Introduction to Middle Eastern Music

Juhan Puhm

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It is an incredibly daunting task to try and formulate an introduction to Middle Eastern music. We aren't only dealing with different cultures, but different civilizations! The Middle Eastern world may be best delineated by looking at the different languages spoken. Languages with official status include Arabic, Turkish, Persian, Kurdish, and also include Hebrew and Greek. In total there are over sixty other languages spoken in over seventeen countries with over 400 million people.

Even with such diversity across this most ancient part of the world, we can see musically many similarities both in the instruments played and theoretically. For starters, no other culture so prominently includes what are called "quarter-tones" into their musical language. A quarter-tone is half of a semitone. Middle Eastern music sits at an interesting crossroads between Indian music and the music of the Western world.

Indian music without any doubt is a drone-based music. The Indian drone for the most part consists of the tonic note **C** (movable Do or Sa) and its dominant **G** (So or Pa). Everything that is played is in a harmonic relation to the drone. There are only twelve semitones and seven letter or note names, and a plethora of very subtle microtonal variations and ornaments. (See the chapter called "Introduction to Indian Music"). There are no quarter-tones in the Indian musical system for the simple fact that quarter-tones sound awful against a drone. If they in any way sounded good then Indian musicians would have long ago incorporated these notes into their music.

Every chromatic note in Indian music sounds good against the drone and each note serves an emotional as well as a harmonic or gravitational function (meaning the note wants to move or resolve to another note). Indian music theoretically is also incredibly comprehensive and well thought out. There are exactly 32 ragas in Hindustani and 72 ragas in Carnatic music, no more , no less. A system of 22 microtonal Shrutis establishes Indian music, with its instruments built towards these ends, as the greatest Just Intonation musical tradition ever practiced.

Western music on the other hand long, long ago gave up the absolute beauty and purity of Just Intonation for its out of tune, tempered, fixed pitched, fretted and keyboard instruments. Why did it do this? To make a long story very short, there are a few succinct reasons. First of all, evolving from Gregorian chant to triadic harmony, Western music became harmonically complex. Secondly, in order to play all the chords in tune in Just Intonation requires a lot of notes, all subtly different in pitch. The number of notes required greatly exceeds the number of keys or frets that can conveniently be laid out in an octave and played ergonomically.

Since many of these extra notes are very close to one another a compromise was sought, so that a common pitch could be used for these very slightly different pairs of notes or pitches. This compromised or averaged pitch is no longer in Just Intonation and perfectly in tune, but not so out of tune as to offend the ear. This is called tempering, and historically, temperaments evolved from Meantone Temperament, through to Well Temperament, and finally to Equal Temperament, as the harmonic demands of Western music became more and more complex and encompassing. One main feature of Western music is its ability to modulate to many, many different keys, incorporating complex chords, all with only twelve notes to the octave.

Middle Eastern music lies somewhere in the middle between these two world musical systems. In order to understand any musical system we always have to start with "First Principals", which in music means Just Intonation. Simply, these are the pitches or notes that we hear to be most in tune when sounding together. What other possible basis is there for music, except the combinations of sounds that are pleasing to the

ear? No matter where we finally end up, we have to approach Middle Eastern music, as we would approach any music, with the understanding of Just Intonation.

Middle Eastern music can be considered heterophonic melodic music. Heterophony means everyone pretty much plays the same melodic line, but each with slightly different elaborations and embellishments and even intonations. The rhythmic element, played on a variety of percussion instruments, is equally a fundamental aspect of Middle Eastern music. Every culture, language and region has its own rhythmic patterns and musical forms. An exploration of these different patterns and forms would be voluminous.

There are no specifically built drone instruments in Middle Eastern music, like the Tanpura that is found in India. Middle Eastern music is not a drone-based music. However, when playing any string instrument, the lowest string is often struck and used as a quasi-drone. The low string can keep ringing when other notes of the melody are played over top of it, even including the non-harmonic quarter-tones. The low string can and is used to emphasis the root of the Maqam (scale or mode) that is being played. This makes sense as every scale has a home note that is the beginning and end of the scale, that all other notes start from, end to, and revolve around. Sometimes the pitch of the lower string is changed when the root of the Maqam changes.

In Indian music every note that is played is in relation to the drone. In Middle Eastern music, since there is no drone to be bound to, (except maybe the lowest string of an instrument emphasizing the root of a Maqam), many Maqams can be found in different transpositions higher and lower, or to put it simply, in different keys, like in Western music but not as extensive. That different Maqams can be found in two or three or four different transpositions already makes analyzing Middle Eastern music much more complicated and messier. For starters, some Maqams for no reason at all have hardly any transpositions, and others have four or even five. It makes it hard to be completely inclusive in a comprehensive theoretical system. There are so many possible inclusions and omissions and subtle variations. Though there are many transpositions of a single Maqam possible, it is hard to say that Middle Eastern music modulates in the same way as Western music through a series of keys, though more than likely it does so incidentally, when modulating between closer and farther related Maqams.

Quarter Tones

Middle Eastern music has what neither Indian or Western music has, and that is quarter-tones. The sound of Middle Eastern music simply is the sound of scales that include these quarter-tones. Quarter-tones are the pitches that are found between the chromatic semitones of the octave in both Indian and Western music. We can also think of quarter-tones as neutral intervals.

For example, a “neutral third” is the interval that is found between a major third (interval 0 to 4 in semitones) and a minor third (interval 0 to 3 in semitones), which is 3½ semitones above **C** or any other root. A neutral third can be written using a half flat, for example, **C** to **E𝄳**, (E half flat). A neutral third splits a perfect fifth (interval 0 to 7 in semitones) evenly in half.

A “neutral second” splits a minor third (0 to 3) evenly in half at 1½ semitones, for example, **C** to **D𝄳**, (D half flat). In this treatise we will always measure distances in semitones which are easier to think about, never tones which just introduce confusion in the mind.

Theoretically there are twelve possible quarter-tones, one between each semitone. However, nowhere even near that number are used in Middle Eastern musical systems. In actuality, there are almost no Maqams that have more than two quarter-tones in the scale. Many Maqams or scales have only one quarter-tone and many more have no quarter-tones at all. The number of possible quarter tones increases due to different possible transpositions of a Maqam, but even then there are hardly more than six different quarter-tones in common usage.

These six I call the Primary Quarter-tones and they are, for the major and minor intervals, the neutral 2^{nd}, 3^{rd}, 6^{th} and 7^{th}, and for the perfect intervals, the neutral 4^{th} and 5^{th}. The remaining six possible quarter-tones I call the Secondary Quarter-tones and it is rare to come across them at all, even in different transpositions.

How can we ascertain in the real practical world which quarter-tones are actually used? Simply, we can look at the Middle Eastern instruments that have (movable) frets. Just visually we can learn and make huge amounts of sense of Middle Eastern music and understand volumes about its theory as concerning both intonation and quarter-tones. The fret placement of all of these instruments tell us almost all we need to know about Middle Eastern music theory, no matter the culture and the subtle differences between the different cultures. The frets and the musicians behind adjusting those frets don't lie.

The Oud, which is an instrument found right across the Middle Eastern world won't help us here, as it has no frets, but we can learn a lot from the tuning of its open strings. We will look at the Oud in depth further on.

Just Intonation

When trying to make sense of any musical system we have to start somewhere, what I call "First Principles". There is a pitch continuum that can include any and all pitches we can think of and play. Yet, every culture in the world no matter how far removed from one another, come up with more or less the same sequence or set of notes. Simply put, these notes are notes that sound good, pleasing or consonant together. Twenty-five hundred years ago or more, it was discovered that the relationship between these individual notes could be described mathematically. These simple relationships or simple number ratios between different pitches is what is called Just Intonation.

Each of the chromatic pitches above the root note can be assigned their own ratio:

C-(**1/1**), **Db**-(**16/15**), **D**-(**9/8**), **Eb**-(**6/5**), **E**-(**5/4**), **F**-(**4/3**), **F#**-(**45/32**) **/ Gb**-(**64/45**), **G**-(**3/2**), **Ab**-(**8/5**), **A**-(**5/3**), **Bb**-(**16/9**), **B**-(**15/8**), **C**-(**2/1**)

These given ratios are the most consonant ratios possible above a root note. It is also important to note that there is no note duality in Just Intonation, for example, a **Db** is not the same note as a **C#**. No matter how we look at it or evolve, when trying to understand the tuning system of any culture, this is where we must start. These ratios are also called **5 Limit** ratios as there is no prime factor greater than **5** in the above ratios. These ratios are not only the most harmonic ratios above the root note but also the most harmonic in relationship to one another. There is no perfection however, and there are always a few note relations in any Just Intonation system that have higher number and less in tune ratios. There is no way around that.

The "Practical 53Et System" and 5, 7 and 11 Limit Just Intonation

Before going further and getting messed up and bogged down with our 5 Limit ratios, we can use the excellent approximations that **53Et** (53 note equal temperament) gives for even very large 5 Limit ratios. For chromatic notes or semitones that are an even number of steps apart in 53Et it is easy to divide the semitone into two perfectly equal quarter-tones. We then search around looking for the closest 5 Limit ratio to that step of 53Et. Of course, when we find these quarter-tone ratios their numerator and denominator are quite large. We see though that even these very large ratios are only a few cents, a little more than 1/50th of a semitone, different than the closest step in 53Et. Another thing large ratios tell us is that they are not very harmonic, or they do not blend well with the root note that they are in reference to. We mentioned earlier how quarter-tones do not sound good against a drone.

We run into a problem if a semitone is an odd number of steps apart in 53Et. How do we get around this problem and continue? Dividing the semitone unevenly is not good or satisfying solution. Trying to find a temperament different from 53Et is also not good, as 53Et is the best temperament of all for 5 Limit ratios. The simplest solution is just to divide a step in 53Et into half, that is a "half" step in 53Et. For the full set of twenty-four "Chromatic Pitches and Primary and Secondary Quarter-tones" on the root note **C**, we need to divide only two steps in 53Et into half. We find that 7 Limit ratios are the closest ratios to these 53Et "half" steps.

In the charts **11 Limit** ratios as well are given. The reason is that many people think that quarter-tones are best described by 11 Limit ratios like 11/6, 11/8, 11/9, 12/11 etc. 11 Limit ratios divide the semitone less evenly and are around 8 cents, or a 1/12th of a semitone different from the closest 53Et step. Though 11 Limit ratios have smaller ratio numbers, when trying to define a quarter-tone, they are less accurate in dividing the semitone equally.

Quarter-tones always divide two chromatic notes that have the same letter name. For example, **E𝄳** (E half flat) divides in two the semitone between **Eb** and **E**, which both share the same letter name.

In the same way as there is no duality of note name in Just Intonation (meaning for example, a **C#** doesn't equal a **Db**) the same must also be true for 53Et. Enharmonically equivalent notes, e.g. (**F#** / **Gb**) have different pitches and will always be found one step apart in 53Et.

With the "Practical 53Et System" we have laid down a foundation of "First Principals" that we can work and elaborate from. From here we can subtly adjust the **Intonation** of individual notes for the preference of the ear, individual and cultural, without needing to overhaul the mathematical and notational system.

Fretted Instruments

There are many fretted Middle Eastern instruments. Almost all of them have movable frets.

From Iran there is the Setar, Tar, Tanboor and Dotar and a few others. A common tuning for three course instruments is **C G C**, with the melody mainly played on the first string. This makes it easy to figure out what is going on with the frets and the intonation. We can see on the Setar and Tar, quarter-tones that correspond to the neutral 2^{nd}, 3^{rd}, 4^{th}, 6^{th} and 7^{th}. Sometimes, much more rarely there is also the neutral 5^{th}. Interestingly the Setar always seems to be missing the minor second fret!

Fretted instruments from Turkey include the different sizes of the Baglama Saz. We see commonly the twelve chromatic semitones and the five neutral intervals of the 2^{nd}, 3^{rd}, 4^{th}, 6^{th} and 7^{th} . The neutral 5^{th} again isn't very common at all.

With the Saz there is an interesting observation we can make from the different ways it can be tuned, whether a long neck or short necked Saz. It at first seems that on the first (thinnest) playing string there are a couple of Secondary quarter-tones fretted among the Primary quarter-tones that we have already mentioned. That isn't the case however. The open first (thinnest) string is never the fundamental root note of the instrument. For example, for a Saz tuned **G D A**, the root note of the instrument is the low **G**. The unique fret placement on the first (thinnest) string **A** then corresponds not to the **A** but to the root **G** of the instrument.

This is a good example how the lower string may act as a quasi-drone to the notes of the higher strings. Interestingly, the above fret placement on the first (thinnest) string does give on the third (thickest) string some of the less usual Secondary quarter-tones. That is unless we angle some of the frets or even ever play melodically on the lower string!

From Turkey we also have the very long necked Tanbur which we will also look at more closely.

Certain parts of the Arabic world play the fretted Buzuk which is related to the Greek Bouzouki. Again a common tuning is **C G C** and since it has a long neck it is able to have many frets including as well the neutral 5^{th} .

Different Middle Eastern cultures then have all sorts of instruments with frets, some movable, some fixed and metal. When looking at most Middle Eastern fretted instruments they usually have only two or three courses, and they are tuned generally in fifths and fourths which make an octave, or in a combination of three fifths. The fretting as well relates harmonically to the lowest string, which can also be thought of as the root note of whatever Maqam one is playing and of the instrument itself. Sometimes the dominant note instead of the tonic, can be thought of as the root note, though now a few frets intonation wise would no longer be accurate and would need to be readjusted. But this is neither here nor there, as the fret placement for the most part is done by ear to capture a specific intonational nuance or flavour, which is slightly different depending on the musical culture or performer.

Fret Placement and Intonation

Now since we have defined acoustically how we can be most in tune, and also how best to find the quarter-tones, we can look and compare things to the real world musical practice. We can't do this with the Oud or other unfretted Middle Eastern instruments as we have no idea how to ascertain exactly how they are tuned or where the fingers are placed. We can however easily determine or measure the fret placement of fretted instruments exactly, to what ratios the frets may be in relation to the open strings or roots of different Maqams.

When we look at the fret placement we can see that it's pattern exactly matches the above distribution in the "Practical 53Et System" of the Chromatic semitones, and the Primary quarter-tones, being the neutral 2^{nd}, 3^{rd}, 4^{th}, 6^{th} and 7^{th} and sometimes the neutral 5^{th}. I can't say I have seen a single example of a fret being placed for any of the remaining six Secondary quarter-tones.

We see a similar pattern on all the fretted instruments, most of which are tuned to a root, fifth, octave (**C G C**) or a combination of three consecutive perfect fifths, the lowest sounding string always being the root of the tuning. This simplicity of tuning makes our life easy in analyzing fret placement.

From the start we can see frets in groups of three. We will assume the open string to be **C** to which it is commonly tuned to. The first group of three frets then are D flat, D half flat and D. Again, on the Setar it is interesting that most times the Db is excluded. We continue with a group of three frets for E flat, E half flat and E, followed by F, F half sharp and F#. Each group of three frets is separated by a larger space which on the neck is a whole semitone. Between F Sharp and Ab flat, the dominant G sits alone. The fret pattern of threes resumes for A flat, A half flat and A, a semitone space, and then B flat, B half flat and B. The octave **C** as well sits alone between the two larger spaces or semitones of B to C and C to Db. The pattern repeats then for the next half octave or so.

Sometimes however, there is also the neutral 5^{th} which is the G half flat fret. This then implies that there must also be a Gb. When there is a neutral 5^{th} we can see a tight group of five frets a third of the way up the neck. These are the notes F, F half sharp, F sharp or G flat, G half flat and G. Theoretically we can see that F# and Gb aren't the same pitch. They are what is called a Diaschisma (2048/2025) or 19.56 cents apart or about a fifth of a semitone. It is ridiculous to have two frets one fifth of a semitone apart. They will be too close together to play correctly and serve no independent purpose. Here is a perfect case where it is just better to average or temper F# and Gb to a single pitch or adjust the fret by ear for preference.

The group of five frets between F and G, or the subdominant and dominant of C, is a distinct tight group of frets. The reason is that F and G being intervals of a perfect fourth (4/3) and a perfect fifth (3/2) don't sound good when they are adjusted too far from their true pitch. So, there is no other choice than to jam 5 frets into the space of a tone in close proximity to one another.

This isn't however always the case for the major and minor 2^{nd}, 3^{rd}, 6^{th} and 7^{th} intervals with also their neutral quarter-tones. When positioning the major and minor frets and their pitches exactly to Just Intonation they also form a tight group, with their neutral interval in the middle. But this isn't what we always see. Most times we see the three fret groupings a little more spread out. What is happening here?

This is where we can talk about subtle nuances of pitch or **Intonation** between different cultures, and even different musicians in that same culture. If the group of three frets visually look to be more spread out than they would be in Just Intonation one of three things is happening:

1) the minor interval is being tuned a little lower than Just. This of course slightly depresses and makes sadder the sound. The Western equal temperament minor third for an example is tuned 15.64 cents, or almost a sixth of a semitone flatter than Just.

2) the major interval is being tuned a little higher than Just. This of course makes the major intervals brighter and more strident in sound. The Western equal temperament major third for an example is tuned 13.69 cents, or almost a seventh of a semitone sharper than Just.

3) a little of both of the above, meaning the minor interval a little flatter and the major interval a little sharper than Just.

When we separate the minor and major frets a little more than in Just Intonation, we have more room to adjust the fret of the neutral interval up or down. Visually we can always simply position the quarter-tone fret half way between the minor and major fret. But this is where individual or cultural preference comes into play. Some might feel that the quarter-tone should be a little higher than half way between the major and minor frets. Others might feel that it should sound a little lower.

The same goes for the frets of the minor and major intervals. All these frets then get adjusted slightly upward or downward depending on musical and cultural tradition and the accepted **Intonation** of each pitch. This is how we can start from “First Principles” and pure tuning in Just Intonation, and extend it to various cultural or individual differences and preferences. If someone prefers their minor third to be little flatter who is to say they are wrong.

Heterophony

The usage of quarter-tones or neutral intervals almost seems to be exclusive to Middle Eastern music or its nearby cultures. How does such a system work harmonically? We have already mentioned that quarter-tones do not sound good against a drone and neither do they sound good in a harmony. The answer is simply, Middle Eastern music is neither a drone based music nor a harmonic based music. It is practically entirely linear, meaning mainly melodic (and of course rhythmic). When many instruments play the same melody all slightly differently, it is called heterophony.

If Middle Eastern music is not harmonic or drone based, then the quarter-tones have nothing to clash and be dissonant against. They become genuinely free and expressive inflections of pitch. This is not only true for the quarter-tones, but also the major or minor intervals that might be altered intonation wise as compared to pure Just Intonation. When listening to Middle Eastern music I always find the ensemble to be a little “loose” pitch wise. This makes sense as there is no drone or harmony to reference and align the notes of the Maqam pitch wise. Not only do the musicians in the ensemble all play the melody slightly differently, but they also play the nuances of the pitches slightly differently as well depending on the instrument.

Arabic Musical System

The Arabic Musical System for simplicity uses a notational system based on 24 notes to the octave. The twelve chromatic notes of the scale are written using our standard naturals, sharps and flats. The extra twelve quarter-tones are written using half flat (***ƀ***) and half sharp (***†***) symbols (or other similar equivalent symbols). The microtonal nuances of pitch however have absolutely nothing to do with 24 note equal temperament. 24Et has horrible sounding major and minor intervals. Nobody in their right musical ear would adjust the frets to the pitches of 24Et or attempt to finger these pitches on a fretless instrument. We easily can use the "Practical 53Et System" as a starting point for Arabic music and its Maqams.

The main microtones found in Arabic music are B and E half flat. These two quarter-tones are given their own names ***Sikah*** and ***Iraq*** while the remaining four Primary quarter-tones don't have their own unique names. The first quarter-tone ***Sikah*** is the neutral third above the tonic **C,** and the second ***Iraq*** is the neutral third above the dominant **G**. Less common and found mainly by transposition, are **A** half flat and **F** half sharp. We have seen above that many fretted instruments also have frets at **D** half flat and **G** half flat. The Buzuq usually has frets for all six Primary quarter-tones.

Where notes are written in the Arabic system is also where they sound. The Arabic scale and its written note names start from a low **G** going up two octaves to a high **G**. It is easy to see though by the way the notes are laid out, that the tonic or root of the scale is **C**, which in the first octave is called ***Rast***, and in the second octave ***Kirdan***. We can find where the tonic of a scale is by locating the group of symmetrical intervals between the sub-dominant and dominant notes, especially the augmented fourth **F#** and diminished fifth **Gb** which are right next to one another.

All told, there isn't much to write about the Arabic musical system as it works without any problem. It corresponds perfectly to the "Practical 53Et System", from which point it is easy to make subtle adjustments of **Intonation** by preference of ear.

Arabic Pitch Set

In once sense who knows exactly where each pitch must be. The frets are placed by ear, and on fretless instruments like the Oud, notes are not always played exactly the same, especially when changing or modulating between Maqams, and no two instruments are probably ever always perfectly tuned the same, or in the same way, due to temperature or humidity. Everything is in the realm of approximation.

But regardless, the tradition of mathematically defining notes and intervals is thousands of years old. If we must exactly define pitches and ratios the only way to do so is mathematically. What other method is there?

We have two goals:

1) The first is to have a mathematical system define best as possible the real world musical practice. That is, not to try and squeeze the practical playing system into some arbitrary and unrealistic mathematical construct. We will see a prime example of this when we look at Turkish music theory.

2) The second is to use a mathematical construct that actually defines those notes that we consider to be in tune. As seen above, we will use the “Practical 53Et System” for both the Chromatic pitches and the Primary quarter-tones.

There is no better or more in tune system for 5 Limit Just intonation than 53Et. As well, I have completely developed its notational system, which is just an easily understood extension of our current 12 note notational system.

Above a **C** tonic we can easily map using **53Et** the twelve 5 Limit Chromatic ratios, and the six Primary quarter-tones. If, however we change the tonic to, for example **F** or **G**, we need to remap the chromatic and quarter-tone ratios to the new tonic. If the new tonic is nearby, (like **F** to **C**), then we will find that most of the pitches between the two tonics are the same, but not all!

When we transpose from one tonic to another we start finding pitches that are very close to one another but not exactly the same. We also find that these very close pitches are always what is called a **Syntonic comma** apart, which has the ratio of **81/80** and is 21.51 cents in size. This is around a ninth of a tone so it doesn’t seem that large, but a Just Intonation major third (**5/4**) sharpened by that amount sounds awful!

So, to be perfectly in tune, every time we change the root or tonic of the Maqam we will have a slightly different mapping of the Chromatic and Primary quarter-tone ratios.

The first question is what roots should we use for our **Pitch Set**? We can see that almost all Arabic Maqams have the root notes of **A D G C F Bb** (besides the Maqams that start on the quarter-tones). We don’t really see Arabic Maqams with the roots of **E** or **Eb** etc, though of course there is no reason why they couldn’t be possible.

A common tuning of the Arabic Oud is **C F | A D G C** (low pitch to high pitch). And there you have almost a one-to-one correspondence between the roots of the Maqams and the open strings of the Oud.

Now the Arabic **Pitch Set** with its six different tonics is definitely overkill for detail, but regardless, it either is what it is or it isn’t what it is, and since it can’t be what it is not, then it is just (or Just) mathematically the gamut of necessary pitches required to be in tune with 18 notes on each of the six individual tonics!

Meaning, the major third of the Jiharkah Maqam or the minor third of the Buselik Jin are not “specially lower” than a Just Intonation interval. These intervals are just found a little lower due to the tonic root they are related to. The point is, that subtle inflections of pitch are already taken into consideration by the ear and theoretically in Middle Eastern music. The Arabic **Pitch Set** shows all the possible inflections depending on which note is taken to be the tonic. Of course, in the real world this degree of playing accuracy isn’t always perfectly possible. But if we decided to try and play as perfectly in tune as possible, these would be the pitches we would strive for. Again, they would all subtly vary by a Syntonic comma which is round 1/9 of a tone.

The Arabic Oud

Most Middle Eastern fretted musical instruments have only 2 or 3 courses which are tuned to a tonic and a dominant, so one need only worry about a single set of 18 pitches above a single root, which usually always corresponds to the lowest sounding string of the instrument.

But this isn't so with the Oud, which in a way is the Middle Eastern equivalent of the Western piano, in that it is possible to play in many different keys or Maqam roots. The slightly different pitches that are a Syntonic comma apart can be attempted by ear, as the Oud has no fixed frets. The Oud also seems to be the instrument that most theoretical systems are based and elucidated on.

In the same way that the Oud is tuned mainly in fourths, this entire treatise is organized using Perfect 4ths, as opposed to the Western preference for organizing everything by Perfect 5ths.

Arabic note names go for two octaves from **G** to **G** with the tonic on **C**. This scale so very nicely fits on the Arabic Oud tuned **C F | A D G C** (low pitch to high pitch) right across the strings. The tonic **C** is supported by the low **C** string. All the six Maqam roots, except **Bb**, are found on the open strings. Of course, this completely facilitates the execution of the different Maqams. If need be, the lowest string can be tuned to **D** for **D** based Maqams as can the **F** string to **G**, and so on. There are many possible Oud tunings.

But even for something as simple as tuning the open strings of the Oud, how in blazes do we actually tune the Oud strings!

Let's start with the two **C** strings. We can tune in perfect fourths, up from the low **C** the **F** string, and down from the high **C**, the strings **G**, **D** and **A**. Everything sounds so simple, but…the **F** to **A** then isn't a Just pure **5/4** major third, but the very sharp and out of tune **81/64** Pythagorean major third. Well for starters, does anyone notice or tune this accurately? And if they did lower the **A** slightly to be more in tune with the **F**, then they would have to even things out by lowering slightly the **D** and **G** as well.

In the West this is called tempering. One-quarter and one-fifth Syntonic comma tunings are also given for the Oud open strings. The **A D G C** fourths, when tempered aren't exactly perfect anymore, but does anyone even notice and does it really matter? The tuning of the open strings is close enough and can as well be used for as many Maqams that require the open strings, which is all of them, with a looseness of accuracy.

But if we want absolute mathematical perfection, then even the open strings must be slightly retuned to match the pitches of a given root or tonic of the Maqam. That is just the way it goes. We can see in the charts how the open strings need to be slightly retuned depending on the root of the Maqam.

The main point of all of this is, that there is an absolute mathematical basis for tuning all the pitches as accurately as possible. And then from that starting point, individual pitches and frets can be adjusted for **Intonation**, depending upon the familiar pitch nuances of a certain musical culture or performer, of course derived by ear and tradition. After that, there is "just close enough" which will do alright as well, as with unfretted instruments everything is always pretty fluid anyways.

Turkish Musical System

It is not possible to look at the Turkish Musical System without realizing what a theoretical disaster it is. This musically impracticable system stretches back more than eleven centuries to the time of the philosopher *Al-Kindi* with a notational system called *Abjad*. This was extended to a 17 note Pythagorean scale in the 13th century, altered in the 18th century, and finally extended to a 24 note system in the beginning of the 20th century. This 24 note Pythagorean scale developed by *Rauf Yekta* (that started on the D note), was revamped to start on C by those whose surnames make up the *"Arel-Ezgi-Uzdilek"* system that is taught to this day.

To start off, the Turkish system that was devised and has been passed down for over a millennium, isn't even a system of chromatic notes and quarter tones! It is actually a system of Pythagorean intervals and commas generated by a long sequence of perfect 5ths, which we can call a **3 Limit** system. When creating a sequence of pure perfect fifths with the ratio **3/2**, the greatest prime factor of any fraction or ratio we come up with is the prime number **3**.

The "Enharmonic Pythagorean 53Et System"

One thing that is overlooked when working with 3 Limit Just Intonation is that we can amazingly approximate (within 1.95 cents!) 5 Limit Just Intonation ratios or pitches. Simply, if we descend through 8 perfect fifths (or ascend through 8 perfect fourths) we will find a 3 Limit diminished fourth which is only 1.95 cents flat to the enharmonic equivalent of a 5 Limit major third!

C F Bb Eb Ab Db Gb Cb Fb

C ←almost Just 5/4 major third→ **E**

More comprehensive and expansive details of this tuning/temperament can be found in the "Enharmonic Tunings and Temperaments" chapter. This is also dealt with in the "Greek Musical Theory" chapter. One way the word enharmonic can be defined is simply, "to put into or bring into the condition of harmony". Certainly, the enharmonic almost 5/4 major third is much more in tune than the very sharp and out of tune Pythagorean major third 81/64 found by four consecutive perfect fifths: **C G D A E**

The *"Arel-Ezgi-Uzdilek"* system is made by piling up 11 ascending perfect fifths and 12 descending perfect fifths, both from the starting note **C**. We are going to add one more ascending perfect fifth so we can at least deal with a symmetrical system.

What we find in this Pythagorean system of 24 perfect fifths and 25 notes, is pairs of notes that are a little less than a quarter of a semitone or a ninth of a tone apart. These pairs of notes are separated by what is known as a Pythagorean (or Ditonic) comma which has the very large ratio of 531441/524288 which is around 23.46 cents. True quarter-tones are nowhere to be found.

When we substitute in the almost 5 Limit enharmonic ratios, as laid out above, our pairs of notes now become a Syntonic comma (81/80) or 21.51 cents apart.

