, created by having a consistent logic behind the tuning of each note as in the exercise above. The idea of uniform intonation exercises is to play the same group of notes with every possible fingering, making them all sound exactly the same, since the right tuning of a note is the same no matter which finger you play it with.

You can do this in pieces, or just take a random group of a few notes and play them in every position, with every fingering. Here is a superb example, applying the idea to scales:

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The image shows a musical score for a three-octave scale exercise in B-flat major, consisting of five staves. The key signature has two flats (B-flat and E-flat). The exercise is divided into five numbered sections:

- (1)**: A four-measure phrase with eighth notes. The first two measures have a '4' above the notes and a '2' below the first note. The last two measures have a '4' above the notes and a '1' below the first note.
- (2)**: A four-measure phrase with eighth notes. The first measure has an 'A' above the notes and a '1' below the first note. The last measure has a 'D' above the notes and a '4' below the first note.
- (3)**: A four-measure phrase with eighth notes. The first measure has a 'D' above the notes and a '3' below the first note. The last measure has a 'D' above the notes and a '2' below the first note.
- (4)**: A four-measure phrase with eighth notes. The first measure has a 'D' above the notes and a '1' below the first note. The last measure has a 'G' above the notes and a '4' below the first note.
- (5)**: A four-measure phrase with eighth notes. The first measure has a 'G' above the notes and a '3' below the first note. The last measure has an 'A' above the notes and a '1' below the first note.

You can see for yourself the amazing power of this exercise if you do a simple experiment: first, play a three-octave scale and give yourself a mark out of ten for intonation. Then do the uniform intonation exercise once, for ten minutes, in the key of the scale. Then play the scale again. Perhaps you scored 10/10 the first time; but if before you scored 5 or lower, you might find that now you are reaching 8 or even 9. The question is, could you have improved the scale as much just by playing it over and over again for ten minutes, or even playing by it in rhythms or speeding up with the metronome. This is a super-effective way of ironing-out the intonation.