We further find that the Pythagorean comma and the Syntonic comma are both very close to the Holdrian comma (2^(1/53)) which is 22.64 cents. The Holdrian comma is one step in 53Et, and we can now see why everything we do with Middle Eastern music can be organized using 53Et. 53Et approximates even very large 5 Limit ratios to an accuracy of a few cents or 1/50 of a semitone.

This whole system based upon perfect 5ths and enharmonic notes I call the “Enharmonic Pythagorean 53Et System”. It doesn’t produce the same pitches as the “Practical 53Et System”.

Now we have laid out very clearly the theoretical foundation of the Turkish Musical System. Time to compare it to the real world of musical practice. First of all, there are no true quarter-tones in the “Enharmonic Pythagorean 53Et System” and also the requirements for frets to be placed about a ninth of a tone apart. We can stop pretty much right here. Turkish music in actual practice does have true quarter-tones, no matter if they are adjusted slightly higher or lower intonation wise than Arabic quarter-tones.

There is however one Turkish instrument that fits the bill for the “Enharmonic Pythagorean 53Et System”. That instrument is called the Tanbur. The Turkish Tanbur has a very, very long neck. The length of the neck allows frets that are around a ninth of a tone apart to be tied on and adjusted. This is a very fine delineation of pitch, the frets corresponding to steps in 53Et. By filling in some of the spaces between the notes of the “Enharmonic Pythagorean 53Et System” we can only then start introducing approximate quarter-tones into this system. The chart shows up to 34 frets possible per octave. Most Tanbur players online however, regardless of the number of frets seem to stick to the main frets most in tune by ear. Do any players explore in depth and performance the subtle pitch shades possible by so many frets?

Now the question as well arises, how can we notate such fine gradations of pitch? Turkish music has developed a whole set of confusing new accidentals to deal with the extra pitches of the “Enharmonic Pythagorean 53Et System”.

For example, there is a lower and a higher **F#** separated by a comma. The lower **F#** uses our regular sharp symbol while the upper **F#** uses an altered sharp symbol. Except, the altered Turkish sharp symbol is actually the equivalent to our regular sharp symbol. The regular Turkish sharp symbol is actually akin to our quarter sharp symbol. However, in the real world, the regular Turkish sharp symbol pitches are always played more than one comma lower than the upper pitch, meaning closer to a proper quarter-tone. So, what we end up with in this example of Turkish accidentals, is an altered sharp symbol which is actually our regular sharp, and a regular sharp symbol which is actually our quarter-tone symbol, which isn’t played anywhere near where it is theoretically defined!

Needless to say, that is enough confusion for anyone. I am completely abandoning any use of Turkish accidentals in this treatise. They are completely unnecessary, and things are confusing enough as it is. Even so, the four sharp and four flat Turkish accidentals (excluding double sharps and flats) are insufficient to notate the extra frets possible on the Tanbur!

Throughout this treatise we will always use the notational system I have developed for 53Et, which consists of a completely uniform system of familiar Western accidentals altered by Syntonic comma inflections, delineated by upwards and downwards arrows. This polychromatic system is also easily delineated by colour. With this 53Et notation, every step of 53Et can be notated in a completely uniform, comprehensive

and understandable way requiring no more theoretical understanding than the understanding of regular notation, and no required recognition of strange symbols! That means every fret of the Tanbur can now be notated by accidentals, which wasn't the case before.

Throughout the writing of this treatise, it has never ceased to dismay me how disconnected the Turkish theoretical musical system has become from the rest of the Arabic and Western world. The practical playing side of Turkish music is great. The theoretical side is a mess, as we will keep on discovering as we unearth and dig deeper into Turkish music theory.

The Turkish "Practical 53Et System"

The "Enharmonic Pythagorean 53Et System" seems to be the main Turkish theoretical system that is still taught. There is no reason to try and change it. Better is to introduce a superior practical system and hope one day that it naturally supersedes the earlier system. There is absolutely no reason why we can't use the same "Practical 53Et System" that we have applied for use in Arabic music and transfer it to Turkish music or Persian music, or any Middle Eastern music for that matter.

The only difference between the pitch set of the Arabic and Turkish "Practical 53Et System" is the root notes are shifted over a Perfect fourth. It is always confusing with Turkish music to think about what root or key we should use. This is straight forward with Arabic music as instruments like the oud and buzuq are already in **C**, which corresponds to the music theory which also sounds and is written in **C**.

This is not the case with Turkish music theory, which is further compounded by instruments that sound at one pitch being notated a fourth higher. Also, Turkish instruments are tuned to many other roots than (written) **C**. The Tanbur sounds in **A** and so is written in **D**. The Baglama Saz's are tuned to a number of different tonics including written **D**, **G**, **C** and **F**. The Turkish oud as well is tuned a tone higher than the Arabic oud and tuned in concert **D**, which actually is written as **G**. The charts show Turkish music theory with multiple different roots.

I also show a chart comparing the "Practical 53Et System" to the "Enharmonic Pythagorean 53Et System". If we absolutely need the few extra notes of the "Enharmonic Pythagorean 53Et System" then they can easily be incorporated into the "Practical 53Et System" with its superior notational system familiar to all regular readers of music notation.

The big question when playing Turkish music is do we think about the actual pitch we are playing or the written note? So, for example, when playing a Makam that sounds a **G** root on the Turkish Oud, do we actually think of the Makam as written in **C**? Theoretically written notation must take precedence over the sounding pitch of the note. So the answer is, yes we would think in **C** even though the music is actually sounding in **G**!

If we look at the Turkish Bagalama Saz family of instruments we can see that the frets are positioned in pretty much the same way as any other Middle Eastern fretted instrument. The quarter-tones lie evenly spaced between the frets. Yes, it is possible some might adjust the quarter-tone to sound a little higher than midway, but it is never only a ninth of a tone right adjacent to the next upper fret. No matter how we want to theorize using the "Enharmonic Pythagorean 53Et System", in the real world everything is tuned to the "Practical 53Et System"

anyways, allowing for individual preference of intonation. A theoretical system that closer represents actual musical practice must supercede a system that has to be bent this way and that to work. It is like trying to hammer a round peg into a square hole. One might be able to eventually jam it in, but it really is a poor fit!

Arabic vs Turkish Musical Systems

So how did Turkish music theory become such a mess? It is a challenge to try to understand how Turkish music theory is at such variance to Arabic and Western music theory. But let's give it a go!

The Turkish Oud is slightly smaller than the Arabic Oud. That means it's strings must be tuned a little higher to maintain the same tension. So, while the Arabic Oud could be tuned **C F | A D G C** the Turkish Oud in comparison would be tuned **D G | B E A D**. Again there are many possible Oud tunings. We will just use the above tunings for commonality and for comparison.

Let's pretend the Turkish Oud only has five strings **G | B E A D**. Now **G** as the thickest string gives a very strong feeling of being the root note of the oud, and also the tonic of any **G** Makam. It is also easy to play the two octave scale from **G** to **G** to **G** across the 5 strings. And so, simple as that, the lowest note **G** of the Turkish oud switches over to become the tonic of the scale.

On the Arabic Oud we can also easily play a two octave scale from **G** to **G** to **G**, but the root of the scale in this case isn't **G**, but the lowest note of the Oud which happens to be **C**. So, **G** for the Arabic Oud is the dominant of **C**, while for the Turkish Oud the **G** is the tonic of the **G** scale. We can play the two octave **G** to **G** scale on both Ouds and they will sound the same though they won't be played in the same place. **Rast** and **Kirdan** note names are the tonic of the Arabic system while **Cargah** is the tonic of the Turkish system.

Both Arabic and Turkish music have pretty much the same note names, besides being spelt differently due to language. When we compare the actual note names to each other we find that all the Turkish note names are a tone higher than the same Arabic note names.

The low note **G** on the Arabic oud is played on the second position of the **F** string and is called **Yakah** and is the dominant of the **C** scale. The second position on the **G** string of the Turkish Oud is also called **YEGÂH** but it sounds **A** and is the second note of the **G** scale. We can continue playing and matching note names right through the scales on both Ouds. Besides some microtonal variation depending on the intonation of which **53Et** system we use, all the note names on both instruments are found in the same place on the neck, except that they sound a tone apart and they represent different scale degrees. The **C** on the Arabic Oud is the root or tonic, while the **G** on the Turkish Oud is the root or tonic. So confusing!

But we aren't done yet! If the Arabic Oud can be thought of as being in "Concert C", **C F | A D G C**, the Turkish Oud, which is tuned a tone higher **D G | B E A D** can be thought of as being in "Concert D". The root note of the Arabic oud is **C**, but the root note of the Turkish oud is **G** even though we think of the Turkish Oud being tuned in "Concert D".

And then of course, the Turkish oud is also written and thought of a perfect fourth higher than it sounds! Oh boy, what a mess to wrap our mind around this!

Okay, so while the Turkish Oud sounds in “Concert D” with a tonic on **G**, it is actually written and thought of a perfect fourth higher as **G C | E A D G** with its tonic on **C**. Which means the two octave scale on the Turkish Oud that sounds **G** to **G**, actually is thought of as **C** to **C**!

So finally then, the Turkish Oud sounds a tone higher than the Arabic Oud and is written a fifth higher than the Arabic Oud. Since all the note names are to be found in the same place on both instruments the same Maqams/Makams will be found in the same place on both instruments, except they will *sound* a tone apart and are *written* a fifth apart.

We have to remember the note names are not the letter names, whether sounding or written. Arabic and Turkish Maqams with the same note names once again to reiterate, are notated a perfect fifth apart and sound a tone apart.

If then we have two Oud players, one Arabic and one Turkish, then the simplest way to have them play together is to match the tuning of the two Ouds by having the Turkish player tune down a semitone and the Arabic player tune up a semitone. Now the note names already being in the same place will sound the same as well. The same name of Maqam/Makam will then give the players the same sounding scale, again only differing in different possible intonations.

The charts for the Turkish Oud are laid out in exactly the same way as for the Arabic Oud. These charts as well use the “Practical 53Et System” and only the common Arabic or Western accidentals. For tuning the oud strings, the charts are written for pitches as they sound. For pitches above different Makam roots the notes are shown theoretically as written a perfect fourth higher.

A number of charts compare Arabic and Turkish note names, sounding pitches and written pitches.

Persian Musical System

For the moment this chapter won’t be looking at Persian music theory. In the future when more sources of information are found this will be remedied.

Jins (Ajnas) and Maqams/Makams

A Maqam (Arabic) or Makam (Turkish) is what a scale is called in Middle Eastern music. The smaller components that this scale can be broken down into; trichords, tetrachords, pentachords and hexchords are called Jins or Ajnas.

Most maqams are constructed with a lower and upper Jins. The lower Jin starts on the root or tonic of the maqam which is called the *qarer*. The lower Jin determines what family the maqam belongs to. The upper Jin starts on what is called the *ghammaz.* The *ghammaz* note of the upper Jin can either be connected to the highest note (or notes) of the lower Jin, being **conjunct**, or disconnected and following right after the highest note of the lower Jin, therefore being **disjunct**.

Each maqam has a *sayr* or *seyr,* which is an ambiguous term that denotes a maqams melodic development, whether ascending or descending or focusing on a particular note or group notes of the maqam. Sometimes a maqam can have more than one way of looking at the Jins it is made up of.

A common way to organize the Maqams is by the root note of the Makam. Indian music has pretty much only one root note which is the drone note. Western music has fifteen keys or root notes even though there are only twelve notes in the octave. Middle Eastern music has a select possible number of roots organized around the open strings of the oud. This makes sense as the open strings of the oud are the strongest and most grounding notes for the tonic and dominant notes of the maqam.

The roots of the Arabic maqams are **A D G C F B♭** and the quarter-tones **B𝄭** and **E𝄭**.

The roots of the Turkish makams sound a tone higher, **B E A D G C** and the quarter-tones **C𝄲** and **F𝄲**, and are written a fifth higher at **E A D G C F** and the quarter-tones **F𝄲** and **B𝄭**.

We can see how these roots correspond nicely to the open strings of the Arabic oud **C F | A D G C**, or the Turkish oud, written **G C | E A D G**. Any other roots are very uncommon.

I have organized the maqams in one more way which is Modally. In Western music, a single major scale can also be thought of as seven different modes each starting on a different degree of the scale. I thought there is no reason we can't think of maqams in the same way and connect together all the maqams that share the same set of notes, differentiated only by the note or tonic they start on.

I have classified the maqams according to eight different Modal Families, four without quarter-tones and four with quarter-tones. There are also a number of unique maqams that don't fit into any mode, but can easily be seen as a subtle variation of a modal maqam. Organizing maqams modally is an excellent way to uncovering their shared scale structure and transpositions.

When we take the eight Modal Familes and transpose them to the six maqam roots we have almost the complete gamut of pitches we could possibly ever use in Middle Eastern music.

The idea that a single maqam can exist in different transpositions of course connects it to Western music practices and disconnects it from Indian music practice, where the concept of transposition to different keys and tonics (or drones) doesn't exist. The biggest question I find is, what determines how many different transpositions a single maqam can have? Some maqams aren't transposed at all. Other maqams can be

found to have up to five different transpositions and roots. Sometimes different transpositions have their own unique names, and other times a maqam is just defined as starting on a different root.

A common practice with maqams is to pair them in ascending and descending forms. The pitches of ascending maqams usually lead upwards to the upper final or tonic and then are in a lowered form descending. It seems that these ascending and descending forms are quite standardized. Of course, there can also be less common combinations as well.

There are also extended maqams that are greater than an octave and can even have octave notes that aren't the same as the root.

Finally, there are compound maqams that are made up of two or three different maqams or alternate Jins. It is difficult to ascertain how standardized these forms are, or how much these are just transposition possibilities when playing and unfolding a maqam. A common practice of course when playing Middle Eastern music is to move through or transpose through different related maqams. I haven't shown any compound maqams in the charts.

In the same way that Arabic and Turkish musical systems share similar note names, they also share similar Maqams and Ajnas. When one deciphers the erroneous Turkish system of Pythagorean commas, (that aren't played theoretically correct anyways), and the confusing accidentals, and also sounding a tone apart and written a fifth apart from the Arabic system, it is surprising how consistent the Arabic and Turkish maqams are in their relation to one another. The entire set of Maqams are transposed up a fifth for Turkish music whether they are Turkish Makams or not.

Conclusion

It is an incredibly complicated task attempting to in any way organize Middle Eastern music. Different cultures share similar names and materials but also have many elements unique to themselves. However, even though we are dealing with different languages, cultures and geographic locations it is surprising how much commonality there actually is.

This task is endless. I hope there aren't too many mistakes. While this introduction is very comprehensive, one can only hope in time to clarify its terminology, especially as applied to other possible maqams and their names, especially Turkish makams. This will become possible as more sources are located and acquired for comparison. Also, it would be nice to extend this treatise to Persian music theory as well as other cultures. Middle Eastern rhythms and forms must be a separate chapter completely.

Of course, we are only describing the fundamental elements of a music here. There is no substitute for the actual playing of the music of different cultures and traditions. That can only be heard, enjoyed and practiced!

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"Practical 53Et System" and 5, 7 and 11 Limit Just Intonation

Chromatic Pitches and Primary and Secondary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Practical 53Et System on C

53ET	Ratio	Cents	+/- from 12ET	C Root		2/1	1200	53Et +/- from Just		Six Primary Quarter-tones
2^(53/53)	2	1200	0	C		2/1	1200	0		
2^(48/53)	1.873402	1086.79	-13.21	B↓		15/8	1088.27	-1.48	------	
		45.28					49.17		↑	
2^(46/53)	1.825036	1041.51	41.51	Bb↑↑	B♭	729/400	1039.10	2.41	135/128	Neutral Seventh
		45.28					43.01		↓	
2^(44/53)	1.777918	996.23	-3.77	Bb		16/9	996.09	0.14	------	
2^(39/53)	1.665377	883.02	-16.98	A↓		5/3	884.36	-1.34	------	
		33.96					34.98		↑	
2^(37.5/53)	1.633025	849.06	49.06	A↓↓½	A♭	49/30	849.38	-0.33	25/24	Neutral Sixth
		33.96					35.70		↓	(7 Limit Ratio)
2^(36/53)	1.601302	815.09	15.09	Ab↑		8/5	813.69	1.41	------	
2^(31/53)	1.499941	701.89	1.89	G		3/2	701.96	-0.07	------	
		45.28					43.01		↑	
2^(29/53)	1.461216	656.60	-43.40	G↓↓	G♭	3200/2187	658.94	-2.34	135/128	Neutral Fifth
		45.28					49.17		↓	
2^(27/53)	1.423492	611.32	11.32	Gb↑		64/45	609.78	1.54	------	
2^(26/53)	1.404996	588.68	-11.32	F#↓		45/32	590.22	-1.54	------	
		45.28					49.17		↑	
2^(24/53)	1.368723	543.40	43.40	F↑↑	F+	2187/1600	541.06	2.34	135/128	Neutral Fourth
		45.28					43.01		↓	
2^(22/53)	1.333386	498.11	-1.89	F		4/3	498.04	0.07	------	
2^(17/53)	1.248984	384.91	-15.09	E↓		5/4	386.31	-1.41	------	
		33.96				(49/48)	35.70		↑	
2^(15.5/53)	1.224721	350.94	-49.06	Eb↑↑½	E♭	60/49	350.62	0.33	25/24	Neutral Third
		33.96				(50/49)	34.98		↓	(7 Limit Ratio)
2^(14/53)	1.200929	316.98	16.98	Eb↑		6/5	315.64	1.34	------	
2^(9/53)	1.124911	203.77	3.77	D		9/8	203.91	-0.14	------	
		45.28				(6561/6400)	43.01		↑	
2^(7/53)	1.095869	158.49	-41.51	D↓↓	D♭	800/729	160.90	-2.41	135/128	Neutral Second
		45.28				(250/243)	49.17		↓	
2^(5/53)	1.067577	113.21	13.21	Db↑		16/15	111.73	1.48	------	
2^(0/53)	1	0	0	C		1/1	0	0		

Six Secondary Quarter-tones		C Root		2/1	1200	53Et +/- from Just	
		C		2/1	1200	0	------
					43.01		↑
Lower Neutral First	C♭	C↓↓		12800/6561	1156.99	-2.27	135/128
					49.17		↓
		Cb↑		256/135	1107.82	1.61	------
		Bb		16/9	996.09	0.14	------
					43.01		↑
Lower Neutral Seventh	B♭♭	Bb↓↓		102400/59049	953.08	-2.13	135/128
					49.17		↓
		Bbb↑		2048/1215	903.91	1.75	------
		G#↓		405/256	794.13	-1.68	------
					49.17		↑
Upper Neutral Fifth	G+	G↑↑		19683/12800	744.97	2.20	135/128
					43.01		↓
		G		3/2	701.96	-0.07	------
		Gb↑		64/45	609.78	1.54	
		F#↓		45/32	590.22	-1.54	
		F		4/3	498.04	0.07	------
					43.01		↑
Lower Neutral Fourth	F♭	F↓↓		25600/19683	455.03	-2.20	135/128
					49.17		↓
		Fb↑		512/405	405.87	1.68	------
		D#↓		1215/1024	296.09	-1.75	------
					49.17		↑
Upper Neutral Second	D+	D↑↑		59049/51200	246.92	2.13	135/128
					43.01		↓
		D		9/8	203.91	-0.14	------
		C#↓		135/128	92.18	-1.61	------
					49.17		↑
Upper Neutral First	C+	C↑↑		6561/6400	43.01	2.27	135/128
					43.01		↓
		C		1/1	0	0	------

Holdrian Comma = 2^(1/53) = 22.64 cents

53ET	Ratio	Cents	+/- from 12ET
2^(53/53)	2	1200	0
		45.28	
2^(51/53)	1.948365	1154.72	-45.28
		45.28	
2^(49/53)	1.898064	1109.43	9.43
2^(44/53)	1.777918	996.23	-3.77
		45.28	
2^(42/53)	1.732017	950.94	-49.06
		45.28	
2^(40/53)	1.687301	905.66	5.66
2^(35/53)	1.580496	792.45	-7.55
		45.28	
2^(33/53)	1.539692	747.17	47.17
		45.28	
2^(31/53)	1.499941	701.89	1.89
2^(27/53)	1.423492	611.32	11.32
2^(26/53)	1.404996	588.68	-11.32
2^(22/53)	1.333386	498.11	-1.89
		45.28	
2^(20/53)	1.298961	452.83	-47.17
		45.28	
2^(18/53)	1.265426	407.55	7.55
2^(13/53)	1.185325	294.34	-5.66
		45.28	
2^(11/53)	1.154723	249.06	49.06
		45.28	
2^(9/53)	1.124911	203.77	3.77
2^(4/53)	1.053705	90.57	-9.43
		45.28	
2^(2/53)	1.026502	45.28	45.28
		45.28	
2^(0/53)	1	0	0

11 Limit Primary Quarter-tone Ratios (poorer approximations)

Note	53ET	Ratio	Cents	53Et +/- from Just	Step above	Step below
Bƀ	Bb↑↑	11/6	1049.36	-7.85	38.91	53.27
Aƀ	A↓↓½	18/11	852.59	-3.54	31.77	38.91
Gƀ	G↓↓	16/11	648.68	7.92	53.27	38.91
F†	F↑↑	11/8	551.32	-7.92	38.91	53.27
Eƀ	Eb↑↑½	11/9 (45/44) (55/54)	347.41	3.54	38.91	31.77
Dƀ	D↓↓	12/11 (33/32) (45/44)	150.64	7.85	53.27	38.91

11 Limit Secondary Quarter-tone Ratios (poorer approximations)

Note	53ET	Ratio	Cents	53Et +/- from Just	Step above	Step below
Cƀ	C↓↓	64/33	1146.73	7.99	53.27	38.91
Bbƀ	Bb↓↓	512/297	942.82	8.13	53.27	38.91
G†	G↑↑	99/64	755.23	-8.06	38.91	53.27
Fƀ	F↓↓	128/99	444.77	8.06	53.27	38.91
D†	D↑↑	297/256	257.18	-8.13	38.91	53.27
C†	C↑↑	33/32	53.27	-7.99	38.91	53.27

"Practical 53Et System" and 5, 7 and 11 Limit Just Intonation

Chromatic Pitches and Primary and Secondary Quarter-tones **C Root**

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Practical 53Et System on C

≈(4/3)^x 2^n	53ET	Ratio	Cents	+/- from 12ET
26	2^(42/53)	1.732017	950.94	-49.06
25	2^(20/53)	1.298961	452.83	-47.17
24	2^(51/53)	1.948365	1154.72	-45.28
23	2^(29/53)	1.461216	656.60	-43.40
22	2^(7/53)	1.095869	158.49	-41.51
21	2^(38/53)	1.643739	860.38	-39.62
20	2^(16/53)	1.232756	362.26	-37.74
19	2^(47/53)	1.849061	1064.15	-35.85
18	2^(25/53)	1.386741	566.04	-33.96
17	2^(3/53)	1.040015	67.92	-32.08
16	2^(34/53)	1.559960	769.81	-30.19
15	2^(12/53)	1.169924	271.70	-28.30
14	2^(43/53)	1.754817	973.58	-26.42
13	2^(21/53)	1.316061	475.47	-24.53
12	2^(52/53)	1.974014	1177.36	-22.64
11	2^(30/53)	1.480452	679.25	-20.75
10	2^(8/53)	1.110295	181.13	-18.87
9	2^(39/53)	1.665377	883.02	-16.98
9	2^(17/53)	1.248984	384.91	-15.09
7	2^(48/53)	1.873402	1086.79	-13.21
6	2^(26/53)	1.404996	588.68	-11.32
5	2^(4/53)	1.053705	90.57	-9.43
4	2^(35/53)	1.580496	792.45	-7.55
3	2^(13/53)	1.185325	294.34	-5.66
2	2^(44/53)	1.777918	996.23	-3.77
1	2^(22/53)	1.333386	498.11	-1.89
0	2^(0/53)	1	0	0
-1	2^(31/53)	1.499941	701.89	1.89
-2	2^(9/53)	1.124911	203.77	3.77
-3	2^(40/53)	1.687301	905.66	5.66
-4	2^(18/53)	1.265426	407.55	7.55
-5	2^(49/53)	1.898064	1109.43	9.43
-6	2^(27/53)	1.423492	611.32	11.32
-7	2^(5/53)	1.067577	113.21	13.21
-8	2^(36/53)	1.601302	815.09	15.09
-9	2^(14/53)	1.200929	316.98	16.98
-10	2^(45/53)	1.801323	1018.87	18.87
-11	2^(23/53)	1.350939	520.75	20.75
-12	2^(1/53)	1.013164	22.64	22.64
-13	2^(32/53)	1.519686	724.53	24.53
-14	2^(10/53)	1.139720	226.42	26.42
-15	2^(41/53)	1.709512	928.30	28.30
-16	2^(19/53)	1.282084	430.19	30.19
-17	2^(50/53)	1.923050	1132.08	32.08
-18	2^(28/53)	1.442231	633.96	33.96
-19	2^(6/53)	1.081630	135.85	35.85
-20	2^(37/53)	1.622382	837.74	37.74
-21	2^(15/53)	1.216738	339.62	39.62
-22	2^(46/53)	1.825036	1041.51	41.51
-23	2^(24/53)	1.368723	543.40	43.40
-24	2^(2/53)	1.026502	45.28	45.28
-25	2^(33/53)	1.539692	747.17	47.17
-26	2^(11/53)	1.154723	249.06	49.06
-27	2^(42/53)	1.732017	950.94	-49.06

5 Limit Chromatic Ratios

53Et +/- from Just

Bb	16/9	996.09	0.14
F	4/3	498.04	0.07
C	1/1	0	0
G	3/2	701.96	-0.07
D	9/8	203.91	-0.14

5 Limit Chromatic Ratios

53Et +/- from Just

A↓	5/3	884.36	-1.34	
E↓	5/4	386.31	-1.41	
B↓	15/8	1088.27	-1.48	
F#↓	45/32	590.22	-1.54	
C#↓	135/128	92.18	-1.61	*Secondary*
G#↓	405/256	794.13	-1.68	*Diatonic*
D#↓	1215/1024	296.09	-1.75	*Ratios*

53Et +/- from Just

Bbb↑	2048/1215	903.91	1.75	*Secondary*
Fb↑	512/405	405.87	1.68	*Diatonic*
Cb↑	256/135	1107.82	1.61	*Ratios*
Gb↑	64/45	609.78	1.54	
Db↑	16/15	111.73	1.48	
Ab↑	8/5	813.69	1.41	
Eb↑	6/5	315.64	1.34	

5 Limit Quarter-tone Ratios

53Et +/- from Just

Secondary Quarter-tones	*Bbb*	Bb↓↓	102400/59049	953.08	-2.13
	Fb	F↓↓	25600/19683	455.03	-2.20
	Cb	C↓↓	12800/6561	1156.99	-2.27
Primary Quarter-tones	***Gb***	G↓↓	3200/2187	658.94	-2.34
	Db	D↓↓	800/729	160.90	-2.41

53Et +/- from Just

Primary Quarter-tones	***Bb***	Bb↑↑	729/400	1039.10	2.41
	F†	F↑↑	2187/1600	541.06	2.34
Secondary Quarter-tones	*C†*	C↑↑	6561/6400	43.01	2.27
	G†	G↑↑	19683/12800	744.97	2.20
	D†	D↑↑	59049/51200	246.92	2.13

Holdrian Comma = 2^(1/53) = 22.64 cents

53ET
2^(42/53)
2^(20/53)
2^(51/53)
2^(29/53)
2^(7/53)
2^(38/53)
2^(16/53)
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2^(25/53)
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2^(48/53)
2^(26/53)
2^(4/53)
2^(35/53)
2^(13/53)
2^(44/53)
2^(22/53)
2^(0/53)
2^(31/53)
2^(9/53)
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2^(18/53)
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2^(15/53)
2^(46/53)
2^(24/53)
2^(2/53)
2^(33/53)
2^(11/53)
2^(42/53)

11 Limit Quarter-tone Ratios
(poorer approximations)

				53Et +/- from Just
Bbb	Bb↓↓	512/297	942.82	8.13
Fb	F↓↓	128/99	444.77	8.06
Cb	C↓↓	64/33	1146.73	7.99
Gb	G↓↓	16/11	648.68	7.92
Db	D↓↓	12/11	150.64	7.85

				53Et +/- from Just
Bb	Bb↑↑	11/6	1049.36	-7.85
F†	F↑↑	11/8	551.32	-7.92
C†	C↑↑	33/32	53.27	-7.99
G†	G↑↑	99/64	755.23	-8.06
D†	D↑↑	297/256	257.18	-8.13

53ET half steps	Ratio	Cents	+/- from 12ET
2^(37.5/53)	***1.633025***	*849.06*	*49.06*
2^(15.5/53)	***1.224721***	*350.94*	*-49.06*

7 Limit Quarter-tone Ratios

				53Et half steps +/- from Just
Ab	***A↓↓ ½***	*49/30*	*849.38*	*-0.33*
Eb	***Eb↑↑ ½***	*60/49*	*350.62*	*0.33*

53ET half steps	Ratio	Cents	+/- from 12ET
2^(37.5/53)	***1.633025***	*849.06*	*49.06*
2^(15.5/53)	***1.224721***	*350.94*	*-49.06*

11 Limit Quarter-tone Ratios
(poorer approximations)

				53Et half steps +/- from Just
Ab	***A↓↓ ½***	*18/11*	*852.59*	*-3.54*
Eb	***Eb↑↑ ½***	*11/9*	*347.41*	*3.54*

Arabic Note Names and Tuning

Chromatic Pitches and Primary Quarter-tones — **C Root**

Practical 53Et System on C

53ET	Ratio	Cents	+/- from 12ET		Closest Ratios: 5 Limit	7 Limit	11 Limit	Written & Sounds	Arabic Note Names: Lower Octave	Upper Octave
2^(31/53)	1.499941	701.89	1.89	G	3/2			G	Nawa	Ramal Tuti
2^(29/53)	1.461216	656.60	-43.40	G↓↓	3200/2187		16/11	Gđ	tik Hijaz	jawab tik Hijaz
2^(27/53)	1.423492	611.32	11.32	Gb↑	64/45			Gb		
2^(26/53)	1.404996	588.68	-11.32	F#↓	45/32			F#	Hijaz	jawab Hijaz
2^(24/53)	1.368723	543.40	43.40	F↑↑	2187/1600		11/8	F+	nim Hijaz	jawab nim Hijaz
2^(22/53)	1.333386	498.11	-1.89	F	4/3			F	Jaharkah	Mahuran
									tik Busalik	jawab tik Busalik
2^(17/53)	1.248984	384.91	-15.09	E↓	5/4			E	Busalik	jawab Busalik
2^(15.5/53)	1.224721	350.94	-49.06	Eb↑↑½		60/49	11/9	Eđ	Sikah	Buzrak
2^(14/53)	1.200929	316.98	16.98	Eb↑	6/5			Eb	Kurd	Sunbulah
									nim Kurd	nim Sunbulah
2^(9/53)	1.124911	203.77	3.77	D	9/8			D	Dukah	Muhayar
2^(7/53)	1.095869	158.49	-41.51	D↓↓	800/729		12/11	Dđ	tik Zirkulah	tik Shahnaz
2^(5/53)	1.067577	113.21	13.21	Db↑	16/15			Db	Zirkulah	Shahnaz
									nim Zirkulah	nim Shahnaz
2^(0/53)	1	0	0	C	1/1			C	Rast	Kirdan
									tik Kawasht	tik Nihuft
2^(48/53)	1.873402	1086.79	-13.21	B↓	15/8			B	Kawasht	Nihuft
2^(46/53)	1.825036	1041.51	41.51	B↓↓	729/400		11/6	Bđ	Iraq	Awj
2^(44/53)	1.777918	996.23	-3.77	Bb	16/9			Bb	qarer Ajam	Ajam
									qarar nim Ajam	nim Ajam
2^(39/53)	1.665377	883.02	-16.98	A↓	5/3			A	Ushayran	Husayni
2^(37.5/53)	1.633025	849.06	49.06	A↓↓½		49/30	18/11	Ađ	qarar tik Hisar	tik Hisar
2^(36/53)	1.601302	815.09	15.09	Ab↑	8/5			Ab	qarar Hisar	Hisar
									qarar nim Hisar	nim Hisar
2^(31/53)	1.499941	701.89	1.89	G	3/2			G	Yakah	Nawa

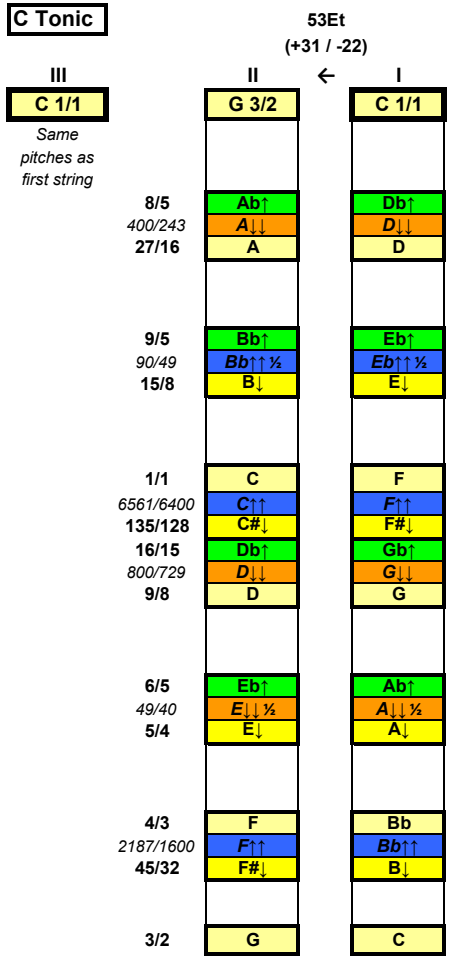
"nim" = lower "tik" = higher

Erroneous 24Et Quarter-tone System

24ET	Ratio	Cents	+/- from 53ET
2^(14/24)	**1.498307**	700	-1.89
2^(13/24)	**1.455653**	650	-6.60
2^(12/24)	**1.414214**	600	-11.32
2^(12/24)	**1.414214**	600	11.32
2^(11/24)	**1.373954**	550	6.60
2^(10/24)	**1.334840**	500	1.89
2^(9/24)	1.296840	450	
2^(8/24)	**1.259921**	400	15.09
2^(7/24)	**1.224054**	350	-0.94
2^(6/24)	**1.189207**	300	-16.98
2^(5/24)	1.155353	250	
2^(4/24)	**1.122462**	200	-3.77
2^(3/24)	**1.090508**	150	-8.49
2^(2/24)	**1.059463**	100	-13.21
2^(1/24)	1.029302	50	
2^(0/24)	**1**	0	0
2^(23/24)	1.943064	1150	
2^(22/24)	**1.887749**	1100	13.21
2^(21/24)	**1.834008**	1050	8.49
2^(20/24)	**1.781797**	1000	3.77
2^(19/24)	1.731073	950	
2^(18/24)	**1.681793**	900	16.98
2^(17/24)	**1.633915**	850	0.94
2^(16/24)	**1.587401**	800	-15.09
2^(15/24)	1.542211	750	
2^(14/24)	**1.498307**	700	-1.89

Buzuk, Setar, Tar, etc Tuning and Frets Chromatic Pitches and Primary Quarter-tones

Any "Tonic - Dominant - Tonic" or "Dominant - Tonic - Dominant" Instrument



Closest Ratios				Practical 53Et System on C			
5 Limit	7 Limit	11 Limit		53ET	Ratio	Cents	+/- from 12ET
1/1				2^(0/53)	1	0	0
16/15				2^(5/53)	1.067577	113.21	13.21
800/729		12/11		2^(7/53)	1.095869	158.49	-41.51
9/8				2^(9/53)	1.124911	203.77	3.77
6/5				2^(14/53)	1.200929	316.98	16.98
	60/49	11/9		*2^(15.5/53)*	*1.224721*	*350.94*	*-49.06*
5/4				2^(17/53)	1.248984	384.91	-15.09
4/3				2^(22/53)	1.333386	498.11	-1.89
2187/1600		11/8		2^(24/53)	1.368723	543.40	43.40
45/32				2^(26/53)	1.404996	588.68	-11.32
64/45				2^(27/53)	1.423492	611.32	11.32
3200/2187		16/11		2^(29/53)	1.461216	656.60	-43.40
3/2				2^(31/53)	1.499941	701.89	1.89
8/5				2^(36/53)	1.601302	815.09	15.09
	49/30	18/11		*2^(37.5/53)*	*1.633025*	*849.06*	*49.06*
5/3				2^(39/53)	1.665377	883.02	-16.98
16/9				2^(44/53)	1.777918	996.23	-3.77
729/400		11/6		2^(46/53)	1.825036	1041.51	41.51
15/8				2^(48/53)	1.873402	1086.79	-13.21
2/1				2^(53/53)	2	1200	0

Buzuk, Setar, Tar, etc — Tuning and Frets — Chromatic Pitches and Primary Quarter-tones

Any "Tonic - Dominant - Tonic" or "Dominant - Tonic - Dominant" Instrument

F Tonic

53Et (-31 / +22)

	III		II	←	I	Frets	Closest Ratios 5 Limit	7 Limit	11 Limit	Practical 53Et System on F 53ET	Ratio	Cents	+/- from 12ET
3/2	C 3/2		F 1/1		C 3/2	————	3/2			2^(31/53)	1.499941	701.89	1.89
	Same pitches as first string					(Frets placed by first string ratios)							
		16/15	Gb↑		Db↑	————	8/5			2^(36/53)	1.601302	815.09	15.09
↔		*49/45*	*G↓↓½*		*D↓↓½*	————		*49/30*	*18/11*	*2^(37.5/53)*	*1.633025*	*849.06*	*49.06*
↔		10/9	G↓		D↓	————	5/3			2^(39/53)	1.665377	883.02	-16.98
Different fret placement													
↔		32/27	Ab		Eb	————	16/9			2^(44/53)	1.777918	996.23	-3.77
↔		*243/200*	*Ab↑↑*		*Eb↑↑*	————	*729/400*		*11/6*	2^(46/53)	1.825036	1041.51	41.51
		5/4	A↓		E↓	————	15/8			2^(48/53)	1.873402	1086.79	-13.21
		4/3	Bb		F	————	1/1			2^(0/53)	1	0	-1200
↔													
↔													
		64/45	Cb↑		Gb↑	————	16/15			2^(5/53)	1.067577	113.21	13.21
		3200/2187	*C↓↓*		*G↓↓*	————	*800/729*		*12/11*	2^(7/53)	1.095869	158.49	-41.51
		3/2	C		G	————	9/8			2^(9/53)	1.124911	203.77	3.77
		8/5	Db↑		Ab↑	————	6/5			2^(14/53)	1.200929	316.98	16.98
		80/49	*Db↑↑½*		*Ab↑↑½*	————		*60/49*	*11/9*	*2^(15.5/53)*	*1.224721*	*350.94*	*-49.06*
		5/3	D↓		A↓	————	5/4			2^(17/53)	1.248984	384.91	-15.09
		16/9	Eb		Bb	————	4/3			2^(22/53)	1.333386	498.11	-1.89
		729/400	*Eb↑↑*		*Bb↑↑*	————	*2187/1600*		*11/8*	2^(24/53)	1.368723	543.40	43.40
		15/8	E↓		B↓	————	45/32			2^(26/53)	1.404996	588.68	-11.32
↔		256/135	Fb↑		Cb↑	*	64/45			2^(27/53)	1.423492	611.32	11.32
↔		*12800/6561*	*F↓↓*		*C↓↓*	————	*3200/2187*		*16/11*	2^(29/53)	1.461216	656.60	-43.40
		2/1	F		C	————	3/2			2^(31/53)	1.499941	701.89	1.89

* (Augmented 4th / Diminished 5th tempered to one fret)

Pitch Set for Arabic Music

A D G C F Bb Roots — **53Et Tonic on C**

(all 5 Limit ratios calculated by Perfect Fifthsand Syntonic Commas)

"Practical 53Et System" and 5, 7 and 11 Limit Just Intonation
Chromatic Pitches and Primary Quarter-tones

Practical 53Et System on A D G C F Bb				A Root				D Root				G Root			
53ET	Ratio	Cents	+/- from 12ET				53Et +/- from Just				53Et +/- from Just				53Et +/- from Just
2^(53/53)	2	1200	0					C	2/1	1200	0	C	2/1	1200	0
2^(51/53)	1.948365	1154.72	-45.28												
2^(49/53)	1.898064	1109.43	9.43		B	243/128	1109.78	-0.34							
2^(48/53)	1.873402	1086.79	-13.21						B↓	15/8	1088.27	-1.48	B↓	15/8	1088.27	-1.48
2^(47/53)	1.849061	1064.15	-35.85	B♭	B↓↓	50/27	1066.76	-2.61							
2^(46.5/53)	*1.837009*	*1052.83*	*-47.17*						B↓↓½	147/80	1053.29	-0.46	B♭	Bb↑↑½	90/49	1052.57	0.26
2^(46/53)	1.825036	1041.51	41.51														
2^(45/53)	1.801323	1018.87	18.87		Bb↑	9/5	1017.60	1.27	Bb↑	9/5	1017.60	1.27		Bb↑	9/5	1017.60	1.27
2^(44/53)	1.777918	996.23	-3.77														
2^(40/53)	1.687301	905.66	5.66		A	27/16	905.87	-0.20	A	27/16	905.87	-0.20	A	27/16	905.87	-0.20
2^(39/53)	1.665377	883.02	-16.98														
2^(38/53)	1.643739	860.38	-39.62						A↓↓	400/243	862.85	-2.48	A♭	A↓↓	400/243	862.85	-2.48
2^(37.5/53)	*1.633025*	*849.06*	*49.06*														
2^(37/53)	1.622382	837.74	37.74														
2^(36/53)	1.601302	815.09	15.09						Ab↑	8/5	813.69	1.41		Ab↑	8/5	813.69	1.41
2^(35/53)	1.580496	792.45	-7.55		G#↓	405/256	794.13	-1.68	G#↓	405/256	794.13	-1.68					
2^(33/53)	1.539692	747.17	47.17	G𝄲	G↑↑	19683/12800	744.97	2.20	G𝄲	G↑↑	19683/12800	744.97	2.20				
2^(31/53)	1.499941	701.89	1.89		G	3/2	701.96	-0.07	G	3/2	701.96	-0.07		G	3/2	701.96	-0.07
2^(30/53)	1.480452	679.25	-20.75														
2^(29/53)	1.461216	656.60	-43.40														
2^(28.5/53)	*1.451692*	*645.28*	*45.28*														
2^(27/53)	1.423492	611.32	11.32														
2^(26/53)	1.404996	588.68	-11.32		F#↓	45/32	590.22	-1.54	F#↓	45/32	590.22	-1.54		F#↓	45/32	590.22	-1.54
2^(24.5/53)	*1.377702*	*554.72*	*-45.28*	F𝄲	F#↓↓½	441/320	555.25	-0.53	F𝄲	F↑↑½	135/98	554.53	0.19				
2^(24/53)	1.368723	543.40	43.40											F𝄲	F↑↑	2187/1600	541.06	2.34
2^(23/53)	1.350939	520.75	20.75		F↑	27/20	519.55	1.20	F↑	27/20	519.55	1.20					
2^(22/53)	1.333386	498.11	-1.89											F	4/3	498.04	0.07
2^(20/53)	1.298961	452.83	-47.17														
2^(18/53)	1.265426	407.55	7.55		E	81/64	407.82	-0.27	E	81/64	407.82	-0.27					
2^(17/53)	1.248984	384.91	-15.09											E↓	5/4	386.31	-1.41
2^(16/53)	1.232756	362.26	-37.74	E♭	E↓↓	100/81	364.81	-2.54	E♭	E↓↓	100/81	364.81	-2.54				
2^(15.5/53)	*1.224721*	*350.94*	*-49.06*											E♭	E↓↓½	49/40	351.34	-0.39
2^(15/53)	1.216738	339.62	39.62														
2^(14/53)	1.200929	316.98	16.98		Eb↑	6/5	315.64	1.34	Eb↑	6/5	315.64	1.34		Eb↑	6/5	315.64	1.34
2^(13/53)	1.185325	294.34	-5.66		D#↓	1215/1024	296.09	-1.75									
2^(11/53)	1.154723	249.06	49.06	D𝄲	D↑↑	59049/51200	246.92	2.13									
2^(9/53)	1.124911	203.77	3.77		D	9/8	203.91	-0.14	D	9/8	203.91	-0.14		D	9/8	203.91	-0.14
2^(8/53)	1.110295	181.13	-18.87														
2^(7/53)	1.095869	158.49	-41.51											D♭	D↓↓	800/729	160.90	-2.41
2^(6.5/53)	*1.088726*	*147.17*	*47.17*														
2^(5/53)	1.067577	113.21	13.21												Db↑	16/15	111.73	1.48
2^(4/53)	1.053705	90.57	-9.43		C#↓	135/128	92.18	-1.61	C#↓	135/128	92.18	-1.61		C#↓	135/128	92.18	-1.61
2^(2.5/53)	*1.033236*	*56.60*	*-43.40*	C𝄲	C↑↑½	405/392	56.48	0.12									
2^(2/53)	1.026502	45.28	45.28						C↑↑	6561/6400	43.01	2.27	C𝄲	C↑↑	6561/6400	43.01	2.27
2^(1/53)	1.013164	22.64	22.64		C↑	81/80	21.51	1.14									
2^(0/53)	1	0	0						C	1/1	0	0		C	1/1	0	0

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Holdrian Comma = 2^(1/53) = 22.64 cents

	C Root			53Et +/- from Just
	C	2/1	1200	0
	B↓	15/8	1088.27	-1.48
B♭	Bb↑↑	729/400	1039.10	2.41
	Bb	16/9	996.09	0.14
	A↓	5/3	884.36	-1.34
A♭	A↓↓𝄾	49/30	849.38	-0.33
	Ab↑	8/5	813.69	1.41
	G	3/2	701.96	-0.07
G♭	G↓↓	3200/2187	658.94	-2.34
	Gb↑	64/45	609.78	1.54
	F#↓	45/32	590.22	-1.54
F♮	F↑↑	2187/1600	541.06	2.34
	F	4/3	498.04	0.07
	E↓	5/4	386.31	-1.41
E♭	Eb↑↑𝄾	60/49	350.62	0.33
	Eb↑	6/5	315.64	1.34
	D	9/8	203.91	-0.14
D♭	D↓↓	800/729	160.90	-2.41
	Db↑	16/15	111.73	1.48
	C	1/1	0	0

	F Root			53Et +/- from Just
	C	2/1	1200	0
C♭	C↓↓	12800/6561	1156.99	-2.27
	Cb↑	256/135	1107.82	1.61
	B↓	15/8	1088.27	-1.48
B♭	Bb↑↑	729/400	1039.10	2.41
	Bb	16/9	996.09	0.14
	A↓	5/3	884.36	-1.34
A♭	Ab↑↑𝄾	80/49	848.66	0.39
	Ab↑	8/5	813.69	1.41
	G	3/2	701.96	-0.07
G♭	G↓↓	3200/2187	658.94	-2.34
	Gb↑	64/45	609.78	1.54
	F	4/3	498.04	0.07
	E↓	5/4	386.31	-1.41
E♭	Eb↑↑	243/200	337.15	2.48
	Eb	32/27	294.13	0.20
	D↓	10/9	182.40	-1.27
D♭	D↓↓𝄾	49/45	147.43	-0.26
	Db↑	16/15	111.73	1.48
	C	1/1	0	0

	Bb Root			53Et +/- from Just
	C	2/1	1200	0
C♭	C↓↓	12800/6561	1156.99	-2.27
	Cb↑	256/135	1107.82	1.61
	A↓	5/3	884.36	-1.34
A♭	Ab↑↑	81/50	835.19	2.54
	Ab	128/81	792.18	0.27
	G↓	40/27	680.45	-1.20
G♭	G↓↓𝄾	196/135	645.47	-0.19
	Gb↑	64/45	609.78	1.54
	F	4/3	498.04	0.07
F♭	F↓↓	25600/19683	455.03	-2.20
	Fb↑	512/405	405.87	1.68
	E↓	5/4	386.31	-1.41
E♭	Eb↑↑	243/200	337.15	2.48
	Eb	32/27	294.13	0.20
	D↓	10/9	182.40	-1.27
D♭	Db↑↑𝄾	160/147	146.71	0.46
	Db↑	16/15	111.73	1.48
	C	1/1	0	0

Practical 53Et System on A D G C F Bb

53ET	Ratio	Cents	+/- from 12ET
2^(53/53)	2	1200	0
2^(51/53)	1.948365	1154.72	-45.28
2^(49/53)	1.898064	1109.43	9.43
2^(48/53)	1.873402	1086.79	-13.21
2^(47/53)	1.849061	1064.15	-35.85
2^(46.5/53)	*1.837009*	*1052.83*	*-47.17*
2^(46/53)	1.825036	1041.51	41.51
2^(45/53)	1.801323	1018.87	18.87
2^(44/53)	1.777918	996.23	-3.77
2^(40/53)	1.687301	905.66	5.66
2^(39/53)	1.665377	883.02	-16.98
2^(38/53)	1.643739	860.38	-39.62
2^(37.5/53)	*1.633025*	*849.06*	*49.06*
2^(37/53)	1.622382	837.74	37.74
2^(36/53)	1.601302	815.09	15.09
2^(35/53)	1.580496	792.45	-7.55
2^(33/53)	1.539692	747.17	47.17
2^(31/53)	1.499941	701.89	1.89
2^(30/53)	1.480452	679.25	-20.75
2^(29/53)	1.461216	656.60	-43.40
2^(28.5/53)	*1.451692*	*645.28*	*45.28*
2^(27/53)	1.423492	611.32	11.32
2^(26/53)	1.404996	588.68	-11.32
2^(24.5/53)	*1.377702*	*554.72*	*-45.28*
2^(24/53)	1.368723	543.40	43.40
2^(23/53)	1.350939	520.75	20.75
2^(22/53)	1.333386	498.11	-1.89
2^(20/53)	1.298961	452.83	-47.17
2^(18/53)	1.265426	407.55	7.55
2^(17/53)	1.248984	384.91	-15.09
2^(16/53)	1.232756	362.26	-37.74
2^(15.5/53)	*1.224721*	*350.94*	*-49.06*
2^(15/53)	1.216738	339.62	39.62
2^(14/53)	1.200929	316.98	16.98
2^(13/53)	1.185325	294.34	-5.66
2^(11/53)	1.154723	249.06	49.06
2^(9/53)	1.124911	203.77	3.77
2^(8/53)	1.110295	181.13	-18.87
2^(7/53)	1.095869	158.49	-41.51
2^(6.5/53)	*1.088726*	*147.17*	*47.17*
2^(5/53)	1.067577	113.21	13.21
2^(4/53)	1.053705	90.57	-9.43
2^(2.5/53)	*1.033236*	*56.60*	*-43.40*
2^(2/53)	1.026502	45.28	45.28
2^(1/53)	1.013164	22.64	22.64
2^(0/53)	1	0	0

5 Limit Chromatic Ratios			53Et +/- from Just
C	2/1	1200	0
B	243/128	1109.78	-0.34
Bb↑	9/5	1017.60	1.27
Bb	16/9	996.09	0.14
A	27/16	905.87	-0.20
A↓	5/3	884.36	-1.34
Ab	128/81	792.18	0.27
G	3/2	701.96	-0.07
G↓	40/27	680.45	-1.20
F↑	27/20	519.55	1.20
F	4/3	498.04	0.07
E	81/64	407.82	-0.27
Eb	32/27	294.13	0.20
D	9/8	203.91	-0.14
D↓	10/9	182.40	-1.27
C↑	81/80	21.51	1.14
C	1/1	0	0

5 Limit Chromatic Ratios (Aug. 4th / Dim. 5th)			53Et +/- from Just
F Root			
Cb↑	256/135	1107.82	1.61
B↓	15/8	1088.27	-1.48
D Root			
Ab↑	8/5	813.69	1.41
G#↓	405/256	794.13	-1.68
C Root			
Gb↑	64/45	609.78	1.54
F#↓	45/32	590.22	-1.54
Bb Root			
Fb↑	512/405	405.87	1.68
E↓	5/4	386.31	-1.41
A Root			
Eb↑	6/5	315.64	1.34
D#↓	1215/1024	296.09	-1.75
G Root			
Db↑	16/15	111.73	1.48
C#↓	135/128	92.18	-1.61

5 Limit Quarter-tone Ratios Neutral Fifth and Second			53Et +/- from Just
Cb	C↓↓	12800/6561	1156.99	-2.27
Bb	B↓↓	50/27	1066.76	-2.61
Ab	A↓↓	400/243	862.85	-2.48
Gb	G↓↓	3200/2187	658.94	-2.34
Fb	F↓↓	25600/19683	455.03	-2.20
Eb	E↓↓	100/81	364.81	-2.54
Db	D↓↓	800/729	160.90	-2.41

5 Limit Quarter-tone Ratios Neutral Fourth and Seventh			53Et +/- from Just
Bb	Bb↑↑	729/400	1039.10	2.41
Ab	Ab↑↑	81/50	835.19	2.54
G♮	G↑↑	19683/12800	744.97	2.20
F♮	F↑↑	2187/1600	541.06	2.34
Eb	Eb↑↑	243/200	337.15	2.48
D♮	D↑↑	59049/51200	246.92	2.13
C♮	C↑↑	6561/6400	43.01	2.27

	7 Limit Quarter-tone Ratios Neutral Sixth			53Et half steps +/- from Just		7 Limit Quarter-tone Ratios Neutral Third			53Et half steps +/- from Just
B𝄫	B𝄫↓↓½	147/80	1053.29	-0.46	B𝄫	B𝄫↑↑½	90/49	1052.57	0.26
A𝄫	A𝄫↓↓½	49/30	849.38	-0.33	A𝄫	A𝄫↑↑½	80/49	848.66	0.39
G𝄫	G𝄫↓↓½	196/135	645.47	-0.19					
F𝄪	F#↓↓½	441/320	555.25	-0.53	F𝄪	F𝄪↑↑½	135/98	554.53	0.19
E𝄫	E𝄫↓↓½	49/40	351.34	-0.39	E𝄫	E𝄫↑↑½	60/49	350.62	0.33
D𝄫	D𝄫↓↓½	49/45	147.43	-0.26	D𝄫	D𝄫↑↑½	160/147	146.71	0.46
					C𝄪	C𝄪↑↑½	405/392	56.48	0.12

	11 Limit Quarter-tone Ratios (poorer approximations) Neutral Fifth, Second and Sixth			53Et +/- from Just		11 Limit Quarter-tone Ratios (poorer approximations) Neutral Fourth, Seventh and Third			53Et +/- from Just
C𝄫	C𝄫↓↓	64/33	1146.73	7.99					
B𝄫	B𝄫↓↓	81/44	1056.50	7.65					
B𝄫	B𝄫↓↓½	81/44	1056.50	-3.67	B𝄫	B𝄫↑↑½	11/6	1049.36	3.47
					B𝄫	B𝄫↑↑	11/6	1049.36	-7.85
A𝄫	A𝄫↓↓	18/11	852.59	7.79					
A𝄫	A𝄫↓↓½	18/11	852.59	-3.54	A𝄫	A𝄫↑↑½	44/27	845.45	3.60
					A𝄫	A𝄫↑↑	44/27	845.45	-7.72
					G𝄪	G𝄪↑↑	99/64	755.23	-8.06
G𝄫	G𝄫↓↓	16/11	648.68	7.92					
G𝄫	G𝄫↓↓½	16/11	648.68	-3.40					
F𝄪	F#↓↓½	243/176	558.46	-3.74	F𝄪	F𝄪↑↑½	11/8	551.32	3.40
					F𝄪	F𝄪↑↑	11/8	551.32	-7.92
F𝄫	F𝄫↓↓	128/99	444.77	8.06					
E𝄫	E𝄫↓↓	27/22	354.55	7.72					
E𝄫	E𝄫↓↓½	27/22	354.55	-3.60	E𝄫	E𝄫↑↑½	11/9	347.41	3.54
					E𝄫	E𝄫↑↑	11/9	347.41	-7.79
					D𝄪	D𝄪↑↑	297/256	257.18	-8.13
D𝄫	D𝄫↓↓	12/11	150.64	7.85					
D𝄫	D𝄫↓↓½	12/11	150.64	-3.47	D𝄫	D𝄫↑↑½	88/81	143.50	3.67
					C𝄪	C𝄪↑↑½	33/32	53.27	3.33
					C𝄪	C𝄪↑↑	33/32	53.27	-7.99

Practical 53Et System on A D G C F Bb

53ET	Ratio	Cents	+/- from 12ET
2^(53/53)	2	1200	0
2^(51/53)	1.948365	1154.72	-45.28
2^(49/53)	1.898064	1109.43	9.43
2^(48/53)	1.873402	1086.79	-13.21
2^(47/53)	1.849061	1064.15	-35.85
2^(46.5/53)	*1.837009*	*1052.83*	*-47.17*
2^(46/53)	1.825036	1041.51	41.51
2^(45/53)	1.801323	1018.87	18.87
2^(44/53)	1.777918	996.23	-3.77
2^(40/53)	1.687301	905.66	5.66
2^(39/53)	1.665377	883.02	-16.98
2^(38/53)	1.643739	860.38	-39.62
2^(37.5/53)	*1.633025*	*849.06*	*49.06*
2^(37/53)	1.622382	837.74	37.74
2^(36/53)	1.601302	815.09	15.09
2^(35/53)	1.580496	792.45	-7.55
2^(33/53)	1.539692	747.17	47.17
2^(31/53)	1.499941	701.89	1.89
2^(30/53)	1.480452	679.25	-20.75
2^(29/53)	1.461216	656.60	-43.40
2^(28.5/53)	*1.451692*	*645.28*	*45.28*
2^(27/53)	1.423492	611.32	11.32
2^(26/53)	1.404996	588.68	-11.32
2^(24.5/53)	*1.377702*	*554.72*	*-45.28*
2^(24/53)	1.368723	543.40	43.40
2^(23/53)	1.350939	520.75	20.75
2^(22/53)	1.333386	498.11	-1.89
2^(20/53)	1.298961	452.83	-47.17
2^(18/53)	1.265426	407.55	7.55
2^(17/53)	1.248984	384.91	-15.09
2^(16/53)	1.232756	362.26	-37.74
2^(15.5/53)	*1.224721*	*350.94*	*-49.06*
2^(15/53)	1.216738	339.62	39.62
2^(14/53)	1.200929	316.98	16.98
2^(13/53)	1.185325	294.34	-5.66
2^(11/53)	1.154723	249.06	49.06
2^(9/53)	1.124911	203.77	3.77
2^(8/53)	1.110295	181.13	-18.87
2^(7/53)	1.095869	158.49	-41.51
2^(6.5/53)	*1.088726*	*147.17*	*47.17*
2^(5/53)	1.067577	113.21	13.21
2^(4/53)	1.053705	90.57	-9.43
2^(2.5/53)	*1.033236*	*56.60*	*-43.40*
2^(2/53)	1.026502	45.28	45.28
2^(1/53)	1.013164	22.64	22.64
2^(0/53)	1	0	0

Pitch Set for Arabic Music

A D G C F Bb Roots

53Et Tonic on C

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

"Practical 53Et System" and 5, 7 and 11 Limit Just Intonation

Chromatic Pitches and Primary Quarter-tones

Practical 53Et System on A D G C F Bb

Roots ~	≈(4/3)^x 2^n	53ET	Ratio	Cents	+/- from 12ET
	25	2^(20/53)	1.298961	452.83	-47.17
	24	2^(51/53)	1.948365	1154.72	-45.28
	23	2^(29/53)	1.461216	656.60	-43.40
	22	2^(7/53)	1.095869	158.49	-41.51
	21	2^(38/53)	1.643739	860.38	-39.62
	20	2^(16/53)	1.232756	362.26	-37.74
	19	2^(47/53)	1.849061	1064.15	-35.85
	18	2^(25/53)	1.386741	566.04	-33.96
	17	2^(3/53)	1.040015	67.92	-32.08
	16	2^(34/53)	1.559960	769.81	-30.19
	15	2^(12/53)	1.169924	271.70	-28.30
	14	2^(43/53)	1.754817	973.58	-26.42
	13	2^(21/53)	1.316061	475.47	-24.53
	12	2^(52/53)	1.974014	1177.36	-22.64
	11	2^(30/53)	1.480452	679.25	-20.75
	10	2^(8/53)	1.110295	181.13	-18.87
	9	2^(39/53)	1.665377	883.02	-16.98
	9	2^(17/53)	1.248984	384.91	-15.09
	7	2^(48/53)	1.873402	1086.79	-13.21
	6	2^(26/53)	1.404996	588.68	-11.32
	5	2^(4/53)	1.053705	90.57	-9.43
	4	2^(35/53)	1.580496	792.45	-7.55
	3	2^(13/53)	1.185325	294.34	-5.66
	2	2^(44/53)	1.777918	996.23	-3.77
	1	2^(22/53)	1.333386	498.11	-1.89
	0	2^(0/53)	1	0	0
	-1	2^(31/53)	1.499941	701.89	1.89
	-2	2^(9/53)	1.124911	203.77	3.77
	-3	2^(40/53)	1.687301	905.66	5.66
	-4	2^(18/53)	1.265426	407.55	7.55
	-5	2^(49/53)	1.898064	1109.43	9.43
	-6	2^(27/53)	1.423492	611.32	11.32
	-7	2^(5/53)	1.067577	113.21	13.21
	-8	2^(36/53)	1.601302	815.09	15.09
	-9	2^(14/53)	1.200929	316.98	16.98
	-10	2^(45/53)	1.801323	1018.87	18.87
	-11	2^(23/53)	1.350939	520.75	20.75
	-12	2^(1/53)	1.013164	22.64	22.64
	-13	2^(32/53)	1.519686	724.53	24.53
	-14	2^(10/53)	1.139720	226.42	26.42
	-15	2^(41/53)	1.709512	928.30	28.30
	-16	2^(19/53)	1.282084	430.19	30.19
	-17	2^(50/53)	1.923050	1132.08	32.08
	-18	2^(28/53)	1.442231	633.96	33.96
	-19	2^(6/53)	1.081630	135.85	35.85
	-20	2^(37/53)	1.622382	837.74	37.74
	-21	2^(15/53)	1.216738	339.62	39.62
	-22	2^(46/53)	1.825036	1041.51	41.51
	-23	2^(24/53)	1.368723	543.40	43.40
	-24	2^(2/53)	1.026502	45.28	45.28
	-25	2^(33/53)	1.539692	747.17	47.17
	-26	2^(11/53)	1.154723	249.06	49.06
	-27	2^(42/53)	1.732017	950.94	-49.06
	-28	2^(20/53)	1.298961	452.83	-47.17

5 Limit Chromatic Ratios

		53Et +/- from Just
Ab	128/81	0.27
Eb	32/27	0.20
Bb	**16/9**	**0.14**
F	**4/3**	**0.07**
C	**1/1**	**0**
G	**3/2**	**-0.07**
D	**9/8**	**-0.14**
A	**27/16**	**-0.20**
E	81/64	-0.27
B	243/128	-0.34

5 Limit Chromatic Ratios

		53Et +/- from Just
G↓	40/27	-1.20
D↓	**10/9**	**-1.27**
A↓	**5/3**	**-1.34**
E↓	**5/4**	**-1.41**
B↓	**15/8**	**-1.48**
F#↓	**45/32**	**-1.54**
C#↓	135/128	-1.61
G#↓	405/256	-1.68
D#↓	1215/1024	-1.75

		53Et +/- from Just
Fb↑	512/405	1.68
Cb↑	256/135	1.61
Gb↑	**64/45**	**1.54**
Db↑	**16/15**	**1.48**
Ab↑	**8/5**	**1.41**
Eb↑	**6/5**	**1.34**
Bb↑	**9/5**	**1.27**
F↑	27/20	1.20
C↑	81/80	1.14

5 Limit Quarter-tone Ratios

			53Et +/- from Just
Fb	F↓↓	25600/19683	-2.20
Cb	C↓↓	12800/6561	-2.27
Gb	G↓↓	3200/2187	-2.34
Db	D↓↓	800/729	-2.41
Ab	A↓↓	400/243	-2.48
Eb	E↓↓	100/81	-2.54
Bb	B↓↓	50/27	-2.61

			53Et +/- from Just
Ab	Ab↑↑	81/50	2.54
Eb	Eb↑↑	243/200	2.48
Bb	Bb↑↑	729/400	2.41
F†	F↑↑	2187/1600	2.34
C†	C↑↑	6561/6400	2.27
G†	G↑↑	19683/12800	2.20
D†	D↑↑	59049/51200	2.13

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Holdrian Comma = 2^(1/53) = 22.64 cents

53ET
2^(20/53)
2^(51/53)
2^(29/53)
2^(7/53)
2^(38/53)
2^(16/53)
2^(47/53)
2^(25/53)
2^(3/53)
2^(34/53)
2^(12/53)
2^(43/53)
2^(21/53)
2^(52/53)
2^(30/53)
2^(8/53)
2^(39/53)
2^(17/53)
2^(48/53)
2^(26/53)
2^(4/53)
2^(35/53)
2^(13/53)
2^(44/53)
2^(22/53)
2^(0/53)
2^(31/53)
2^(9/53)
2^(40/53)
2^(18/53)
2^(49/53)
2^(27/53)
2^(5/53)
2^(36/53)
2^(14/53)
2^(45/53)
2^(23/53)
2^(1/53)
2^(32/53)
2^(10/53)
2^(41/53)
2^(19/53)
2^(50/53)
2^(28/53)
2^(6/53)
2^(37/53)
2^(15/53)
2^(46/53)
2^(24/53)
2^(2/53)
2^(33/53)
2^(11/53)
2^(42/53)
2^(20/53)

11 Limit Quarter-tone Ratios

(poorer approximations)

					53Et +/- from Just
Fb	F↓↓	128/99	444.77		8.06
Cb	C↓↓	64/33	1146.73		7.99
Gb	G↓↓	16/11	648.68		7.92
Db	D↓↓	12/11	150.64		7.85
Ab	A↓↓	18/11	852.59		7.79
Eb	E↓↓	27/22	354.55		7.72
Bb	B↓↓	81/44	1056.50		7.65

					53Et +/- from Just
Ab	Ab↑↑	44/27	845.45		-7.72
Eb	Eb↑↑	11/9	347.41		-7.79
Bb	Bb↑↑	11/6	1049.36		-7.85
F†	F↑↑	11/8	551.32		-7.92
C†	C↑↑	33/32	53.27		-7.99
G†	G↑↑	99/64	755.23		-8.06
D†	D↑↑	297/256	257.18		-8.13

53ET half steps	Ratio	Cents	+/- from 12ET
2^(28.5/53)	1.451692	645.28	45.28
2^(6.5/53)	1.088726	147.17	47.17
2^(6.5/53)	1.088726	147.17	47.17
2^(37.5/53)	1.633025	849.06	49.06
2^(37.5/53)	1.633025	849.06	49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(46.5/53)	1.837009	1052.83	-47.17
2^(46.5/53)	1.837009	1052.83	-47.17
2^(24.5/53)	1.377702	554.72	-45.28
2^(24.5/53)	1.377702	554.72	-45.28
2^(2.5/53)	1.033236	56.60	-43.40

7 Limit Quarter-tone Ratios

					53Et half steps +/- from Just
Gb	G↓↓½	196/135	645.47		-0.19
Db	D↓↓½	49/45	147.43		-0.26
Db	Db↑↑½	160/147	146.71		0.46
Ab	A↓↓½	49/30	849.38		-0.33
Ab	Ab↑↑½	80/49	848.66		0.39
Eb	E↓↓½	49/40	351.34		-0.39
Eb	Eb↑↑½	60/49	350.62		0.33
Bb	B↓↓½	147/80	1053.29		-0.46
Bb	Bb↑↑½	90/49	1052.57		0.26
F†	F#↓↓½	441/320	555.25		-0.53
F†	F↑↑½	135/98	554.53		0.19
C†	C↑↑½	405/392	56.48		0.12

53ET half steps	Ratio	Cents	+/- from 12ET
2^(28.5/53)	1.451692	645.28	45.28
2^(6.5/53)	1.088726	147.17	47.17
2^(6.5/53)	1.088726	147.17	47.17
2^(37.5/53)	1.633025	849.06	49.06
2^(37.5/53)	1.633025	849.06	49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(46.5/53)	1.837009	1052.83	-47.17
2^(46.5/53)	1.837009	1052.83	-47.17
2^(24.5/53)	1.377702	554.72	-45.28
2^(24.5/53)	1.377702	554.72	-45.28
2^(2.5/53)	1.033236	56.60	-43.40

11 Limit Quarter-tone Ratios

(poorer approximations)

					53Et half steps +/- from Just
Gb	G↓↓½	16/11	648.68		-3.40
Db	D↓↓½	12/11	150.64		-3.47
Db	Db↑↑½	88/81	143.50		3.67
Ab	A↓↓½	18/11	852.59		-3.54
Ab	Ab↑↑½	44/27	845.45		3.60
Eb	E↓↓½	27/22	354.55		-3.60
Eb	Eb↑↑½	11/9	347.41		3.54
Bb	B↓↓½	81/44	1056.50		-3.67
Bb	Bb↑↑½	11/6	1049.36		3.47
F†	F#↓↓½	243/176	558.46		-3.74
F†	F↑↑½	11/8	551.32		3.40
C†	C↑↑½	33/32	53.27		3.33

Arabic Oud Open String Tuning

Arabic Oud Tuning (Sounds and Written)

Root	P4	+6th	+2nd	P5	Root
C	F	A	D	G	C
	G	B	E	A	D
		C	F		
				B	E
					F
					G

Two octave G to G with tonic on C

Dominant G = Yakah / Nawa / Ramal Tuti
Tonic C = Rast / Kirdan

Arabic Oud Open String Just Intonation Tuning

Bb Root	C	F	A↓	D↓	G↓	C
16/9	1/1	4/3	5/3	10/9	40/27	1/1
F Root	C	F	A↓	D↓	G	C
4/3	1/1	4/3	5/3	10/9	3/2	1/1
C Root	C	F	A↓	D	G	C
1/1	1/1	4/3	5/3	9/8	3/2	1/1
G Root	C	F	A	D	G	C
3/2	1/1	4/3	27/16	9/8	3/2	1/1
D Root	C	F↑	A	D	G	C
9/8	1/1	27/20	27/16	9/8	3/2	1/1
A Root	C↑	F↑	A	D	G	C↑
27/16	81/80	27/20	27/16	9/8	3/2	81/80

Arabic Oud Open String Tempered Tuning

1/4 Syntonic Comma tuning (≈31ET)

	C	F	5/4	A	D	G	C
	1/1		386.3137				1/1
31Et	2^0/31	2^13/31	+/- Just	2^23/31	2^5/31	2^18/31	2^0/31
Ratio	1.00	1.337329	0.78306	1.672418	1.118287	1.495518	1.00
Cents	0	503.2258	387.0968	890.3226	193.5484	696.7742	0
+/- from 12ET	0	3.225806		-9.67742	-6.45161	-3.22581	0

1/5 Syntonic Comma tuning (≈43ET)

	C	F	5/4	A	D	G	C
	1/1		386.3137				1/1
43Et	2^0/43	2^18/43	+/- Just	2^32/43	2^7/43	2^25/43	2^0/43
Ratio	1.00	1.336634	4.383961	1.675029	1.119450	1.496296	1.00
Cents	0	502.3256	390.6977	893.0233	195.3488	697.6744	0
+/- from 12ET	0	2.325581		-6.97674	-4.65116	-2.32558	0

Arabic Oud Tuning Roots

Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

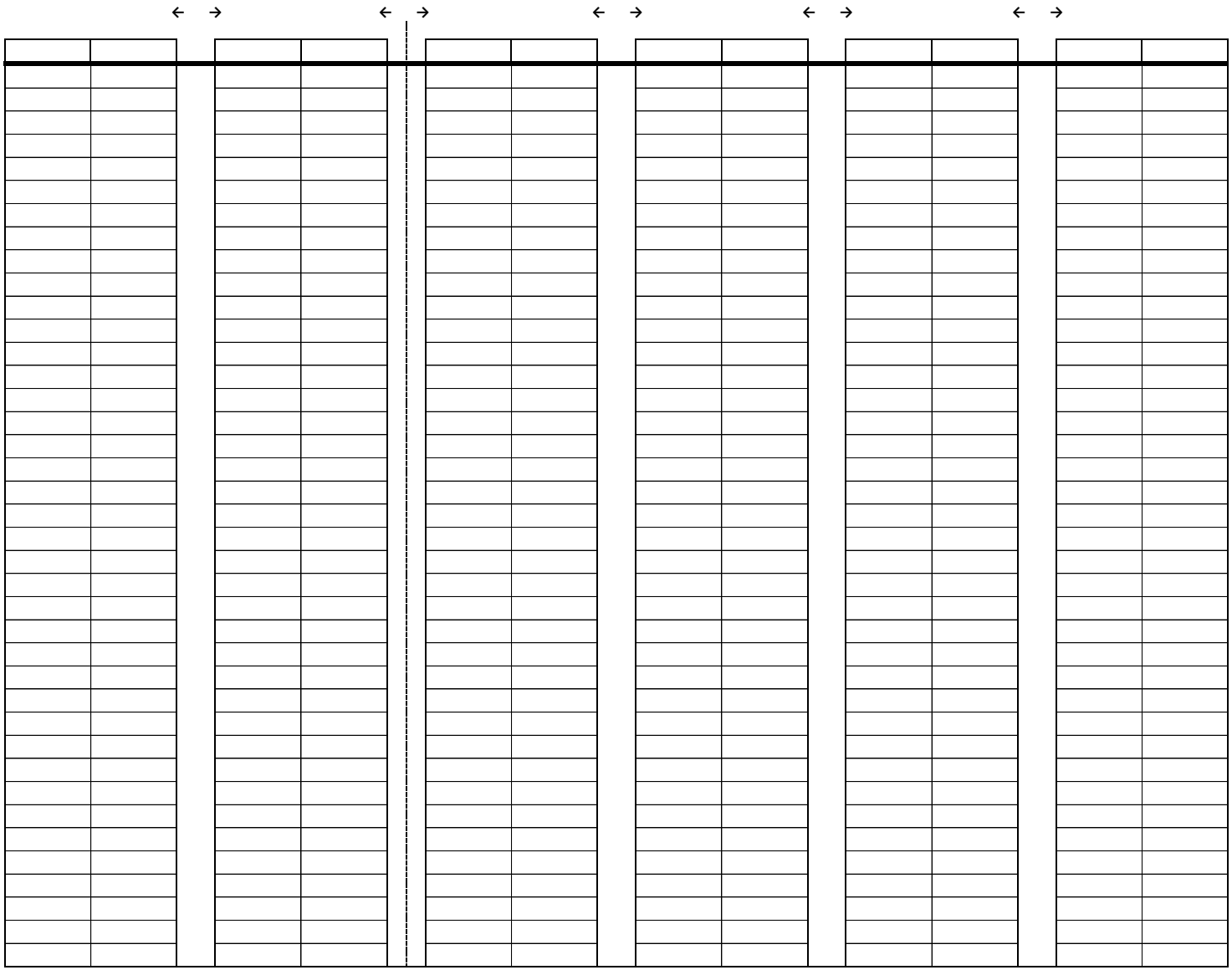
↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

A D G C F Bb Roots (Sounds and Written)

Diaschisma = (2048/2025) = 19.55 cents

←4/3→		←81/64→		←4/3→		←4/3→		←4/3→			
C	**1/1**	**F**	**4/3**	**A**	**27/16**	**D**	**9/8**	**G**	**3/2**	**C**	**1/1**
Comma **C↑**	81/80	**F↑**	27/20							**C↑**	81/80 Comma
				-----	-----	***D†***		***G†***			
C†		***F†***								***C†***	
						1215/1024	32/27	405/256	128/81		
C#↓	135/128	**F#↓**	45/32	16/9	**Bb**	**D#↓**	**= Eb**	**G#↓**	**= Ab**	**C#↓**	135/128
16/15	**Db↑**	64/45	**Gb↑**	9/5	**Bb↑**	6/5	**Eb↑**	8/5	**Ab↑**	16/15	**Db↑**
	Dƀ		***Gƀ***		***Bƀ***		***Eƀ***		***Aƀ***		***Dƀ***
10/9	**D↓**	40/27	**G↓**	15/8	**B↓**	5/4	**E↓**	5/3	**A↓**	10/9	**D↓**
9/8	**D**	3/2	**G**	**Cb↑**	**= B**	**Fb↑**	**= E**	27/16	**A**	9/8	**D**
				256/135	243/128	512/405	81/64				
	D†		***G†***	***Cƀ***		***Fƀ***		-----	-----		***D†***
32/27	1215/1024	128/81	405/256							32/27	1215/1024
Eb	**= D#↓**	**Ab**	**= G#↓**	**C**	1/1	**F**	4/3	**Bb**	16/9	**Eb**	**= D#↓**
Eb↑	6/5	**Ab↑**	8/5	**C↑**	81/80	**F↑**	27/20	**Bb↑**	9/5	**Eb↑**	6/5
Eƀ		***Aƀ***		***C†***		***F†***		***Bƀ***		***Eƀ***	
E↓	5/4	**A↓**	5/3	**C#↓**	135/128	**F#↓**	45/32	**B↓**	15/8	**E↓**	5/4
E	**= Fb↑**	**A**	27/16	16/15	**Db↑**	64/45	**Gb↑**	**B**	**= Cb↑**	**E**	**= Fb↑**
81/64	512/405							243/128	256/135	81/64	512/405
					Dƀ		***Gƀ***				
	Fƀ	-----	-----						***Cƀ***		***Fƀ***
				10/9	**D↓**	40/27	**G↓**				
4/3	**F**	16/9	**Bb**	9/8	**D**	3/2	**G**	1/1	**C**	4/3	**F**
27/20	**F↑**	9/5	**Bb↑**					81/80	**C↑**	27/20	**F↑**
					D†		***G†***				
	F†		***Bƀ***						***C†***		***F†***
				32/27	1215/1024	128/81	405/256				
45/32	**F#↓**	15/8	**B↓**	**Eb**	**= D#↓**	**Ab**	**= G#↓**	135/128	**C#↓**	45/32	**F#↓**
Gb↑	64/45	**Cb↑**	**= B**	**Eb↑**	6/5	**Ab↑**	8/5	**Db↑**	16/15	**Gb↑**	64/45
		256/135	243/128								
Gƀ				***Eƀ***		***Aƀ***		***Dƀ***		***Gƀ***	
		Cƀ									
G↓	40/27			**E↓**	5/4	**A↓**	5/3	**D↓**	10/9	**G↓**	40/27
G	3/2	**C**	1/1	**E**	**= Fb↑**	**A**	27/16	**D**	9/8	**G**	3/2
				81/64	512/405						

Worksheet



Arabic Oud Tuning

Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

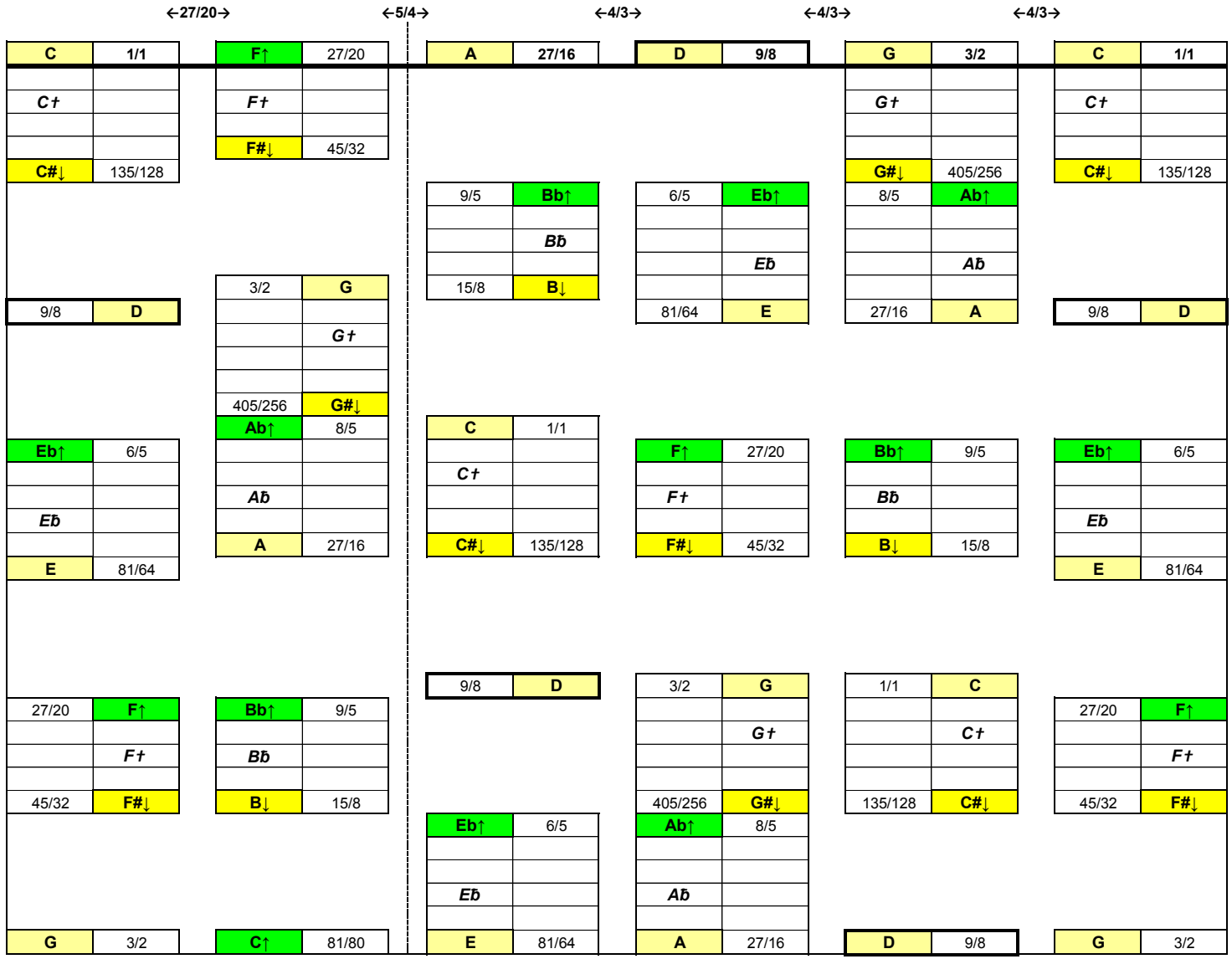
↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Diaschisma = (2048/2025) = 19.55 cents

A Root (Sounds and Written)

←4/3→		←5/4→		←4/3→		←4/3→		←27/20→	
C↑	81/80	F↑	27/20	**A**	**27/16**	D	9/8	G	3/2	C↑	81/80
C♮		F♮				D♮		G♮		C♮	
C#↓	135/128	F#↓	45/32			D#↓	1215/1024	G#↓	405/256	C#↓	135/128
				9/5	Bb↑	6/5	Eb↑				
					B♭		E♭				
9/8	D	3/2	G	243/128	B	81/64	E	27/16	A	9/8	D
	D♮		G♮								D♮
1215/1024	D#↓	405/256	G#↓							1215/1024	D#↓
Eb↑	6/5			C↑	81/80	F↑	27/20	Bb↑	9/5	Eb↑	6/5
E♭				C♮		F♮		B♭		E♭	
E	81/64	A	27/16	C#↓	135/128	F#↓	45/32	B	243/128	E	81/64
27/20	F↑	9/5	Bb↑	9/8	D	3/2	G	81/80	C↑	27/20	F↑
	F♮		B♭		D♮		G♮		C♮		F♮
45/32	F#↓	243/128	B	1215/1024	D#↓	405/256	G#↓	135/128	C#↓	45/32	F#↓
				Eb↑	6/5						
				E♭							
G	3/2	C↑	81/80	E	81/64	A	27/16	D	9/8	G	3/2

D Root **(Sounds and Written)**



Arabic Oud Tuning

Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

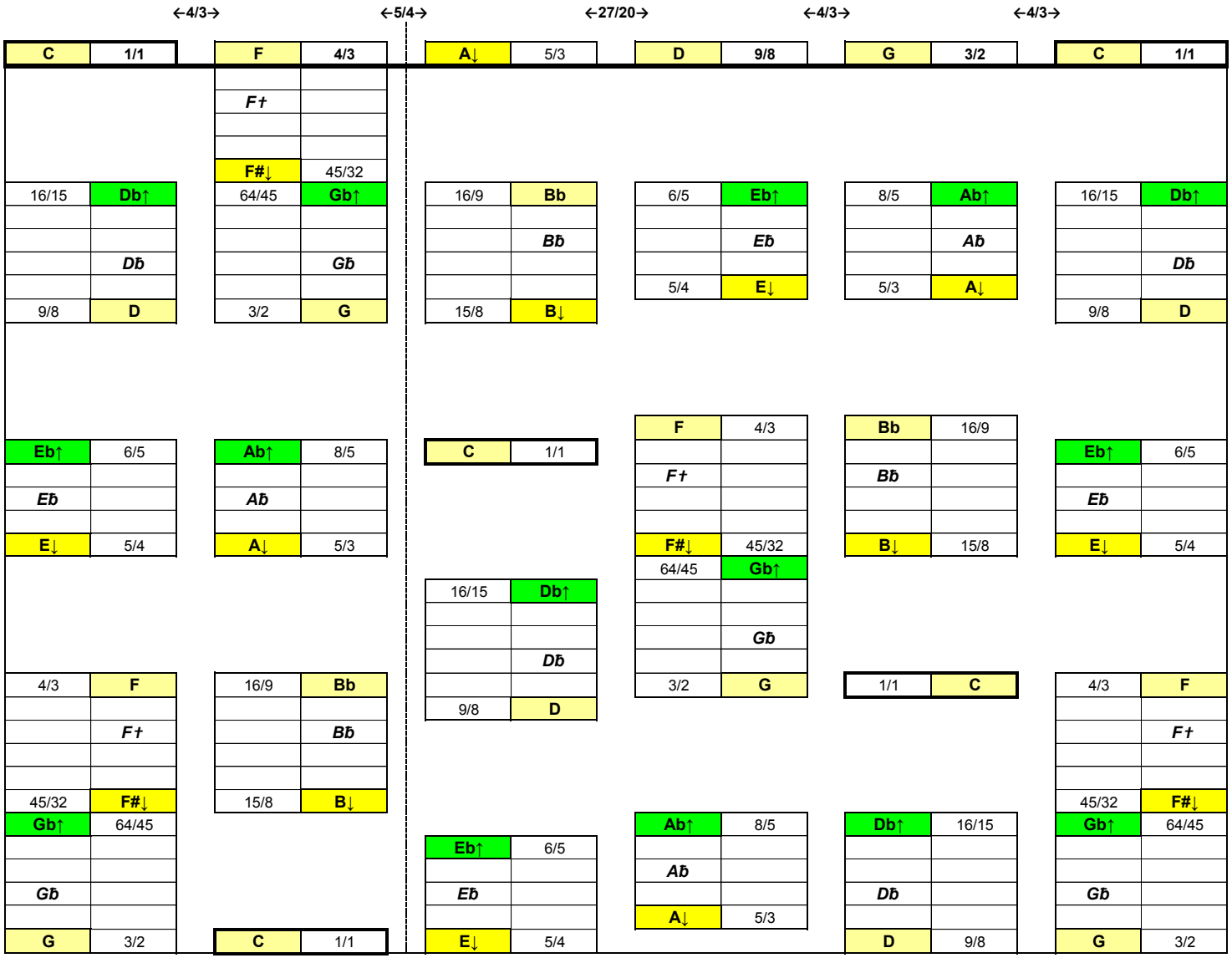
Diaschisma = (2048/2025) = 19.55 cents

G Root (Sounds and Written)

←4/3→		←81/64→		←4/3→		←4/3→		←4/3→	
C	**1/1**	**F**	**4/3**	**A**	**27/16**	**D**	**9/8**	**G**	**3/2**
C†		***F†***							
C#↓	135/128	**F#↓**	45/32						
16/15	**Db↑**			9/5	**Bb↑**	6/5	**Eb↑**	8/5	**Ab↑**
					Bđ		***Eđ***		***Ađ***
	Dđ			15/8	**B↓**	5/4	**E↓**	27/16	**A**
9/8	**D**	3/2	**G**						
Eb↑	6/5	**Ab↑**	8/5	**C**	1/1	**F**	4/3	**Bb↑**	9/5
				C†		***F†***		***Bđ***	
Eđ		***Ađ***							
E↓	5/4	**A**	27/16	**C#↓**	135/128	**F#↓**	45/32	**B↓**	15/8
				16/15	**Db↑**				
					Dđ				
4/3	**F**	9/5	**Bb↑**	9/8	**D**	3/2	**G**	1/1	**C**
	F†		***Bđ***						***C†***
45/32	**F#↓**	15/8	**B↓**					135/128	**C#↓**
				Eb↑	6/5	**Ab↑**	8/5	**Db↑**	16/15
				Eđ		***Ađ***		***Dđ***	
G	3/2	**C**	1/1	**E↓**	5/4	**A**	27/16	**D**	9/8

C	1/1	
C†		
C#↓	135/128	
16/15	**Db↑**	
	Dđ	
9/8	**D**	
Eb↑	6/5	
Eđ		
E↓	5/4	
4/3	**F**	
F†		
45/32	**F#↓**	
G	3/2	

C Root **(Sounds and Written)**



Arabic Oud Tuning

Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

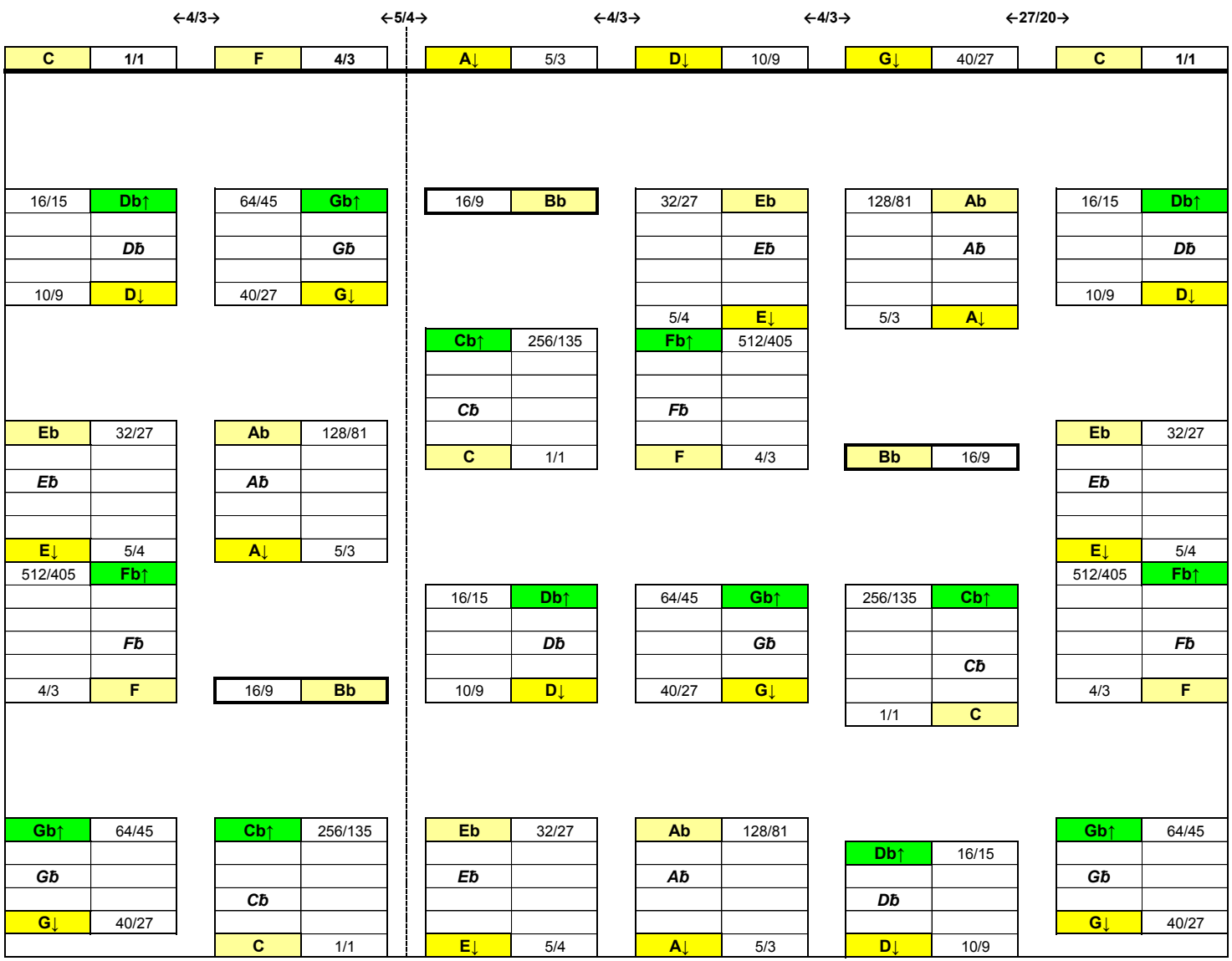
↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Diaschisma = (2048/2025) = 19.55 cents

F Root (Sounds and Written)

←4/3→		←5/4→		←4/3→		←27/20→		←4/3→	
C	**1/1**	**F**	**4/3**	**A↓**	5/3	**D↓**	10/9	**G**	**3/2**	**C**	**1/1**
16/15	**Db↑**	64/45	**Gb↑**	16/9	**Bb**	32/27	**Eb**	8/5	**Ab↑**	16/15	**Db↑**
	Dƀ		***Gƀ***		***Bƀ***		***Eƀ***		***Aƀ***		***Dƀ***
10/9	**D↓**	3/2	**G**	15/8	**B↓**	5/4	**E↓**	5/3	**A↓**	10/9	**D↓**
				Cb↑	256/135						
				Cƀ							
Eb	32/27	**Ab↑**	8/5	**C**	1/1	**F**	4/3	**Bb**	16/9	**Eb**	32/27
Eƀ		***Aƀ***						***Bƀ***		***Eƀ***	
E↓	5/4	**A↓**	5/3					**B↓**	15/8	**E↓**	5/4
								256/135	**Cb↑**		
									Cƀ		
				16/15	**Db↑**	64/45	**Gb↑**				
				Dƀ							
4/3	**F**	16/9	**Bb**	10/9	**D↓**		***Gƀ***	1/1	**C**	4/3	**F**
			Bƀ			3/2	**G**				
		15/8	**B↓**								
Gb↑	64/45	**Cb↑**	256/135	**Eb**	32/27			**Db↑**	16/15	**Gb↑**	64/45
						Ab↑	8/5				
				Eƀ				***Dƀ***			
Gƀ		***Cƀ***				***Aƀ***				***Gƀ***	
								D↓	10/9		
G	3/2	**C**	1/1	**E↓**	5/4	**A↓**	5/3			**G**	3/2

Bb Root **(Sounds and Written)**



Turkish Note Names and Tuning - "Enharmonic Pythagorean 53Et System"

Arel - Ezgi - Uzdelik on C **(Yekta starts on D Yegah = 1/1 with 14 descending and 9** (10) **ascending Perfect Fifths)**

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Enharmonic Pythagorean 53Et System on C

53ET	Ratio	Cents	+/- from 12ET	Written
2^(53/53)	2	1200	1200	C
2^(52/53)	1.974014	1177.36	1177.36	C↓
2^(49/53)	1.898064	1109.43	9.43	B
2^(48/53)	1.873402	1086.79	-13.21	B↓
2^(45/53)	1.801323	1018.87	18.87	Bb↑
2^(44/53)	1.777918	996.23	-3.77	Bb
2^(40/53)	1.687301	905.66	5.66	A
2^(39/53)	1.665377	883.02	-16.98	A↓
2^(36/53)	1.601302	815.09	15.09	Ab↑
2^(35/53)	1.580496	792.45	-7.55	Ab
2^(31/53)	1.499941	701.89	1.89	G
2^(30/53)	1.480452	679.25	-20.75	G↓
2^(27/53)	1.423492	611.32	11.32	Gb↑
2^(26/53)	1.404996	588.68	-11.32	F#↓
2^(23/53)	1.350939	520.75	20.75	F↑
2^(22/53)	1.333386	498.11	-1.89	F
2^(18/53)	1.265426	407.55	7.55	E
2^(17/53)	1.248984	384.91	-15.09	E↓
2^(14/53)	1.200929	316.98	16.98	Eb↑
2^(13/53)	1.185325	294.34	-5.66	Eb
2^(9/53)	1.124911	203.77	3.77	D
2^(8/53)	1.110295	181.13	-18.87	D↓
2^(5/53)	1.067577	113.21	13.21	Db↑
2^(4/53)	1.053705	90.57	-9.43	Db
2^(1/53)	1.013164	22.64	-77.36	(C↑)
2^(0/53)	1	0	0	C

Ratio	+/- from 53ET
1200	0
1178.49	-1.14
1109.78	-0.34
1088.27	-1.48
1017.60	1.27
996.09	0.14
905.87	-0.20
884.36	-1.34
813.69	1.41
792.18	0.27
701.96	-0.07
680.45	-1.20
609.78	1.54
590.22	-1.54
519.55	1.20
498.04	0.07
407.82	-0.27
386.31	-1.41
315.64	1.34
294.13	0.20
203.91	-0.14
182.40	-1.27
111.73	1.48
90.22	0.34
21.51	1.14
0	0

5 Limit Enharmonic Ratios

+1.95 cents from 3 Limit

C↓	160/81
B↓	15/8
A↓	5/3
G↓	40/27
F#↓	45/32
E↓	5/4
D↓	10/9

3 Limit Pythagorean Ratios

	Descending Fifths x 12	Ascending Fifths x11(12)
C	2/1	
Dbb	1048576/531441	
B		243/128
Cb	4096/2187	
A#		59049/32768
Bb	16/9	
A		27/16
Bbb	32768/19683	
G#		6561/4096
Ab	128/81	
G		3/2
Abb	262144/177147	
F#		729/512
Gb	1024/729	
E#		177147/131072
F	4/3	
E		81/64
Fb	8192/6561	
D#		19683/16384
Eb	32/27	
D		9/8
Ebb	65536/59049	
C#		2187/2048
Db	256/243	
(B#)		(531441/524288)
C		1/1

5 Limit Enharmonic Ratios

-1.95 cents from 3 Limit

Bb↑	9/5
Ab↑	8/5
Gb↑	64/45
F↑	27/20
Eb↑	6/5
Db↑	16/15
(C↑)	(81/80)

Dbb Abb Ebb Bbb Fb Cb Gb Db Ab Eb Bb F C G D A E B F# C# G# D# A# E# (B#)

← 12 descending perfect 5ths and 11(12) **ascending perfect 5ths →**

Pythagorean (Ditonic) Comma = 531441 / 524288 = 23.46 cents

Holdrian Comma = 2^(1/53) = 22.64 cents

Written	Commas	Enharm. 53Et	Written	Sounds (P4 Lower)	Turkish Note Names — Lower Octave	Turkish Note Names — Upper Octave
C	----------	53	C	G	ÇÂRGÂH	TÎZ ÇÂRGÂH
C↓	4	52	C ↓	G ↓	dik BÛSELIK	TÎZ dik BÛSELIK
B	----------	*49*	B	F#	BÛSELIK	TÎZ BÛSELIK
B↓		*48*	*B ↓*	*F# ↓*	Segâh	Tîz Segâh
Bb↑	9	45	Bb ↑	F ↑	dik Kürdi	dik Sünbüle
Bb		*44*	Bb	F	Kürdi	Sünbüle
A	----------	*40*	A	E	DÜGÂH	MUHAYYER
A↓		39	A ↓	E ↓	dik Zirgüle	dik Şehnâz
Ab↑	9	36	Ab↑	Eb↑	Zirgüle	Şehnâz
Ab		35	Ab	Eb	nim Zirgüle	nim Şehnâz
G	----------	31	G	D	RAST	GERDÂNIYE
G↓		30	G ↓	D ↓	dik Gevest	dik Mâhûr
Gb↑	9	27	Gb↑	Db↑	Gevest	Mâhûr
F#↓		26	F#↓	C#↓	Irak	Eviç
F↑		23	F ↑	C ↑	Dik Acem Aşîrân	dik ACEM
F	----------	22	F	C	ACEM AŞÎRÂN	ACEM
	4					
E	----------	18	E	B	HÜSEYNÎ AŞÎRÂN	HÜSEYNÎ
E↓		17	E ↓	B ↓	Kaba dik Hisâr	dik Hisâr
Eb↑	9	14	Eb↑	Bb↑	Kaba Hisâr	Hisâr
Eb		13	Eb	Bb	Kaba nim Hisâr	nim Hisâr
D	----------	9	D	A	YEGÂH	NEVÂ
D↓		8	D ↓	A ↓	Kaba dik Hicâz	dik Hicâz
Db↑	9	5	Db↑	Ab↑	Kaba Hicâz	Hicâz
Db		4	Db	Ab	Kaba nim Hicâz	nim Hicâz
(C↑)		(1)	(C ↑)	(G ↑)		
C	----------	0	C	G	KABA ÇÂRGÂH	ÇÂRGÂH

"nim" = lower "dik" = higher

Turkish Note Names and Tuning - "Enharmonic Pythagorean 53Et System"

Syntonic Comma = (81/80) = 21.51 cents Holdrian Comma = 2^(1/53) = 22.64 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Enharmonic Pythagorean 53Et System				3 and 5 Limit Ratios	D G C F Root				Enharm. 53Et	Turkish Note Names	
53ET	Ratio	Cents	+/- from 12ET		Written	Written	Written	Written		Lower Octave	Upper Octave
2^(53/53)	2	1200	1200	2/1	D	G	C	F	53	ÇÂRGÂH	TÎZ ÇÂRGÂH
2^(52/53)	1.974014	1177.36	1177.36	160/81	D↓	G↓	C↓	F↓	*52*	dik BÛSELIK	TÎZ dik BÛSELIK
2^(49/53)	1.898064	1109.43	9.43	243/128	C#	F#	B	E	***49***	**BÛSELIK**	**TÎZ BÛSELIK**
2^(48/53)	1.873402	1086.79	-13.21	15/8	C#↓	F#↓	B↓	E↓	***48***	**Segâh**	**Tîz Segâh**
2^(45/53)	1.801323	1018.87	18.87	9/5	C↑	F↑	Bb↑	Eb↑	*45*	dik Kürdi	dik Sünbüle
2^(44/53)	1.777918	996.23	-3.77	16/9	C	F	Bb	Eb	***44***	**Kürdi**	**Sünbüle**
2^(40/53)	1.687301	905.66	5.66	27/16	B	E	A	D	***40***	**DÜGÂH**	**MUHAYYER**
2^(39/53)	1.665377	883.02	-16.98	5/3	B↓	E↓	A↓	D↓	*39*	dik Zirgüle	dik Şehnâz
2^(36/53)	1.601302	815.09	15.09	8/5	Bb↑	Eb↑	Ab↑	Db↑	**36**	**Zirgüle**	**Şehnâz**
2^(35/53)	1.580496	792.45	-7.55	128/81	Bb	Eb	Ab	Db	*35*	nim Zirgüle	nim Şehnâz
2^(31/53)	1.499941	701.89	1.89	3/2	A	D	G	C	**31**	**RAST**	**GERDÂNIYE**
2^(30/53)	1.480452	679.25	-20.75	40/27	A↓	D↓	G↓	C↓	*30*	dik Gevest	dik Mâhûr
2^(27/53)	1.423492	611.32	11.32	64/45	Ab↑	Db↑	Gb↑	Cb↑	**27**	**Gevest**	**Mâhûr**
2^(26/53)	1.404996	588.68	-11.32	45/32	G#↓	C#↓	F#↓	B↓	**26**	**Irak**	**Eviç**
2^(23/53)	1.350939	520.75	20.75	27/20	G↑	C↑	F↑	Bb↑	*23*	Dik Acem Aşîrân	dik ACEM
2^(22/53)	1.333386	498.11	-1.89	4/3	G	C	F	Bb	**22**	**ACEM AŞÎRÂN**	**ACEM**
2^(18/53)	1.265426	407.55	7.55	81/64	F#	B	E	A	**18**	**HÜSEYNÎ AŞÎRÂN**	**HÜSEYNÎ**
2^(17/53)	1.248984	384.91	-15.09	5/4	F#↓	B↓	E↓	A↓	*17*	Kaba dik Hisâr	dik Hisâr
2^(14/53)	1.200929	316.98	16.98	6/5	F↑	Bb↑	Eb↑	Ab↑	**14**	**Kaba Hisâr**	**Hisâr**
2^(13/53)	1.185325	294.34	-5.66	32/27	F	Bb	Eb	Ab	*13*	Kaba nim Hisâr	nim Hisâr
2^(9/53)	1.124911	203.77	3.77	9/8	E	A	D	G	**9**	**YEGÂH**	**NEVÂ**
2^(8/53)	1.110295	181.13	-18.87	10/9	E↓	A↓	D↓	G↓	*8*	Kaba dik Hicâz	dik Hicâz
2^(5/53)	1.067577	113.21	13.21	16/15	Eb↑	Ab↑	Db↑	Gb↑	**5**	**Kaba Hicâz**	**Hicâz**
2^(4/53)	1.053705	90.57	-9.43	256/243	Eb	Ab	Db	Gb	*4*	Kaba nim Hicâz	nim Hicâz
2^(1/53)	1.013164	22.64	-77.36	(81/80)	(D↑)	(G↑)	(C↑)	(F↑)	*(1)*		
2^(0/53)	1	0	0	1/1	D	G	C	F	**0**	**KABA ÇÂRGÂH**	**ÇÂRGÂH**

"nim" = lower "dik" = higher

"Practical 53Et System" compared to Turkish "Enharmonic Pythagorean 53Et System"

Practical 53Et System on C

(Chromatic Pitches and Primary Quarter-tones)

53ET	Ratio	Cents	+/- from 12ET	Written & Sounds	Commas	Practical 53Et	Written & Sounds
2^(53/53)	2	1200	1200	C	--------	53	C
					5		
2^(48/53)	1.873402	1086.79	-13.21	B	--------	48	B↓
2^(46/53)	1.825036	1041.51	41.51	*Bb*		*46*	*Bb↑↑*
2^(44/53)	1.777918	996.23	-3.77	Bb	9	44	Bb
2^(39/53)	1.665377	883.02	-16.98	A	--------	39	A↓
2^(37.5/53)	*1.633025*	*849.06*	*49.06*	*Ab*		*37.5*	*A↓↓½*
2^(36/53)	1.601302	815.09	15.09	Ab	8	36	Ab↑
2^(31/53)	1.499941	701.89	1.89	G	--------	31	G
2^(29/53)	1.461216	656.60	-43.40	*Gb*		*29*	*G↓↓*
2^(27/53)	1.423492	611.32	11.32	Gb	9	27	Gb↑
2^(26/53)	1.404996	588.68	-11.32	F#		26	F#↓
2^(24/53)	1.368723	543.40	43.40	*F†*		*24*	*F↑↑*
2^(22/53)	1.333386	498.11	-1.89	F	--------	22	F
					5		
2^(17/53)	1.248984	384.91	-15.09	E	--------	17	E↓
2^(15.5/53)	*1.224721*	*350.94*	*-49.06*	*Eb*		*15.5*	*Eb↑↑½*
2^(14/53)	1.200929	316.98	16.98	Eb	8	14	Eb↑
2^(9/53)	1.124911	203.77	3.77	D	--------	9	D
2^(7/53)	1.095869	158.49	-41.51	*Db*		*7*	*D↓↓*
2^(5/53)	1.067577	113.21	13.21	Db		5	Db↑
					9		
2^(0/53)	1	0	0	C	--------	0	C

Enharmonic Pythagorean 53Et System on C

Written	Commas	Enharm. 53Et	Written	Sounds (P4 Lower)	Turkish Note Names Lower Octave	Turkish Note Names Upper Octave
C	--------	53	C	G	ÇÂRGÂH	TÎZ ÇÂRGÂH
C↓		*52*	*C↓*	*G↓*	dik BÛSELIK	TÎZ dik BÛSELIK
	4					
B	--------	*49*	B	F#	BÛSELIK	TÎZ BÛSELIK
B↓		*48*	*B↓*	*F#↓*	Segâh	Tîz Segâh
Bb↑		*45*	*Bb↑*	*F↑*	dik Kürdi	dik Sünbüle
Bb	9	*44*	Bb	F	Kürdi	Sünbüle
A	--------	*40*	A	E	DÜGÂH	MUHAYYER
A↓		*39*	*A↓*	*E↓*	dik Zirgüle	dik Şehnâz
Ab↑	9	36	Ab↑	Eb↑	Zirgüle	Şehnâz
Ab		*35*	*Ab*	*Eb*	nim Zirgüle	nim Şehnâz
G	--------	31	G	D	RAST	GERDÂNIYE
G↓		*30*	*G↓*	*D↓*	dik Gevest	dik Mâhûr
Gb↑	9	27	Gb↑	Db↑	Gevest	Mâhûr
F#↓		26	F#↓	C#↓	Irak	Eviç
F↑		*23*	*F↑*	*C↑*	Dik Acem Aşîrân	dik ACEM
F	--------	22	F	C	ACEM AŞÎRÂN	ACEM
	4					
E	--------	18	E	B	HÜSEYNÎ AŞÎRÂN	HÜSEYNÎ
E↓		*17*	*E↓*	*B↓*	Kaba dik Hisâr	dik Hisâr
Eb↑	9	14	Eb↑	Bb↑	Kaba Hisâr	Hisâr
Eb		*13*	*Eb*	*Bb*	Kaba nim Hisâr	nim Hisâr
D	--------	9	D	A	YEGÂH	NEVÂ
D↓		*8*	*D↓*	*A↓*	Kaba dik Hicâz	dik Hicâz
Db↑		5	Db↑	Ab↑	Kaba Hicâz	Hicâz
Db	9	*4*	*Db*	*Ab*	Kaba nim Hicâz	nim Hicâz
(C↑)		*(1)*	*(C↑)*	*(G↑)*		
C	--------	0	C	G	KABA ÇÂRGÂH	ÇÂRGÂH

"nim" = lower "dik" = higher

Turkish Tanbur Tuning and Frets

D Tonic

53Et (+31 / -22)

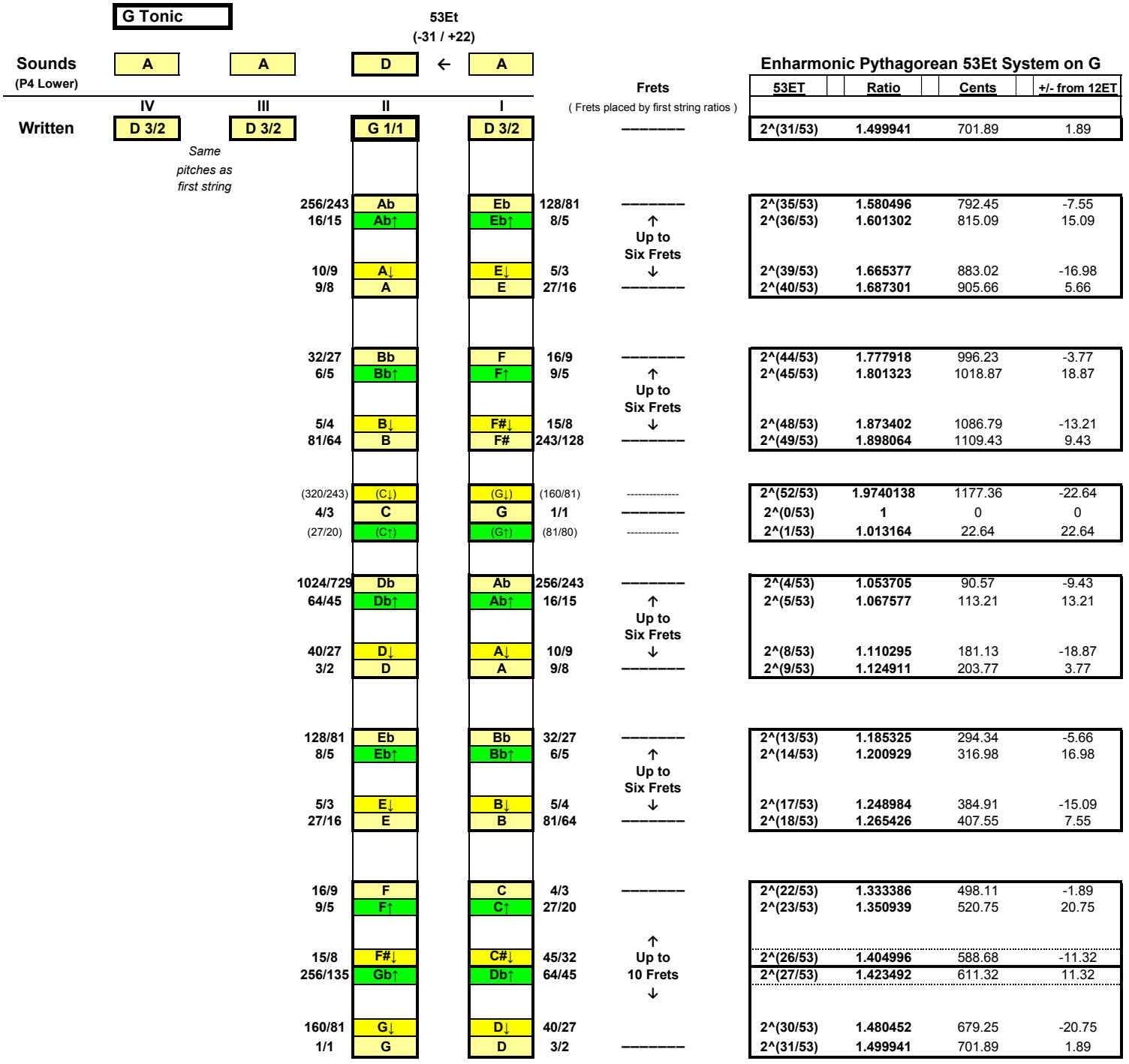
Sounds (P4 Lower)	**A**	**A**	**E**	←	**A**
	IV	**III**	**II**		**I**
Written	**D 1/1**	**D 1/1**	**A 3/2**		**D 1/1**
	Same pitches as first string		(243/160) (A↑)		(D↑) (81/80)
			128/81 Bb		Eb 256/243
			8/5 Bb↑		Eb↑ 16/15
			5/3 B↓		E↓ 10/9
			27/16 B		E 9/8
			16/9 C		F 32/27
			9/5 C↑		F↑ 6/5
			15/8 C#↓		F#↓ 5/4
			243/128 C#		F# 81/64
			1/1 D		G 4/3
			81/80 D↑		G↑ 27/20
			135/128 D#↓		G#↓ 45/32
			16/15 Eb↑		Ab↑ 64/45
			10/9 E↓		A↓ 40/27
			9/8 E		A 3/2
			32/27 F		Bb 128/81
			6/5 F↑		Bb↑ 8/5
			5/4 F#↓		B↓ 5/3
			81/64 F#		B 27/16
			4/3 G		C 16/9
			27/20 G↑		C↑ 9/5
			45/32 G#↓		C#↓ 15/8
			729/512 G#		C# 243/128
			(40/27) (A↓)		(D↓) (160/81)
			3/2 A		D 2/1

Frets (Frets placed by first string ratios)

- ——————
- ----------
- ↑ Up to Six Frets ↓
- ——————
- ——————
- ↑ Up to Six Frets ↓
- ——————
- ——————
- ↑ Up to 10 Frets ↓
- ——————
- ——————
- ↑ Up to Six Frets ↓
- ——————
- ——————
- ↑ Up to Six Frets ↓
- ——————
- ----------
- ——————

Enharmonic Pythagorean 53Et System on D

53ET	Ratio	Cents	+/- from 12ET
2^(0/53)	1	0	0
2^(1/53)	1.013164	22.64	22.64
2^(4/53)	1.053705	90.57	-9.43
2^(5/53)	1.067577	113.21	13.21
2^(8/53)	1.110295	181.13	-18.87
2^(9/53)	1.124911	203.77	3.77
2^(13/53)	1.185325	294.34	-5.66
2^(14/53)	1.200929	316.98	16.98
2^(17/53)	1.248984	384.91	-15.09
2^(18/53)	1.265426	407.55	7.55
2^(22/53)	1.333386	498.11	-1.89
2^(23/53)	1.350939	520.75	20.75
2^(26/53)	1.404996	588.68	-11.32
2^(27/53)	1.423492	611.32	11.32
2^(30/53)	1.480452	679.25	-20.75
2^(31/53)	1.499941	701.89	1.89
2^(35/53)	1.580496	792.45	-7.55
2^(36/53)	1.601302	815.09	15.09
2^(39/53)	1.665377	883.02	-16.98
2^(40/53)	1.687301	905.66	5.66
2^(44/53)	1.777918	996.23	-3.77
2^(45/53)	1.801323	1018.87	18.87
2^(48/53)	1.873402	1086.79	-13.21
2^(49/53)	1.898064	1109.43	9.43
2^(52/53)	1.9740138	1177.36	-22.64
2^(53/53)	2	1200	0



Enharmonic Pythagorean 53Et System on G

53ET	Ratio	Cents	+/- from 12ET
2^(31/53)	1.499941	701.89	1.89
2^(35/53)	1.580496	792.45	-7.55
2^(36/53)	1.601302	815.09	15.09
2^(39/53)	1.665377	883.02	-16.98
2^(40/53)	1.687301	905.66	5.66
2^(44/53)	1.777918	996.23	-3.77
2^(45/53)	1.801323	1018.87	18.87
2^(48/53)	1.873402	1086.79	-13.21
2^(49/53)	1.898064	1109.43	9.43
2^(52/53)	1.9740138	1177.36	-22.64
2^(0/53)	1	0	0
2^(1/53)	1.013164	22.64	22.64
2^(4/53)	1.053705	90.57	-9.43
2^(5/53)	1.067577	113.21	13.21
2^(8/53)	1.110295	181.13	-18.87
2^(9/53)	1.124911	203.77	3.77
2^(13/53)	1.185325	294.34	-5.66
2^(14/53)	1.200929	316.98	16.98
2^(17/53)	1.248984	384.91	-15.09
2^(18/53)	1.265426	407.55	7.55
2^(22/53)	1.333386	498.11	-1.89
2^(23/53)	1.350939	520.75	20.75
2^(26/53)	1.404996	588.68	-11.32
2^(27/53)	1.423492	611.32	11.32
2^(30/53)	1.480452	679.25	-20.75
2^(31/53)	1.499941	701.89	1.89

"Practical" Pitch Set for Turkish Music

E A D G C F Roots

53Et Tonic on Written C

Sounds Perfect fourth lower

"Practical 53Et System" and 5, 7 and 11 Limit Just Intonation

Chromatic Pitches and Primary Quarter-tones

Practical 53Et System on E A D G C F

53ET	Ratio	Cents	+/- from 12ET
2^(53/53)	2	1200	0
2^(51/53)	1.948365	1154.72	-45.28
2^(49/53)	1.898064	1109.43	9.43
2^(48/53)	1.873402	1086.79	-13.21
2^(47/53)	1.849061	1064.15	-35.85
2^(46.5/53)	*1.837009*	*1052.83*	*-47.17*
2^(46/53)	1.825036	1041.51	41.51
2^(45/53)	1.801323	1018.87	18.87
2^(44/53)	1.777918	996.23	-3.77
2^42/53)	1.732017	950.94	-49.06
2^(40/53)	1.687301	905.66	5.66
2^(39/53)	1.665377	883.02	-16.98
2^(38/53)	1.643739	860.38	-39.62
2^(37.5/53)	*1.633025*	*849.06*	*49.06*
2^(36/53)	1.601302	815.09	15.09
2^(35/53)	1.580496	792.45	-7.55
2^(33.5/53)	*1.549793*	*758.49*	*158.49*
2^(33/53)	1.539692	747.17	47.17
2^(32/53)	1.519686	724.53	24.53
2^(31/53)	1.499941	701.89	1.89
2^(29/53)	1.461216	656.60	-43.40
2^(27/53)	1.423492	611.32	11.32
2^(26/53)	1.404996	588.68	-11.32
2^(25/53)	1.386741	566.04	-33.96
2^(24.5/53)	*1.377702*	*554.72*	*-45.28*
2^(24/53)	1.368723	543.40	43.40
2^(23/53)	1.350939	520.75	20.75
2^(22/53)	1.333386	498.11	-1.89
2^(18/53)	1.265426	407.55	7.55
2^(17/53)	1.248984	384.91	-15.09
2^(16/53)	1.232756	362.26	-37.74
2^(15.5/53)	*1.224721*	*350.94*	*-49.06*
2^(15/53)	1.216738	339.62	39.62
2^(14/53)	1.200929	316.98	16.98
2^(13/53)	1.185325	294.34	-5.66
2^(11/53)	1.154723	249.06	49.06
2^(9/53)	1.124911	203.77	3.77
2^(8/53)	1.110295	181.13	-18.87
2^(7/53)	1.095869	158.49	-41.51
2^(6.5/53)	*1.088726*	*147.17*	*47.17*
2^(5/53)	1.067577	113.21	13.21
2^(4/53)	1.053705	90.57	-9.43
2^(2.5/53)	*1.033236*	*56.60*	*-43.40*
2^(2/53)	1.026502	45.28	45.28
2^(1/53)	1.013164	22.64	22.64
2^(0/53)	1	0	0

E Root			53Et +/- from Just
B	243/128	1109.78	-0.34
B↓↓	*50/27*	*1066.76*	-2.61
Bb↑	**9/5**	**1017.60**	1.27
A#↓	3645/2048	998.04	-1.82
A↑↑	177147/102400	948.88	2.07
A	27/16	905.87	-0.20
G#↓	405/256	794.13	-1.68
G↑↑½	*1215/784*	*758.44*	0.05
G↑	243/160	723.46	1.07
F#	729/512	611.73	-0.41
F#↓↓	**25/18**	**568.72**	-2.68
F↑	27/20	519.55	1.20
E	81/64	407.82	-0.27
D#↓	1215/1024	296.09	-1.75
D↑↑	*59049/51200*	*246.92*	2.13
D	**9/8**	**203.91**	-0.14
C#↓	135/128	92.18	-1.61
C#↓↓½	*1323/1280*	*57.20*	-0.60
C↑	81/80	21.51	1.14

A Root			53Et +/- from Just
B	243/128	1109.78	-0.34
B↓↓	*50/27*	*1066.76*	-2.61
Bb↑	**9/5**	**1017.60**	**1.27**
A	27/16	905.87	-0.20
G#↓	405/256	794.13	-1.68
G↑↑	*19683/12800*	*744.97*	*2.20*
G	**3/2**	**701.96**	**-0.07**
F#↓	**45/32**	**590.22**	**-1.54**
F#↓↓½	*441/320*	*555.25*	*-0.53*
F↑	27/20	519.55	1.20
E	81/64	407.82	-0.27
E↓↓	*100/81*	*364.81*	*-2.54*
Eb↑	**6/5**	**315.64**	**1.34**
D#↓	1215/1024	296.09	-1.75
D↑↑	*59049/51200*	*246.92*	*2.13*
D	**9/8**	**203.91**	**-0.14**
C#↓	135/128	92.18	-1.61
C↑↑½	*405/392*	*56.48*	*0.12*
C↑	81/80	21.51	1.14

D Root			53Et +/- from Just
C	**2/1**	**1200**	**0**
B↓	**15/8**	**1088.27**	**-1.48**
B↓↓½	*147/80*	*1053.29*	*-0.46*
Bb↑	**9/5**	**1017.60**	**1.27**
A	27/16	905.87	-0.20
A↓↓	*400/243*	*862.85*	*-2.48*
Ab↑	**8/5**	**813.69**	**1.41**
G#↓	405/256	794.13	-1.68
G↑↑	*19683/12800*	*744.97*	*2.20*
G	**3/2**	**701.96**	**-0.07**
F#↓	**45/32**	**590.22**	**-1.54**
F↑↑½	*135/98*	*554.53*	*0.19*
F↑	27/20	519.55	1.20
E	81/64	407.82	-0.27
E↓↓	*100/81*	*364.81*	*-2.54*
Eb↑	**6/5**	**315.64**	**1.34**
D	**9/8**	**203.91**	**-0.14**
C#↓	135/128	92.18	-1.61
C↑↑	*6561/6400*	*43.01*	*2.27*
C	**1/1**	**0**	**0**

(all 5 Limit ratios calculated by Perfect Fifthsand Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Holdrian Comma = 2^(1/53) = 22.64 cents

	G Root			53Et +/- from Just
	C	2/1	1200	0
	B↓	15/8	1088.27	-1.48
B♭	Bb↑↑½	90/49	1052.57	0.26
	Bb↑	9/5	1017.60	1.27
	A	27/16	905.87	-0.20
A♭	A↓↓	400/243	862.85	-2.48
	Ab↑	8/5	813.69	1.41
	G	3/2	701.96	-0.07
	F#↓	45/32	590.22	-1.54
F♮	F↑↑	2187/1600	541.06	2.34
	F	4/3	498.04	0.07
	E↓	5/4	386.31	-1.41
E♭	E↓↓½	49/40	351.34	-0.39
	Eb↑	6/5	315.64	1.34
	D	9/8	203.91	-0.14
D♭	D↓↓	800/729	160.90	-2.41
	Db↑	16/15	111.73	1.48
	C#↓	135/128	92.18	-1.61
C♮	C↑↑	6561/6400	43.01	2.27
	C	1/1	0	0

	C Root			53Et +/- from Just
	C	2/1	1200	0
	B↓	15/8	1088.27	-1.48
B♭	Bb↑↑	729/400	1039.10	2.41
	Bb	16/9	996.09	0.14
	A↓	5/3	884.36	-1.34
A♭	A↓↓½	49/30	849.38	-0.33
	Ab↑	8/5	813.69	1.41
	G	3/2	701.96	-0.07
G♭	G↓↓	3200/2187	658.94	-2.34
	Gb↑	64/45	609.78	1.54
	F#↓	45/32	590.22	-1.54
F♮	F↑↑	2187/1600	541.06	2.34
	F	4/3	498.04	0.07
	E↓	5/4	386.31	-1.41
E♭	Eb↑↑½	60/49	350.62	0.33
	Eb↑	6/5	315.64	1.34
	D	9/8	203.91	-0.14
D♭	D↓↓	800/729	160.90	-2.41
	Db↑	16/15	111.73	1.48
	C	1/1	0	0

	F Root			53Et +/- from Just
	C	2/1	1200	0
C♭	C↓↓	12800/6561	1156.99	-2.27
	Cb↑	256/135	1107.82	1.61
	B↓	15/8	1088.27	-1.48
B♭	Bb↑↑	729/400	1039.10	2.41
	Bb	16/9	996.09	0.14
	A↓	5/3	884.36	-1.34
A♭	Ab↑↑½	80/49	848.66	0.39
	Ab↑	8/5	813.69	1.41
	G	3/2	701.96	-0.07
G♭	G↓↓	3200/2187	658.94	-2.34
	Gb↑	64/45	609.78	1.54
	E↓	5/4	386.31	-1.41
E♭	Eb↑↑	243/200	337.15	2.48
	Eb	32/27	294.13	0.20
	D↓	10/9	182.40	-1.27
D♭	D↓↓½	49/45	147.43	-0.26
	Db↑	16/15	111.73	1.48
	C	1/1	0	0

Practical 53Et System on E A D G C F

53ET	Ratio	Cents	+/- from 12ET
2^(53/53)	2	1200	0
2^(51/53)	1.948365	1154.72	-45.28
2^(49/53)	1.898064	1109.43	9.43
2^(48/53)	1.873402	1086.79	-13.21
2^(47/53)	1.849061	1064.15	-35.85
2^(46.5/53)	*1.837009*	*1052.83*	*-47.17*
2^(46/53)	1.825036	1041.51	41.51
2^(45/53)	1.801323	1018.87	18.87
2^(44/53)	1.777918	996.23	-3.77
2^42/53)	1.732017	950.94	-49.06
2^(40/53)	1.687301	905.66	5.66
2^(39/53)	1.665377	883.02	-16.98
2^(38/53)	1.643739	860.38	-39.62
2^(37.5/53)	*1.633025*	*849.06*	*49.06*
2^(36/53)	1.601302	815.09	15.09
2^(35/53)	1.580496	792.45	-7.55
2^(33.5/53)	*1.549793*	*758.49*	*158.49*
2^(33/53)	1.539692	747.17	47.17
2^(32/53)	1.519686	724.53	24.53
2^(31/53)	1.499941	701.89	1.89
2^(29/53)	1.461216	656.60	-43.40
2^(27/53)	1.423492	611.32	11.32
2^(26/53)	1.404996	588.68	-11.32
2^(25/53)	1.386741	566.04	-33.96
2^(24.5/53)	*1.377702*	*554.72*	*-45.28*
2^(24/53)	1.368723	543.40	43.40
2^(23/53)	1.350939	520.75	20.75
2^(22/53)	1.333386	498.11	-1.89
2^(18/53)	1.265426	407.55	7.55
2^(17/53)	1.248984	384.91	-15.09
2^(16/53)	1.232756	362.26	-37.74
2^(15.5/53)	*1.224721*	*350.94*	*-49.06*
2^(15/53)	1.216738	339.62	39.62
2^(14/53)	1.200929	316.98	16.98
2^(13/53)	1.185325	294.34	-5.66
2^(11/53)	1.154723	249.06	49.06
2^(9/53)	1.124911	203.77	3.77
2^(8/53)	1.110295	181.13	-18.87
2^(7/53)	1.095869	158.49	-41.51
2^(6.5/53)	*1.088726*	*147.17*	*47.17*
2^(5/53)	1.067577	113.21	13.21
2^(4/53)	1.053705	90.57	-9.43
2^(2.5/53)	*1.033236*	*56.60*	*-43.40*
2^(2/53)	1.026502	45.28	45.28
2^(1/53)	1.013164	22.64	22.64
2^(0/53)	1	0	0

5 Limit Chromatic Ratios			53Et +/- from Just
C	2/1	1200	0
B	243/128	1109.78	-0.34
Bb	16/9	996.09	0.14
A	27/16	905.87	-0.20
A↓	5/3	884.36	-1.34
G↑	243/160	723.46	1.07
G	3/2	701.96	-0.07
F#	729/512	611.73	-0.41
F↑	27/20	519.55	1.20
F	4/3	498.04	0.07
E	81/64	407.82	-0.27
E↓	5/4	386.31	-1.41
Eb	32/27	294.13	0.20
D	9/8	203.91	-0.14
D↓	10/9	182.40	-1.27
C↑	81/80	21.51	1.14
C	1/1	0	0

5 Limit Chromatic Ratios (Aug. 4th / Dim. 5th)			53Et +/- from Just
F Root			
Cb↑	256/135	1107.82	1.61
B↓	15/8	1088.27	-1.48
E Root			
Bb↑	9/5	1017.60	1.27
A#↓	3645/2048	998.04	-1.82
D Root			
Ab↑	8/5	813.69	1.41
G#↓	405/256	794.13	-1.68
C Root			
Gb↑	64/45	609.78	1.54
F#↓	45/32	590.22	-1.54
A Root			
Eb↑	6/5	315.64	1.34
D#↓	1215/1024	296.09	-1.75
G Root			
Db↑	16/15	111.73	1.48
C#↓	135/128	92.18	-1.61

5 Limit Quarter-tone Ratios Neutral Fifth and Second				53Et +/- from Just
Cb	C↓↓	12800/6561	1156.99	-2.27
Bb	B↓↓	50/27	1066.76	-2.61
Ab	A↓↓	400/243	862.85	-2.48
Gb	G↓↓	3200/2187	658.94	-2.34
F†	F#↓↓	25/18	568.72	-2.68
Eb	E↓↓	100/81	364.81	-2.54
Db	D↓↓	800/729	160.90	-2.41

5 Limit Quarter-tone Ratios Neutral Fourth and Seventh				53Et +/- from Just
Bb	Bb↑↑	729/400	1039.10	2.41
A†	A↑↑	177147/102400	948.88	2.07
G†	G↑↑	19683/12800	744.97	2.20
F†	F↑↑	2187/1600	541.06	2.34
Eb	Eb↑↑	243/200	337.15	2.48
D†	D↑↑	59049/51200	246.92	2.13
C†	C↑↑	6561/6400	43.01	2.27

7 Limit Quarter-tone Ratios Neutral Sixth				53Et half steps +/- from Just	7 Limit Quarter-tone Ratios Neutral Third				53Et half steps +/- from Just
B𝄫	B𝄫↓↓½	147/80	1053.29	-0.46	B𝄫	B𝄫↑↑½	90/49	1052.57	0.26
A𝄫	A𝄫↓↓½	49/30	849.38	-0.33	A𝄫	A𝄫↑↑½	80/49	848.66	0.39
					G𝄲	G𝄲↑↑½	1215/784	758.44	0.05
F𝄲	F𝄲↓↓½	441/320	555.25	-0.53	F𝄲	F𝄲↑↑½	135/98	554.53	0.19
E𝄫	E𝄫↓↓½	49/40	351.34	-0.39	E𝄫	E𝄫↑↑½	60/49	350.62	0.33
D𝄫	D𝄫↓↓½	49/45	147.43	-0.26					
C𝄲	C𝄲↓↓½	1323/1280	57.20	-0.60	C𝄲	C𝄲↑↑½	405/392	56.48	0.12

11 Limit Quarter-tone Ratios (poorer approximations) Neutral Fifth, Second and Sixth				53Et +/- from Just	11 Limit Quarter-tone Ratios (poorer approximations) Neutral Fourth, Seventh and Third				53Et +/- from Just
C𝄫	C𝄫↓↓	64/33	1146.73	7.99					
B𝄫	B𝄫↓↓	81/44	1056.50	7.65					
B𝄫	B𝄫↓↓½	81/44	1056.50	-3.67	B𝄫	B𝄫↑↑½	11/6	1049.36	3.47
					B𝄫	B𝄫↑↑	11/6	1049.36	-7.85
					A𝄲	A𝄲↑↑	891/512	959.14	-8.19
A𝄫	A𝄫↓↓	18/11	852.59	7.79					
A𝄫	A𝄫↓↓½	18/11	852.59	-3.54	A𝄫	A𝄫↑↑½	44/27	845.45	3.60
					G𝄲	G𝄲↑↑	99/64	755.23	3.26
					G𝄲	G𝄲↑↑	99/64	755.23	-8.06
G𝄫	G𝄫↓↓	16/11	648.68	7.92					
F𝄲	F𝄲↓↓½	243/176	558.46	7.58					
F𝄲	F𝄲↓↓½	243/176	558.46	-3.74	F𝄲	F𝄲↑↑½	11/8	551.32	3.40
					F𝄲	F𝄲↑↑	11/8	551.32	-7.92
E𝄫	E𝄫↓↓	27/22	354.55	7.72					
E𝄫	E𝄫↓↓½	27/22	354.55	-3.60	E𝄫	E𝄫↑↑½	11/9	347.41	3.54
					E𝄫	E𝄫↑↑	11/9	347.41	-7.79
					D𝄲	D𝄲↑↑	297/256	257.18	-8.13
D𝄫	D𝄫↓↓	12/11	150.64	7.85					
D𝄫	D𝄫↓↓½	12/11	150.64	-3.47					
C𝄲	C𝄲↓↓½	729/704	60.41	-3.81	C𝄲	C𝄲↑↑½	33/32	53.27	3.33
					C𝄲	C𝄲↑↑	33/32	53.27	-7.99

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2^(16/53)	1.232756	362.26	-37.74
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2^(15/53)	1.216738	339.62	39.62
2^(14/53)	1.200929	316.98	16.98
2^(13/53)	1.185325	294.34	-5.66
2^(11/53)	1.154723	249.06	49.06
2^(9/53)	1.124911	203.77	3.77
2^(8/53)	1.110295	181.13	-18.87
2^(7/53)	1.095869	158.49	-41.51
2^(6.5/53)	*1.088726*	*147.17*	*47.17*
2^(5/53)	1.067577	113.21	13.21
2^(4/53)	1.053705	90.57	-9.43
2^(2.5/53)	*1.033236*	*56.60*	*-43.40*
2^(2/53)	1.026502	45.28	45.28
2^(1/53)	1.013164	22.64	22.64
2^(0/53)	1	0	0

"Practical" Pitch Set for Turkish Music

"Practical 53Et System" and 5, 7 and 11 Limit Just Intonation
Chromatic Pitches and Primary Quarter-tones

E A D G C F Roots

53Et Tonic on Written C
Sounds Perfect fourth lower

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Practical 53Et System on A D G C F Bb

≈(4/3)^x		53ET	Ratio	Cents	+/- from 12ET
2^n					
	25	2^(20/53)	1.298961	452.83	-47.17
	24	2^(51/53)	1.948365	1154.72	-45.28
	23	2^(29/53)	1.461216	656.60	-43.40
	22	2^(7/53)	1.095869	158.49	-41.51
	21	2^(38/53)	1.643739	860.38	-39.62
	20	2^(16/53)	1.232756	362.26	-37.74
	19	2^(47/53)	1.849061	1064.15	-35.85
	18	2^(25/53)	1.386741	566.04	-33.96
	17	2^(3/53)	1.040015	67.92	-32.08
	16	2^(34/53)	1.559960	769.81	-30.19
	15	2^(12/53)	1.169924	271.70	-28.30
	14	2^(43/53)	1.754817	973.58	-26.42
	13	2^(21/53)	1.316061	475.47	-24.53
	12	2^(52/53)	1.974014	1177.36	-22.64
	11	2^(30/53)	1.480452	679.25	-20.75
	10	2^(8/53)	1.110295	181.13	-18.87
	9	2^(39/53)	1.665377	883.02	-16.98
	9	2^(17/53)	1.248984	384.91	-15.09
	7	2^(48/53)	1.873402	1086.79	-13.21
	6	2^(26/53)	1.404996	588.68	-11.32
	5	2^(4/53)	1.053705	90.57	-9.43
	4	2^(35/53)	1.580496	792.45	-7.55
	3	2^(13/53)	1.185325	294.34	-5.66
	2	2^(44/53)	1.777918	996.23	-3.77
Roots ~	1	2^(22/53)	1.333386	498.11	-1.89
	0	2^(0/53)	1	0	0
	-1	2^(31/53)	1.499941	701.89	1.89
	-2	2^(9/53)	1.124911	203.77	3.77
	-3	2^(40/53)	1.687301	905.66	5.66
	-4	2^(18/53)	1.265426	407.55	7.55
	-5	2^(49/53)	1.898064	1109.43	9.43
	-6	2^(27/53)	1.423492	611.32	11.32
	-7	2^(5/53)	1.067577	113.21	13.21
	-8	2^(36/53)	1.601302	815.09	15.09
	-9	2^(14/53)	1.200929	316.98	16.98
	-10	2^(45/53)	1.801323	1018.87	18.87
	-11	2^(23/53)	1.350939	520.75	20.75
	-12	2^(1/53)	1.013164	22.64	22.64
	-13	2^(32/53)	1.519686	724.53	24.53
	-14	2^(10/53)	1.139720	226.42	26.42
	-15	2^(41/53)	1.709512	928.30	28.30
	-16	2^(19/53)	1.282084	430.19	30.19
	-17	2^(50/53)	1.923050	1132.08	32.08
	-18	2^(28/53)	1.442231	633.96	33.96
	-19	2^(6/53)	1.081630	135.85	35.85
	-20	2^(37/53)	1.622382	837.74	37.74
	-21	2^(15/53)	1.216738	339.62	39.62
	-22	2^(46/53)	1.825036	1041.51	41.51
	-23	2^(24/53)	1.368723	543.40	43.40
	-24	2^(2/53)	1.026502	45.28	45.28
	-25	2^(33/53)	1.539692	747.17	47.17
	-26	2^(11/53)	1.154723	249.06	49.06
	-27	2^(42/53)	1.732017	950.94	-49.06
	-28	2^(20/53)	1.298961	452.83	-47.17

5 Limit Chromatic Ratios

3 Limit Pythagorean Ratios

		53Et +/- from Just
Dbb	1048576/531441	0.82
Abb	262144/177147	0.75
Ebb	65536/59049	0.68
Bbb	32768/19683	0.61
Fb	8192/6561	0.55
Cb	4096/2187	0.48
Gb	1024/729	0.41
Db	256/243	0.34
Ab	*128/81*	0.27
Eb	32/27	0.20
Bb	16/9	0.14
F	**4/3**	**0.07**
C	**1/1**	**0**
G	**3/2**	**-0.07**
D	**9/8**	**-0.14**
A	**27/16**	**-0.20**
E	**81/64**	**-0.27**
B	243/128	-0.34
F#	729/512	-0.41
C#	2187/2048	-0.48
G#	6561/4096	-0.55
D#	19683/16384	-0.61
A#	59049/32768	-0.68
E#	177147/131072	-0.75
(B#)	(531441/524288)	-0.82

3 Limit Pythagorean Ratios

5 Limit Chromatic Ratios

		53Et +/- from Just
D↓	**10/9**	**-1.27**
A↓	**5/3**	**-1.34**
E↓	**5/4**	**-1.41**
B↓	**15/8**	**-1.48**
F#↓	**45/32**	**-1.54**
C#↓	135/128	-1.61
G#↓	405/256	-1.68
D#↓	1215/1024	-1.75
A#↓	3645/2048	-1.82

			53Et +/- from Just
Cb↑	256/135	1107.82	1.61
Gb↑	**64/45**	**609.78**	**1.54**
Db↑	**16/15**	**111.73**	**1.48**
Ab↑	**8/5**	**813.69**	**1.41**
Eb↑	**6/5**	**315.64**	**1.34**
Bb↑	**9/5**	**1017.60**	**1.27**
F↑	27/20	519.55	1.20
C↑	81/80	21.51	1.14
G↑	243/160	723.46	1.07

5 Limit Quarter-tone Ratios

				53Et +/- from Just
Cb	**C↓↓**	12800/6561	1156.99	-2.27
Gb	**G↓↓**	3200/2187	658.94	-2.34
Db	**D↓↓**	800/729	160.90	-2.41
Ab	**A↓↓**	400/243	862.85	-2.48
Eb	**E↓↓**	100/81	364.81	-2.54
Bb	**B↓↓**	50/27	1066.76	-2.61
F†	**F#↓**	25/18	568.72	-2.68

				53Et +/- from Just
Eb	**Eb↑↑**	243/200	337.15	2.48
Bb	**Bb↑↑**	729/400	1039.10	2.41
F†	**F↑↑**	2187/1600	541.06	2.34
C†	**C↑↑**	6561/6400	43.01	2.27
G†	**G↑↑**	19683/12800	744.97	2.20
D†	**D↑↑**	59049/51200	246.92	2.13
A†	**A↑↑**	177147/102400	948.88	2.07

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Holdrian Comma = 2^(1/53) = 22.64 cents

53ET
2^(20/53)
2^(51/53)
2^(29/53)
2^(7/53)
2^(38/53)
2^(16/53)
2^(47/53)
2^(25/53)
2^(3/53)
2^(34/53)
2^(12/53)
2^(43/53)
2^(21/53)
2^(52/53)
2^(30/53)
2^(8/53)
2^(39/53)
2^(17/53)
2^(48/53)
2^(26/53)
2^(4/53)
2^(35/53)
2^(13/53)
2^(44/53)
2^(22/53)
2^(0/53)
2^(31/53)
2^(9/53)
2^(40/53)
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2^(49/53)
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2^(6/53)
2^(37/53)
2^(15/53)
2^(46/53)
2^(24/53)
2^(2/53)
2^(33/53)
2^(11/53)
2^(42/53)
2^(20/53)

11 Limit Quarter-tone Ratios

(poorer approximations)

					53Et +/- from Just
C𝄭	C↓↓	64/33	1146.73		7.99
G𝄭	G↓↓	16/11	648.68		7.92
D𝄭	D↓↓	12/11	150.64		7.85
A𝄭	A↓↓	18/11	852.59		7.79
E𝄭	E↓↓	27/22	354.55		7.72
B𝄭	B↓↓	81/44	1056.50		7.65
F𝄲	F#↓	243/176	558.46		7.58

					53Et +/- from Just
E𝄭	Eb↑↑	11/9	347.41		-7.79
B𝄭	Bb↑↑	11/6	1049.36		-7.85
F𝄲	F↑↑	11/8	551.32		-7.92
C𝄲	C↑↑	33/32	53.27		-7.99
G𝄲	G↑↑	99/64	755.23		-8.06
D𝄲	D↑↑	297/256	257.18		-8.13
A𝄲	A↑↑	891/512	959.14		-8.19

53ET half steps	Ratio	Cents	+/- from 12ET
2^(6.5/53)	1.088726	147.17	47.17
2^(37.5/53)	1.633025	849.06	49.06
2^(37.5/53)	1.633025	849.06	49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(46.5/53)	1.837009	1052.83	-47.17
2^(46.5/53)	1.837009	1052.83	-47.17
2^(24.5/53)	1.377702	554.72	-45.28
2^(24.5/53)	1.377702	554.72	-45.28
2^(2.5/53)	1.033236	56.60	-43.40
2^(2.5/53)	1.033236	56.60	-43.40
2^(33.5/53)	1.549793	758.49	-41.51

7 Limit Quarter-tone Ratios

					53Et half steps +/- from Just
D𝄭	D↓↓½	49/45	147.43		-0.26
A𝄭	A↓↓½	49/30	849.38		-0.33
A𝄭	Ab↑↑½	80/49	848.66		0.39
E𝄭	E↓↓½	49/40	351.34		-0.39
E𝄭	Eb↑↑½	60/49	350.62		0.33
B𝄭	B↓↓½	147/80	1053.29		-0.46
B𝄭	Bb↑↑½	90/49	1052.57		0.26
F𝄲	F#↓↓½	441/320	555.25		-0.53
F𝄲	F↑↑½	135/98	554.53		0.19
C𝄲	C#↓↓½	1323/1280	57.20		-0.60
C𝄲	C↑↑½	405/392	56.48		0.12
G𝄲	G↑↑½	1215/784	758.44		0.05

53ET half steps	Ratio	Cents	+/- from 12ET
2^(6.5/53)	1.088726	147.17	47.17
2^(37.5/53)	1.633025	849.06	49.06
2^(37.5/53)	1.633025	849.06	49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(15.5/53)	1.224721	350.94	-49.06
2^(46.5/53)	1.837009	1052.83	-47.17
2^(46.5/53)	1.837009	1052.83	-47.17
2^(24.5/53)	1.377702	554.72	-45.28
2^(24.5/53)	1.377702	554.72	-45.28
2^(2.5/53)	1.033236	56.60	-43.40
2^(2.5/53)	1.033236	56.60	-43.40
2^(33.5/53)	1.549793	758.49	-41.51

11 Limit Quarter-tone Ratios

(poorer approximations)

					53Et half steps +/- from Just
D𝄭	D↓↓½	12/11	150.64		-3.47
A𝄭	A↓↓½	18/11	852.59		-3.54
A𝄭	Ab↑↑½	44/27	845.45		3.60
E𝄭	E↓↓½	27/22	354.55		-3.60
E𝄭	Eb↑↑½	11/9	347.41		3.54
B𝄭	B↓↓½	81/44	1056.50		-3.67
B𝄭	Bb↑↑½	11/6	1049.36		3.47
F𝄲	F#↓↓½	243/176	558.46		-3.74
F𝄲	F↑↑½	11/8	551.32		3.40
C𝄲	C#↓↓½	729/704	60.41		-3.81
C𝄲	C↑↑½	33/32	53.27		3.33
G𝄲	G↑↑½	99/64	755.23		3.26

Baglama - Long Neck and Cura Saz — Tuning 1

"Practical 53Et System" for Turkish music
Chromatic Pitches and Primary Quarter-tones

C Tonic

Sounds (P4 Lower)		III G	53Et (-31 / +22) ← (-9 / +44)	II D	53Et (-31 / +22) ←	I A	Frets (Frets placed by first string ratios)	Closest Ratios 5 Limit	7 Limit	11 Limit	Practical 53Et System on C 53ET	Ratio	Cents	+/- from 12ET
Written		C 1/1		G 3/2		D 9/8	————	9/8			2^(9/53)	1.124911	203.77	3.77
16/15		Db↑	8/5	Ab↑		Eb↑	————	6/5			2^(14/53)	1.200929	316.98	16.98
160/147		*Db↑↑½*	*80/49*	*Ab↑↑½*		*Eb↑↑½*	————		*60/49*	*11/9*	*2^(15.5/53)*	*1.224721*	*350.94*	*-49.06*
10/9		D↓	5/3	A↓		E↓	————	5/4			2^(17/53)	1.248984	384.91	-15.09
32/27		Eb	16/9	Bb		F	————	4/3			2^(22/53)	1.333386	498.11	-1.89
243/200		*Eb↑↑*	*729/400*	*Bb↑↑*		*F↑↑*	————	*2187/1600*		*11/8*	2^(24/53)	1.368723	543.40	43.40
5/4		E↓	15/8	B↓		F#↓		45/32			2^(26/53)	1.404996	588.68	-11.32
512/405		Fb↑	256/135	Cb↑		Gb↑	*	64/45			2^(27/53)	1.423492	611.32	11.32
25600/19683		*F↓↓*	*12800/6561*	*C↓↓*		*G↓↓*	————	*3200/2187*		*16/11*	2^(29/53)	1.461216	656.60	-43.40
4/3		F	1/1	C		G	————	3/2			2^(31/53)	1.499941	701.89	1.89
64/45		Gb↑	16/15	Db↑		Ab↑	————	8/5			2^(36/53)	1.601302	815.09	15.09
196/135		*G↓↓½*	*49/45*	*D↓↓½*		*A↓↓½*	————		*49/30*	*18/11*	*2^(37.5/53)*	*1.633025*	*849.06*	*49.06*
40/27		G↓	10/9	D↓		A↓	————	5/3			2^(39/53)	1.665377	883.02	-16.98
128/81		Ab	32/27	Eb		Bb	————	16/9			2^(44/53)	1.777918	996.23	-3.77
81/50		*Ab↑↑*	*243/200*	*Eb↑↑*		*Bb↑↑*	————	*729/400*		*11/6*	2^(46/53)	1.825036	1041.51	41.51
5/3		A↓	5/4	E↓		B↓	————	15/8			2^(48/53)	1.873402	1086.79	-13.21
16/9		Bb	4/3	F		C	————	1/1			2^(0/53)	1	0	0
256/135		Cb↑	64/45	Gb↑		Db↑	————	16/15			2^(5/53)	1.067577	113.21	13.21
12800/6561		*C↓↓*	*3200/2187*	*G↓↓*		*D↓↓*	————	*800/729*		*12/11*	2^(7/53)	1.095869	158.49	-41.51
1/1		C	3/2	G		D	————	9/8			2^(9/53)	1.124911	203.77	3.77

*(Augmented 4th / Diminished 5th tempered to one fret)

Baglama - Long Neck and Cura Saz Tuning 2

"Practical 53Et System" for Turkish music
Chromatic Pitches and Primary Quarter-tones

G Tonic

53Et (-31 / +22)

Sounds (P4 Lower)	A		D ←	A ←
	III		II	I
Written	D 3/2		G 1/1	D 3/2
	Same pitches as first string			
		16/15	Ab↑	Eb↑
		49/45	*A↓↓½*	*E↓↓½*
		10/9	A↓	E↓
		32/27	Bb	F
		243/200	*Bb↑↑*	*F↑↑*
		5/4	B↓	F#↓
		4/3	C	G
		64/45	Db↑	Ab↑
		3200/2187	*D↓↓*	*A↓↓*
		3/2	D	A
		8/5	Eb↑	Bb↑
		80/49	*Eb↑↑½*	*Bb↑↑½*
		5/3	E↓	B↓
		16/9	F	C
		729/400	*F↑↑*	*C↑↑*
		15/8	F#↓	C#↓
		256/135	Gb↑	Db↑
		12800/6561	*G↓↓*	*D↓↓*
		1/1	G	D

Frets (Frets placed by first string ratios)	Closest Ratios: 5 Limit	7 Limit	11 Limit	Practical 53Et System on G: 53ET	Ratio	Cents	+/- from 12ET
————	3/2			2^(31/53)	1.499941	701.89	1.89
————	8/5			2^(36/53)	1.601302	815.09	15.09
————		*49/30*	*18/11*	*2^(37.5/53)*	*1.633025*	*849.06*	*49.06*
————	5/3			2^(39/53)	1.665377	883.02	-16.98
————	16/9			2^(44/53)	1.777918	996.23	-3.77
————	*729/400*		*11/6*	2^(46/53)	1.825036	1041.51	41.51
————	15/8			2^(48/53)	1.873402	1086.79	-13.21
————	1/1			2^(0/53)	1	0	0
————	16/15			2^(5/53)	1.067577	113.21	13.21
————	*800/729*		*12/11*	2^(7/53)	1.095869	158.49	-41.51
————	9/8			2^(9/53)	1.124911	203.77	3.77
————	6/5			2^(14/53)	1.200929	316.98	16.98
————		*60/49*	*11/9*	*2^(15.5/53)*	*1.224721*	*350.94*	*-49.06*
————	5/4			2^(17/53)	1.248984	384.91	-15.09
————	4/3			2^(22/53)	1.333386	498.11	-1.89
————	*2187/1600*		*11/8*	2^(24/53)	1.368723	543.40	43.40
	45/32			2^(26/53)	1.404996	588.68	-11.32
*	64/45			2^(27/53)	1.423492	611.32	11.32
————	*3200/2187*		*16/11*	2^(29/53)	1.461216	656.60	-43.40
————	3/2			2^(31/53)	1.499941	701.89	1.89

*(Augmented 4th / Diminished 5th tempered to one fret)

Baglama - Short Neck Saz — Tuning 1

"Practical 53Et System" for Turkish music
Chromatic Pitches and Primary Quarter-tones

F Tonic

Sounds (P4 Lower)		C	← (-9 / +44)	53Et (-31 / +22) G	←	53Et (-31 / +22) D	Frets	Closest Ratios 5 Limit	7 Limit	11 Limit	Practical 53Et System on F 53ET	Ratio	Cents	+/- from 12ET
		III		II		I	(Frets placed by first string ratios)							
Written		F 1/1		C 3/2		G 9/8	————	9/8			2^(9/53)	1.124911	203.77	3.77
16/15		Gb↑	8/5	Db↑		Ab↑	————	6/5			2^(14/53)	1.200929	316.98	16.98
160/147		*Gb↑↑½*	*80/49*	*Db↑↑½*		*Ab↑↑½*	————		*60/49*	*11/9*	*2^(15.5/53)*	*1.224721*	*350.94*	*-49.06*
10/9		G↓	5/3	D↓		A↓	————	5/4			2^(17/53)	1.248984	384.91	-15.09
32/27		Ab	16/9	Eb		Bb	————	4/3			2^(22/53)	1.333386	498.11	-1.89
243/200		*Ab↑↑*	*729/400*	*Eb↑↑*		*Bb↑↑*	————	*2187/1600*		*11/8*	2^(24/53)	1.368723	543.40	43.40
5/4		A↓	15/8	E↓		B↓		45/32			2^(26/53)	1.404996	588.68	-11.32
512/405		Bbb↑	256/135	Fb↑		Cb↑	*	64/45			2^(27/53)	1.423492	611.32	11.32
25600/19683		*Bb↓↓*	*12800/6561*	*F↓↓*		*C↓↓*	————	*3200/2187*		*16/11*	2^(29/53)	1.461216	656.60	-43.40
4/3		Bb	1/1	F		C	————	3/2			2^(31/53)	1.499941	701.89	1.89
64/45		Cb↑	16/15	Gb↑		Db↑	————	8/5			2^(36/53)	1.601302	815.09	15.09
196/135		*C↓↓½*	*49/45*	*G↓↓½*		*D↓↓½*	————		*49/30*	*18/11*	*2^(37.5/53)*	*1.633025*	*849.06*	*49.06*
40/27		C↓	10/9	G↓		D↓	————	5/3			2^(39/53)	1.665377	883.02	-16.98
128/81		Db	32/27	Ab		Eb	————	16/9			2^(44/53)	1.777918	996.23	-3.77
81/50		*Db↑↑*	*243/200*	*Ab↑↑*		*Eb↑↑*	————	*729/400*		*11/6*	2^(46/53)	1.825036	1041.51	41.51
5/3		D↓	5/4	A↓		E↓	————	15/8			2^(48/53)	1.873402	1086.79	-13.21
16/9		Eb	4/3	Bb		F	————	1/1			2^(0/53)	1	0	0
256/135		Fb↑	64/45	Cb↑		Gb↑	————	16/15			2^(5/53)	1.067577	113.21	13.21
12800/6561		*F↓↓*	*3200/2187*	*C↓↓*		*G↓↓*	————	*800/729*		*12/11*	2^(7/53)	1.095869	158.49	-41.51
1/1		F	3/2	C		G	————	9/8			2^(9/53)	1.124911	203.77	3.77

*(Augmented 4th / Diminished 5th tempered to one fret)

Baglama - Short Neck Saz — Tuning 2

"Practical 53Et System" for Turkish music
Chromatic Pitches and Primary Quarter-tones

D Tonic

Sounds (P4 Lower)		A	53Et (-31 / +22) ← (+31 / -22)	G	53Et (-31 / +22) ←	D	Frets	Closest Ratios 5 Limit	7 Limit	11 Limit	Practical 53Et System on D 53ET	Ratio	Cents	+/- from 12ET
		III		II		I	(Frets placed by first string ratios)							
Written		D 1/1		C 16/9		G 4/3	————	4/3			2^(22/53)	1.333386	498.11	-1.89
	6561/6400	D↑↑	729/400	C↑↑		G↑↑	————	2187/1600		11/8	2^(24/53)	1.368723	543.40	43.40
	135/128	D#↓	15/8	C#↓		G#↓		45/32			2^(26/53)	1.404996	588.68	-11.32
	16/15	Eb↑	256/135	Db↑		Ab↑	*	64/45			2^(27/53)	1.423492	611.32	11.32
	800/729	E↓↓	12800/6561	D↓↓		A↓↓	————	3200/2187		16/11	2^(29/53)	1.461216	656.60	-43.40
	9/8	E	1/1	D		A	————	3/2			2^(31/53)	1.499941	701.89	1.89
							*(Augmented 4th / Diminished 5th tempered to one fret)							
	6/5	F↑	16/15	Eb↑		Bb↑	————	8/5			2^(36/53)	1.601302	815.09	15.09
	49/40	F#↓↓½	49/45	E↓↓½		B↓↓½	————		49/30	18/11	2^(37.5/53)	1.633025	849.06	49.06
	5/4	F#↓	10/9	E↓		B↓	————	5/3			2^(39/53)	1.665377	883.02	-16.98
	4/3	G	32/27	F		C	————	16/9			2^(44/53)	1.777918	996.23	-3.77
	2187/1600	G↑↑	243/200	F↑↑		C↑↑	————	729/400		11/6	2^(46/53)	1.825036	1041.51	41.51
	45/32	G#↓	5/4	F#↓		C#↓	————	15/8			2^(48/53)	1.873402	1086.79	-13.21
	3/2	A	4/3	G		D	————	1/1			2^(0/53)	1	0	0
	8/5	Bb↑	64/45	Ab↑		Eb↑	————	16/15			2^(5/53)	1.067577	113.21	13.21
	400/243	B↓↓	3200/2187	A↓↓		E↓↓	————	800/729		12/11	2^(7/53)	1.095869	158.49	-41.51
	27/16	B	3/2	A		E	————	9/8			2^(9/53)	1.124911	203.77	3.77
	9/5	C↑	8/5	Bb↑		F↑	————	6/5			2^(14/53)	1.200929	316.98	16.98
	90/49	C↑↑½	80/49	Bb↑↑½		F↑↑½	————		60/49	11/9	2^(15.5/53)	1.224721	350.94	-49.06
	15/8	C#↓	5/3	B↓		F#↓	————	5/4			2^(17/53)	1.248984	384.91	-15.09
	1/1	D	16/9	C		G	————	4/3			2^(22/53)	1.333386	498.11	-1.89

Turkish Oud Open String Tuning

Arabic Oud Tuning (Sounds and Written)

Root	P4	+6th	+2nd	P5	Root
C	F	A	D	G	C
	G	B	E	A	D
		C	F		
				B	E
					F
					G

Two octave G to G with tonic on C

Dominant G = Yakah / Nawa / Ramal Tuti
Tonic C = Rast / Kirdan

Turkish Oud Tuning (Sounds)

	Root	+3rd	+6th	+2nd	P5
(D)	G	B	E	A	D
		C			
	A		F#	B	E
		D	G	C	
					F#
					G

Sounds two octave G to G with tonic on G

Dominant D = RAST / GERDÂNIYE
Tonic G = KABA ÇÂRGÂH / ÇÂRGÂH / TÎZ ÇÂRGÂH

Turkish Oud Tuning (Written P4 higher)

	Root	+3rd	+6th	+2nd	P5
(G)	C	E	A	D	G
		F			
	D		B	E	A
		G	C	F	
					B
					C

Written two octave C to C with tonic on C

Dominant G = RAST / GERDÂNIYE
Tonic C = KABA ÇÂRGÂH / ÇÂRGÂH / TÎZ ÇÂRGÂH

Turkish Oud Open String Just Intonation Tuning
(Sounds)

C Root	**D**	**G**	**B↓**	**E↓**	**A↓**	**D**
4/3	**3/2**	**1/1**	**5/4**	**5/3**	**10/9**	**3/2**
G Root	**D**	**G**	**B↓**	**E↓**	**A**	**D**
1/1	**3/2**	**1/1**	**5/4**	**5/3**	**9/8**	**3/2**
D Root	**D**	**G**	**B↓**	**E**	**A**	**D**
3/2	**3/2**	**1/1**	**5/4**	**27/16**	**9/8**	**3/2**
A Root	**D**	**G**	**B**	**E**	**A**	**D**
9/8	**3/2**	**1/1**	**81/64**	**27/16**	**9/8**	**3/2**
E Root	**D**	**G↑**	**B**	**E**	**A**	**D**
27/16	**3/2**	**81/80**	**81/64**	**27/16**	**9/8**	**3/2**
B Root	**D↑**	**G↑**	**B**	**E**	**A**	**D↑**
81/64	**243/160**	**81/80**	**81/64**	**27/16**	**9/8**	**243/160**

Turkish Oud Open String Tempered Tuning
(Sounds)

1/4 Syntonic Comma tuning (31ET)

	D	**G**	**5/4**	**B**	**E**	**A**	**D**
		1/1	**386.3137**				
31Et	**2^18/31**	**2^0/31**	**+/- Just**	**2^10/31**	**2^23/31**	**2^5/31**	**2^18/31**
Ratio	**1.495518**	**1.00**	**0.78306**	**1.250566**	**1.672418**	**1.118287**	**1.495518**
Cents	**696.7742**	**0**	**387.0968**	**387.0968**	**890.3226**	**193.5484**	**696.7742**
+/- from 12ET	**-3.22581**	**0**		**-512.903**	**-9.67742**	**-6.45161**	**-3.22581**

1/5 Syntonic Comma tuning (43ET)

	D	**G**	**5/4**	**B**	**E**	**A**	**D**
		1/1	**386.3137**				
43Et	**2^25/43**	**2^0/43**	**+/- Just**	**2^14/43**	**2^32/43**	**2^7/43**	**2^25/43**
Ratio	**1.496296**	**1.00**	**4.383961**	**1.253169**	**1.675029**	**1.119450**	**1.496296**
Cents	**697.6744**	**0**	**390.6977**	**390.6977**	**893.0233**	**195.3488**	**697.6744**
+/- from 12ET	**-2.32558**	**0**		**-509.302**	**-6.97674**	**-4.65116**	**-2.32558**

Turkish Oud Tuning Roots

"Practical" Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Diaschisma = (2048/2025) = 19.55 cents

B E A D G C Roots -Sounds

	←4/3→		←81/64→		←4/3→		←4/3→		←4/3→	
	D	**3/2**	**G**	**1/1**	**B**	**81/64**	**E**	**27/16**	**A**	**9/8**	**D**	**3/2**	
Comma	**D↑**	243/160	**G↑**	81/80							**D↑**	243/160	Comma
					-----	-----	***E†***		***A†***				
	D†		***G†***								***D†***		
							3645/2048	16/9	1215/1024	32/27			
	D#↓	405/256	**G#↓**	135/128	4/3	**C**	**E#↓**	**= F**	**A#↓**	**= Bb**	**D#↓**	405/256	
	8/5	**Eb↑**	16/15	**Ab↑**	27/20	**C↑**	9/5	**F↑**	6/5	**Bb↑**	8/5	**Eb↑**	
		Eƀ		***Aƀ***		***C†***		***F†***		***Bƀ***		***Eƀ***	
	5/3	**E↓**	10/9	**A↓**	45/32	**C#↓**	15/8	**F#↓**	5/4	**B↓**	5/3	**E↓**	
	27/16	**E**	9/8	**A**	**Db↑**	**= C#**	**Gb↑**	**= F#**	81/64	**B**	27/16	**E**	
					64/45	729/512	256/135	243/128					
		E†		***A†***	***Dƀ***		***Gƀ***		-----	-----		***E†***	
	16/9	3645/2048	32/27	1215/1024							16/9	3645/2048	
	F	**= E#↓**	**Bb**	**= A#↓**	**D**	3/2	**G**	1/1	**C**	4/3	**F**	**= E#↓**	
	F↑	9/5	**Bb↑**	6/5	**D↑**	243/160	**G↑**	81/80	**C↑**	27/20	**F↑**	9/5	
	F†		***Bƀ***		***D†***		***G†***		***C†***		***F†***		
	F#↓	15/8	**B↓**	5/4	**D#↓**	405/256	**G#↓**	135/128	**C#↓**	45/32	**F#↓**	15/8	
	F#	**= Gb↑**	**B**	81/64	8/5	**Eb↑**	16/15	**Ab↑**	**C#**	**= Db↑**	**F#**	**= Gb↑**	
	243/128	256/135							729/512	64/45	243/128	256/135	
						Eƀ		***Aƀ***					
		Gƀ	-----	-----						***Dƀ***		***Gƀ***	
					5/3	**E↓**	10/9	**A↓**					
	1/1	**G**	4/3	**C**	27/16	**E**	9/8	**A**	3/2	**D**	1/1	**G**	
	81/80	**G↑**	27/20	**C↑**					243/160	**D↑**	81/80	**G↑**	
						E†		***A†***					
		G†		***C†***						***D†***		***G†***	
					16/9	3645/2048	32/27	1215/1024					
	135/128	**G#↓**	45/32	**C#↓**	**F**	**= E#↓**	**Bb**	**= A#↓**	405/256	**D#↓**	135/128	**G#↓**	
	Ab↑	16/15	**Db↑**	**= C#**	**F↑**	9/5	**Bb↑**	6/5	**Eb↑**	8/5	**Ab↑**	16/15	
			64/45	729/512									
	Aƀ				***F†***		***Bƀ***		***Eƀ***		***Aƀ***		
			Dƀ										
	A↓	10/9			**F#↓**	15/8	**B↓**	5/4	**E↓**	5/3	**A↓**	10/9	
	A	9/8	**D**	3/2	**F#**	**= Gb↑**	**B**	81/64	**E**	27/16	**A**	9/8	
					243/128	256/135							

E A D G C F Roots **-Written P4 higher**

	G	3/2	←4/3→	C	1/1	←81/64→	E	81/64	←4/3→	A	27/16	←4/3→	D	9/8	←4/3→	G	3/2	
Comma	G↑	243/160		C↑	81/80											G↑	243/160	Comma
							-----	-----		*A†*			*D†*					
	G†			*C†*												*G†*		
										3645/2048	16/9		1215/1024	32/27				
	G#↓	405/256		C#↓	135/128		4/3	F		A#↓	= Bb		D#↓	= Eb		G#↓	405/256	
	8/5	Ab↑		16/15	Db↑		27/20	F↑		9/5	Bb↑		6/5	Eb↑		8/5	Ab↑	
		Ab			*Db*			*F†*			*Bb*			*Eb*			*Ab*	
	5/3	A↓		10/9	D↓		45/32	F#↓		15/8	B↓		5/4	E↓		5/3	A↓	
	27/16	A		9/8	D		Gb↑	= F#		Cb↑	= B		81/64	E		27/16	A	
							64/45	729/512		256/135	243/128							
		A†			*D†*		*Gb*			*Cb*			-----	-----			*A†*	
	16/9	3645/2048		32/27	1215/1024											16/9	3645/2048	
	Bb	= A#↓		Eb	= D#↓		G	3/2		C	1/1		F	4/3		Bb	= A#↓	
	Bb↑	9/5		Eb↑	6/5		G↑	243/160		C↑	81/80		F↑	27/20		Bb↑	9/5	
	Bb			*Eb*			*G†*			*C†*			*F†*			*Bb*		
	B↓	15/8		E↓	5/4		G#↓	405/256		C#↓	135/128		F#↓	45/32		B↓	15/8	
	B	= Cb↑		E	81/64		8/5	Ab↑		16/15	Db↑		F#	= Gb↑		B	= Cb↑	
	243/128	256/135											729/512	64/45		243/128	256/135	
								Ab			*Db*							
		Cb		-----	-----									*Gb*			*Cb*	
							5/3	A↓		10/9	D↓							
	1/1	C		4/3	F		27/16	A		9/8	D		3/2	G		1/1	C	
	81/80	C↑		27/20	F↑								243/160	G↑		81/80	C↑	
								A†			*D†*							
		C†			*F†*									*G†*			*C†*	
							16/9	3645/2048		32/27	1215/1024							
	135/128	C#↓		45/32	F#↓		Bb	= A#↓		Eb	= D#↓		405/256	G#↓		135/128	C#↓	
	Db↑	16/15		Gb↑	= F#		Bb↑	9/5		Eb↑	6/5		Ab↑	8/5		Db↑	16/15	
				64/45	729/512													
	Db						*Bb*			*Eb*			*Ab*			*Db*		
				Gb														
	D↓	10/9					B↓	15/8		E↓	5/4		A↓	5/3		D↓	10/9	
	D	9/8		G	3/2		B	= Cb↑		E	81/64		A	27/16		D	9/8	
							243/128	256/135										

Turkish Oud Tuning

"Practical" Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

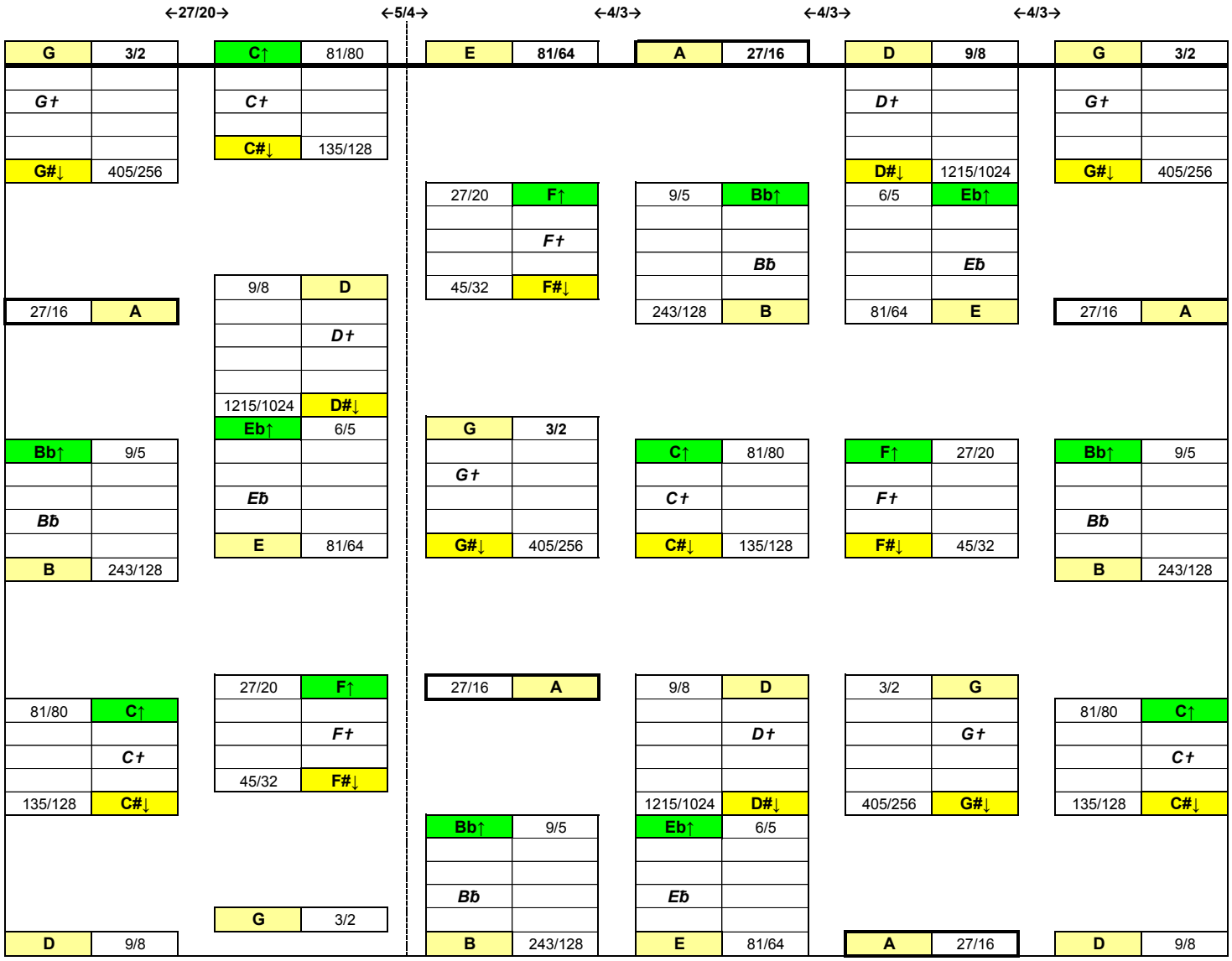
↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Diaschisma = (2048/2025) = 19.55 cents

E Root written (Sounds P4 Lower)

←4/3→		←5/4→		←4/3→		←4/3→		←27/20→	
G↑	243/160	C↑	81/80	E	81/64	A	27/16	D	9/8	G↑	243/160
G♮		C♮				A♮		D♮		G♮	
G#↓	405/256	C#↓	135/128							G#↓	405/256
						A#↓	3645/2048	D#↓	1215/1024		
				27/20	F↑	9/5	Bb↑				
					F♮		Bb				
				729/512	F#	243/128	B	81/64	E		
27/16	A	9/8	D							27/16	A
	A♮		D♮								A♮
3645/2048	A#↓	1215/1024	D#↓							3645/1024	A#↓
Bb↑	9/5									Bb↑	9/5
				G↑	243/160	C↑	81/80	F↑	27/20		
Bb				G♮		C♮				Bb	
								F♮			
B	243/128	E	81/64	G#↓	405/256	C#↓	135/128			B	243/128
								F#	729/512		
81/80	C↑	27/20	F↑	27/16	A	9/8	D			81/80	C↑
								243/160	G↑		
	C♮		F♮		A♮		D♮				C♮
									G♮		
135/128	C#↓	729/512	F#	3645/2048	A#↓	1215/1024	D#↓	405/256	G#↓	135/128	C#↓
				Bb↑	9/5						
				Bb							
D	3/2									D	3/2
		G↑	243/160	B	243/128	E	81/64	A	27/16		

A Root written **(Sounds P4 Lower)**



Turkish Oud Tuning

"Practical" Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

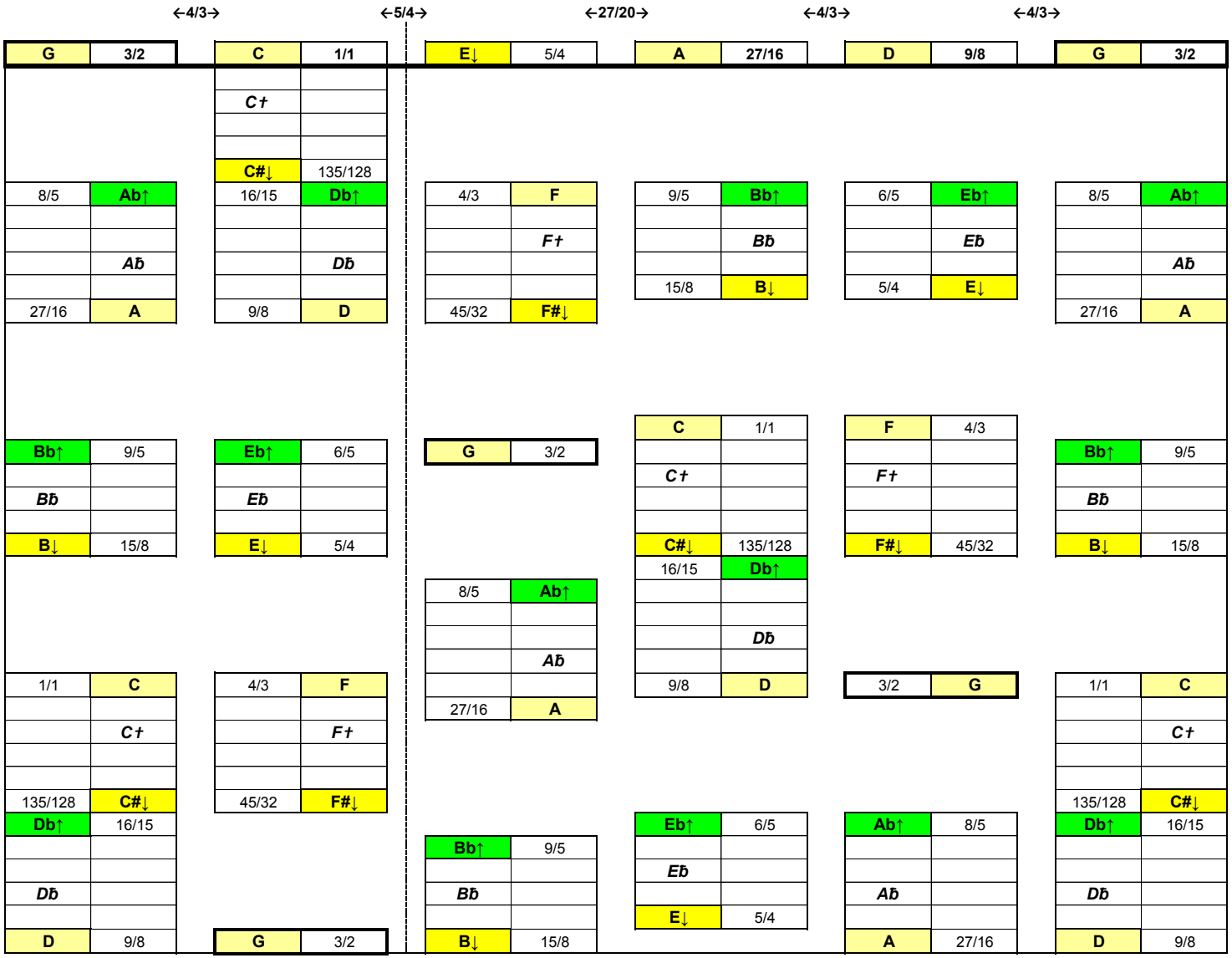
↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

Diaschisma = (2048/2025) = 19.55 cents

D Root written **(Sounds P4 Lower)**

←4/3→		←81/64→		←4/3→		←4/3→		←4/3→	
G	**3/2**	**C**	**1/1**	**E**	**81/64**	**A**	**27/16**	**D**	**9/8**	**G**	**3/2**
G†		***C†***								***G†***	
G#↓	405/256	**C#↓**	135/128							**G#↓**	405/256
8/5	**Ab↑**			27/20	**F↑**	9/5	**Bb↑**	6/5	**Eb↑**	8/5	**Ab↑**
	Aƀ				***F†***		***Bƀ***		***Eƀ***		***Aƀ***
27/16	**A**	9/8	**D**	45/32	**F#↓**	15/8	**B↓**	81/64	**E**	27/16	**A**
				G	**3/2**	**C**	1/1				
				G†		***C†***					
Bb↑	9/5	**Eb↑**	6/5	**G#↓**	405/256	**C#↓**	135/128	**F↑**	27/20	**Bb↑**	9/5
				8/5	**Ab↑**						
Bƀ		***Eƀ***						***F†***		***Bƀ***	
B↓	15/8	**E**	81/64		***Aƀ***			**F#↓**	45/32	**B↓**	15/8
				27/16	**A**	9/8	**D**				
1/1	**C**							3/2	**G**	1/1	**C**
		27/20	**F↑**								
	C†		***F†***						***G†***		***C†***
135/128	**C#↓**	45/32	**F#↓**					405/256	**G#↓**	135/128	**C#↓**
				Bb↑	9/5	**Eb↑**	6/5	**Ab↑**	8/5		
				Bƀ		***Eƀ***		***Aƀ***			
D	9/8	**G**	3/2	**B↓**	15/8	**E**	81/64	**A**	27/16	**D**	9/8

G Root written **(Sounds P4 Lower)**



Turkish Oud Tuning

"Practical" Just Intontion Chromatic Pitches and Primary Quarter-tones

(all 5 Limit ratios calculated by Perfect Fifths and Syntonic Commas)

Syntonic Comma = (81/80) = 21.51 cents

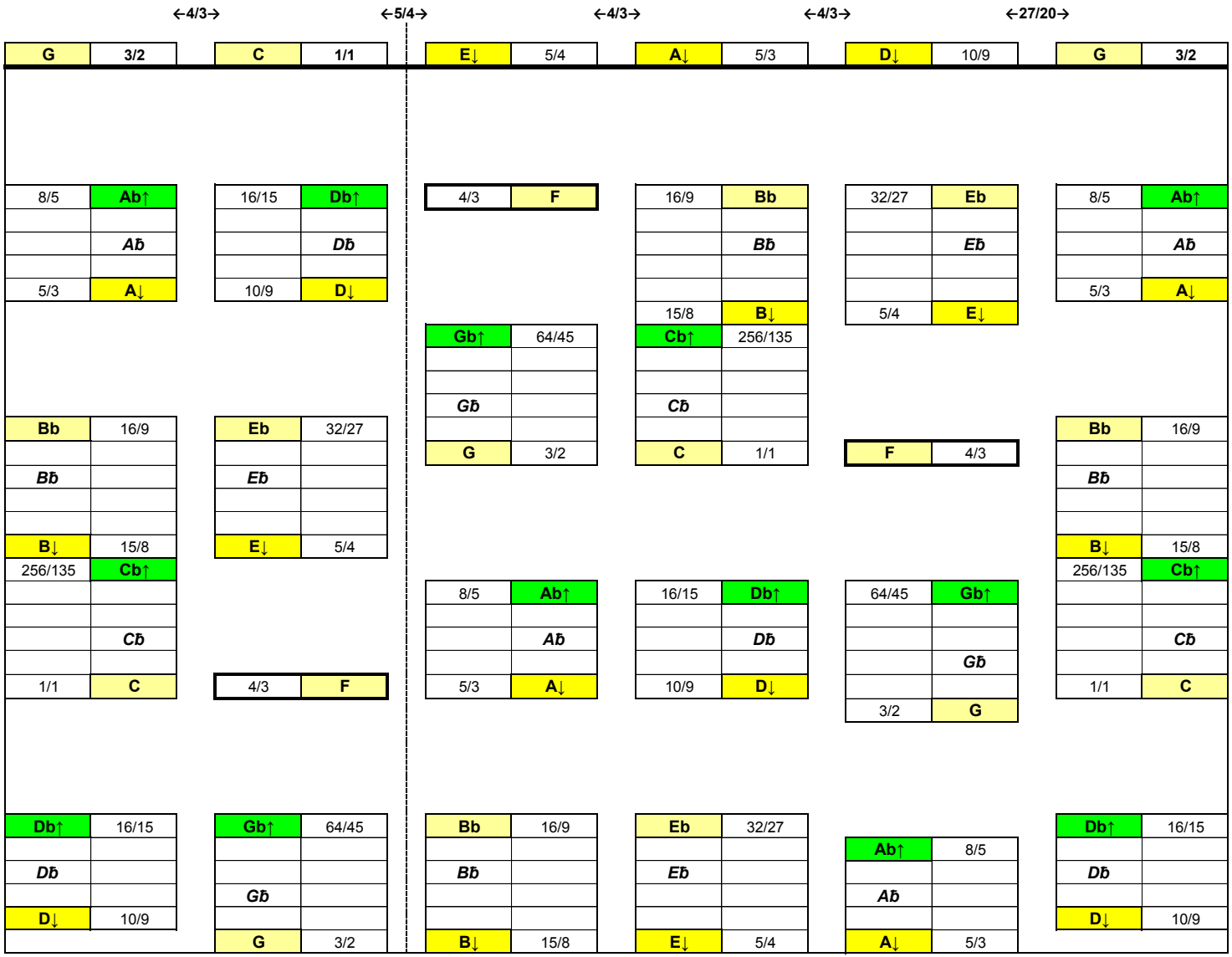
↑,↓,↑↑,↓↓ = Syntonic Comma sharp, flat

C Root written (Sounds P4 Lower)

Diaschisma = (2048/2025) = 19.55 cents

←4/3→		←5/4→		←4/3→		←27/20→		←4/3→	
G	**3/2**	**C**	**1/1**	**E↓**	5/4	**A↓**	5/3	**D**	**9/8**	**G**	**3/2**
8/5	**Ab↑**	16/15	**Db↑**	,4/3	**F**	16/9	**Bb**	6/5	**Eb↑**	8/5	**Ab↑**
	Ab		***Db***		***Bb***		***Bb***		***Eb***		***Ab***
5/3	**A↓**	9/8	**D**	45/32	**F#↓**	15/8	**B↓**	5/4	**E↓**	5/3	**A↓**
				Gb↑	64/45						
				Cb							
Bb	16/9	**Eb↑**	6/5	**G**	3/2	**C**	1/1	**F**	4/3	**Bb**	16/9
Bb		***Eb***						***F+***		***Bb***	
B↓	15/8	**E↓**	5/4					**F#↓**	45/32	**B↓**	15/8
								64/45	**Gb↑**		
				8/5	**Ab↑**	16/15	**Db↑**				
				Db					***Gb***		
						Db					
1/1	**C**	4/3	**F**	5/3	**A↓**			3/2	**G**	1/1	**C**
						9/8	**D**				
			F+								
		45/32	**F#↓**								
Db↑	16/15	**Gb↑**	64/45	**Bb**	16/9			**Ab↑**	8/5	**Db↑**	16/15
						Eb↑	6/5				
				Bb				***Ab***			
Db		***Gb***				***Eb***				***Db***	
								A↓	5/3		
D	9/8	**G**	3/2	**B↓**	15/8	**E↓**	5/4			**D**	9/8

F Root written **(Sounds P4 Lower)**



Arabic and Turkish Note Names Compared

Sounds one tone (9/8) higher→

Written & Sounds	Arabic Note Names Lower Octave	Arabic Note Names Upper Octave	Practical 53Et	C Root Sounds	G Root Sounds	C Root Written	Enharm. 53Et Written	Turkish Note Names Lower Octave	Turkish Note Names Upper Octave	Sounds	Written (P4 Higher)
G *Gb* Gb	Nawa tik Hijaz	Ramal Tuti jawab tik Hijaz	31 *29* 27	G *G↓↓* Gb↑	A A↓ Ab↑ Ab	D D↓ Db↑ Db	9 *8* 5 *4*	NEVÂ dik Hicâz Hicâz nim Hicâz		A *A ↓* Ab↑ *Ab*	D *D ↓* Db↑ *Db*
	Hijaz	jawab Hijaz									
F# *F♮* F	nim Hijaz Jaharkah tik Busalik	jawab nim Hijaz Mahuran jawab tik Busalik	26 *24* 22	F#↓ *F↑↑* F	(G↑) G G↓	(C↑) C C↓	(1) 53 52	ÇÂRGÂH dik BÛSELIK	TÎZ ÇÂRGÂH TÎZ dik BÛSELIK	(G↑) G G↓	(C↑) C C↓
E *Eb* Eb	Busalik *Sikah* Kurd nim Kurd	jawab Busalik *Buzrak* Sunbulah nim Sunbulah	17 *15.5* 14	E↓ *Eb↑↑ ½* Eb↑	F# F#↓ F↑ F	B B↓ Bb↑ Bb	*49* *48* *45* *44*	BÛSELIK Segâh dik Kürdi Kürdi	TÎZ BÛSELIK Tîz Segâh dik Sünbüle Sünbüle	F# *F# ↓* *F ↑* F	B *B ↓* *Bb ↑* Bb
D *Db* Db	Dukah tik Zirkulah Zirkulah nim Zirkulah	Muhayar tik Shahnaz Shahnaz nim Shahnaz	9 *7* 5	D *D↓↓* Db↑	E E↓ Eb↑ Eb	A A↓ Ab↑ Ab	*40* *39* 36 *35*	DÜGÂH dik Zirgüle Zirgüle nim Zirgüle	MUHAYYER dik Şehnâz Şehnâz nim Şehnâz	E *E ↓* Eb↑ *Eb*	A *A ↓* Ab↑ *Ab*
C	Rast	Kirdan	0	C	D D↓ Db↑ C#↓ C↑ C	G G↓ Gb↑ F#↓ F↑ F	31 *30* 27 26 *23* 22	RAST dik Gevest Gevest Irak Dik Acem Aşîrân ACEM AŞÎRÂN	GERDÂNIYE dik Mâhûr Mâhûr Eviç dik ACEM ACEM	D *D ↓* Db↑ C#↓ *C ↑* C	G *G ↓* Gb↑ F#↓ *F ↑* F
	tik Kawasht	tik Nihuft									
B *Bb* Bb	Kawasht *Iraq* qarer Ajam qarar nim Ajam	Nihuft *Awj* Ajam nim Ajam	48 *46* 44	B↓ *Bb↑↑* Bb							
A *Ab* Ab	Ushayran qarar tik Hisar qarar Hisar qarar nim Hisar	Husayni tik Hisar Hisar nim Hisar	39 *37.5* 36	A↓ *A↓↓ ½* Ab↑	B B↓ Bb↑ Bb	E E↓ Eb↑ Eb	18 *17* 14 *13*	HÜSEYNÎ AŞÎRÂN Kaba dik Hisâr Kaba Hisâr Kaba nim Hisâr	HÜSEYNÎ dik Hisâr Hisâr nim Hisâr	B *B ↓* Bb↑ *Bb*	E *E ↓* Eb↑ *Eb*
G	Yakah	Nawa	31	G	A A↓ Ab↑ Ab	D D↓ Db↑ Db	9 *8* 5 *4*	YEGÂH Kaba dik Hicâz Kaba Hicâz Kaba nim Hicâz	NEVÂ dik Hicâz Hicâz nim Hicâz	A *A ↓* Ab↑ *Ab*	D *D ↓* Db↑ *Db*
					(G↑) G	(C↑) C	(1) 0	KABA ÇÂRGÂH	ÇÂRGÂH	(G↑) G	(C↑) C

"nim" = lower "tik" = higher

"nim" = lower "dik" = higher

Arabic and Turkish Sounding Pitches Compared

Written & Sounds	Arabic Note Names — Lower Octave	Arabic Note Names — Upper Octave	Practical 53Et	C Root Sounds
G	Nawa	Ramal Tuti	31	G
Gb	tik Hijaz	jawab tik Hijaz	*29*	*G↓↓*
Gb			27	Gb↑
	Hijaz	jawab Hijaz		
F#			26	F#↓
F†	nim Hijaz	jawab nim Hijaz	*24*	*F↑↑*
F	Jaharkah	Mahuran	22	F
	tik Busalik	jawab tik Busalik		
E	Busalik	jawab Busalik	17	E↓
Eb	*Sikah*	*Buzrak*	*15.5*	*Eb↑↑½*
Eb	Kurd	Sunbulah	14	Eb↑
	nim Kurd	nim Sunbulah		
D	Dukah	Muhayar	9	D
Db	tik Zirkulah	tik Shahnaz	*7*	*D↓↓*
Db	Zirkulah	Shahnaz	5	Db↑
	nim Zirkulah	nim Shahnaz		
C	Rast	Kirdan	0	C
	tik Kawasht	tik Nihuft		
B	Kawasht	Nihuft	48	B↓
Bb	*Iraq*	*Awj*	*46*	*Bb↑↑*
Bb	qarer Ajam	Ajam	44	Bb
	qarar nim Ajam	nim Ajam		
A	Ushayran	Husayni	39	A↓
Ab	qarar tik Hisar	tik Hisar	*37.5*	*A↓↓½*
Ab	qarar Hisar	Hisar	36	Ab↑
	qarar nim Hisar	nim Hisar		
G	Yakah	Nawa	31	G

"nim" = lower "tik" = higher

G Root Sounds	C Root Written	Enharm. 53Et Written	Turkish Note Names — Lower Octave	Turkish Note Names — Upper Octave	Sounds	Written (P4 Higher)
G	C	53	ÇÂRGÂH	TÎZ ÇÂRGÂH	G	C
G↓	C↓	*52*	dik BÛSELIK	TÎZ dik BÛSELIK	*G↓*	*C↓*
F#	B	*49*	BÛSELIK	TÎZ BÛSELIK	F#	B
F#↓	B↓	*48*	Segâh	Tîz Segâh	*F#↓*	*B↓*
F↑	Bb↑	*45*	dik Kürdi	dik Sünbüle	*F↑*	*Bb↑*
F	Bb	*44*	Kürdi	Sünbüle	F	Bb
E	A	*40*	DÜGÂH	MUHAYYER	E	A
E↓	A↓	*39*	dik Zirgüle	dik Şehnâz	*E↓*	*A↓*
Eb↑	Ab↑	36	Zirgüle	Şehnâz	Eb↑	Ab↑
Eb	Ab	*35*	nim Zirgüle	nim Şehnâz	*Eb*	*Ab*
D	G	31	RAST	GERDÂNIYE	D	G
D↓	G↓	*30*	dik Gevest	dik Mâhûr	*D↓*	*G↓*
Db↑	Gb↑	27	Gevest	Mâhûr	Db↑	Gb↑
C#↓	F#↓	26	Irak	Eviç	C#↓	F#↓
C↑	F↑	*23*	Dik Acem Aşîrân	dik ACEM	*C↑*	*F↑*
C	F	22	ACEM AŞÎRÂN	ACEM	C	F
B	E	18	HÜSEYNÎ AŞÎRÂN	HÜSEYNÎ	B	E
B↓	E↓	*17*	Kaba dik Hisâr	dik Hisâr	*B↓*	*E↓*
Bb↑	Eb↑	14	Kaba Hisâr	Hisâr	Bb↑	Eb↑
Bb	Eb	*13*	Kaba nim Hisâr	nim Hisâr	*Bb*	*Eb*
A	D	9	YEGÂH	NEVÂ	A	D
A↓	D↓	*8*	Kaba dik Hicâz	dik Hicâz	*A↓*	*D↓*
Ab↑	Db↑	5	Kaba Hicâz	Hicâz	Ab↑	Db↑
Ab	Db	*4*	Kaba nim Hicâz	nim Hicâz	*Ab*	*Db*
(G↑)	(C↑)	*(1)*			*(G↑)*	*(C↑)*
G	C	0	KABA ÇÂRGÂH	ÇÂRGÂH	G	C

"nim" = lower "dik" = higher

Arabic and Turkish Written Pitches Compared

Sounds Perfect 4th (4/3) lower→

Written & Sounds	Arabic Note Names Lower Octave	Arabic Note Names Upper Octave	Practical 53Et	C Root Written
C	Kirdan		53	C
	tik Nihuft			
B	Nihuft		48	B↓
Bb	*Awj*		*46*	*Bb↑↑*
Bb	Ajam		44	Bb
	nim Ajam			
A	Husayni		39	A↓
Ab	tik Hisar		*37.5*	*A↓↓½*
Ab	Hisar		36	Ab↑
	nim Hisar			
G	Nawa	Ramal Tuti	31	G
Gb	tik Hijaz	jawab tik Hijaz	*29*	*G↓↓*
Gb			27	Gb↑
F#	Hijaz	jawab Hijaz	26	F#↓
F†	nim Hijaz	jawab nim Hijaz	*24*	*F↑↑*
F	Jaharkah	Mahuran	22	F
	tik Busalik	jawab tik Busalik		
E	Busalik	jawab Busalik	17	E↓
Eb	*Sikah*	*Buzrak*	*15.5*	*Eb↑↑½*
Eb	Kurd	Sunbulah	14	Eb↑
	nim Kurd	nim Sunbulah		
D	Dukah	Muhayar	9	D
Db	tik Zirkulah	tik Shahnaz	*7*	*D↓↓*
Db	Zirkulah	Shahnaz	5	Db↑
	nim Zirkulah	nim Shahnaz		
C	Rast	Kirdan	0	C
	tik Kawasht	tik Nihuft		
B	Kawasht	Nihuft	48	B↓
Bb	*Iraq*	*Awj*	*46*	*Bb↑↑*
Bb	qarer Ajam	Ajam	44	Bb
	qarar nim Ajam	nim Ajam		
A	Ushayran	Husayni	39	A↓
Ab	qarar tik Hisar	tik Hisar	*37.5*	*A↓↓½*
Ab	qarar Hisar	Hisar	36	Ab↑
	qarar nim Hisar	nim Hisar		
G	Yakah	Nawa	31	G

"nim" = lower "tik" = higher

C Root Written	Enharm. 53Et Written	G Root Sounds	Turkish Note Names Lower Octave	Turkish Note Names Upper Octave	Written	Sounds (P4 Lower)
C	53	G	ÇÂRGÂH	TÎZ ÇÂRGÂH	C	G
C↓	*52*	G↓	dik BÛSELIK	TÎZ dik BÛSELIK	*C↓*	*G↓*
B	*49*	F#	BÛSELIK	TÎZ BÛSELIK	B	F#
B↓	*48*	F#↓	Segâh	Tîz Segâh	*B↓*	*F#↓*
Bb↑	*45*	F↑	dik Kürdi	dik Sünbüle	*Bb↑*	*F↑*
Bb	*44*	F	Kürdi	Sünbüle	Bb	F
A	*40*	E	DÜGÂH	MUHAYYER	A	E
A↓	*39*	E↓	dik Zirgüle	dik Şehnâz	*A↓*	*E↓*
					Ab↑	Eb↑
Ab↑	36	Eb↑	Zirgüle	Şehnâz	*Ab*	*Eb*
Ab	*35*	Eb	nim Zirgüle	nim Şehnâz		
G	31	D	RAST	GERDÂNIYE	G	D
G↓	*30*	D↓	dik Gevest	dik Mâhûr	*G↓*	*D↓*
Gb↑	27	Db↑	Gevest	Mâhûr	Gb↑	Db↑
F#↓	26	C#↓	Irak	Eviç	F#↓	C#↓
F↑	*23*	C↑	Dik Acem Aşîrân	dik ACEM	*F↑*	*C↑*
F	22	C	ACEM AŞÎRÂN	ACEM	F	C
E	18	B	HÜSEYNÎ AŞÎRÂN	HÜSEYNÎ	E	B
E↓	*17*	B↓	Kaba dik Hisâr	dik Hisâr	*E↓*	*B↓*
					Eb↑	Bb↑
Eb↑	14	Bb↑	Kaba Hisâr	Hisâr	*Eb*	*Bb*
Eb	*13*	Bb	Kaba nim Hisâr	nim Hisâr		
D	9	A	YEGÂH	NEVÂ	D	A
D↓	*8*	A↓	Kaba dik Hicâz	dik Hicâz	*D↓*	*A↓*
Db↑	5	Ab↑	Kaba Hicâz	Hicâz	Db↑	Ab↑
Db	*4*	Ab	Kaba nim Hicâz	nim Hicâz	*Db*	*Ab*
(C↑)	*(1)*	(G↑)			*(C↑)*	*(G↑)*
C	0	G	KABA ÇÂRGÂH	ÇÂRGÂH	C	G

"nim" = lower "dik" = higher

Jins or Ajnas

Intervals measured by semitones
Not all possible transpositions of each Jin are shown

↓ = a Syntonic comma (81/80) or about 1/9 of a tone lower (21.51 cents)

Arabic Jins	Trichords	Tetrachords	Pentachords	Hexachords
Ajam **Jiharkah**	Bb 2 C 2 D F G A↓	Bb 2 C 2 D 1 Eb F G A↓ Bb	Bb 2 C 2 D 1 Eb 2 F F G A↓ Bb C	
Ajam Murassa	F 2 G 2 A	F 2 G 2 A 2 B	F 2 G 2 A 2 B 1 C	
Nahawand **Busalik** (Ushaq)		C 2 D 1 Eb 2 F D E F↓ G	C 2 D 1 Eb 2 F 2 G D E F↓ G A	
Saba Busalik				
Nahawand Murassa		D 2 E 1 F 1 Gb	C 2 D 1 Eb 2 F 1 Gb	
Nawa Athar (Nikriz) Nikriz on G Hisar on D			C 2 D 1 Eb 3 F# 1 G G A Bb C# D D E F G# A	
Athar Kurd			C 1 Db 2 Eb 3 F# 1 G	
Kurd		D 1 Eb 2 F 2 G	D 1 Eb 2 F 2 G 2 A	
Lami			D 1 Eb 2 F 2 G 1 Ab	
Saba Zamzam		D 1 Eb 2 F 1 Gb	D 1 Eb 2 F 1 Gb 3 A	D 1 Eb 2 F 1 Gb 3 A 1 Bb
Hijaz Kar **Shadd Araban** **Hijaz - Shahnaz** **Suzidil**		C 1 Db 3 E 1 F G Ab B 1 C D Eb F# 1 G A Bb C# 1 D		
Hijazkar			Ab 3 B 1 C 1 Db 3 E Eb F# G Ab B	
Hijaz Murassa			D 1 Eb 3 F# 1 G 1 Ab	
Rast (neutral third) **Yakah**		C 2 D 1½ Eb 1½ F G A Bb C	C 2 D 1½ Eb 1½ F 2 G G A Bb C D	
Bayati (neutral second)		D 1½ Eb 1½ F 2 G		
Saba **Saba Dalanshin**		D 1½ Eb 1½ F 1 Gb		D 1½ Eb 1½ F 1 Gb 3 A 1 Bb A Bb C Db E F
Sikah **Farahnak**	Eb 1½ F 2 G Bb C D	Bb 1½ C 2 D 2 E		
Huzzam **Rahat al-Arwah**		Eb 1½ F 2 G 1 Ab Bb C D Eb		
Iraq		Bb 1½ C 2 D 1½ Eb		
Awg	Bb 1½ C 3 D#	Bb 1½ C 3 D# ½ Eb		
Mukhalif Sharqi	Eb 1½ F 1 Gb			
Musta'ar	Eb 2½ F# 1 G	Eb 2½ F# 1 G 2(1) A(b)	Eb 2½ F# 1 G 3 A# ½ Bb Bb 2½ C# 1 D 2 E 1½ F♯ Eb 2 F♯ 1½ G 1½ Ab 2 Bb	
Sikah Baladi				
Sazkar			C 3 D# ½ Eb 1½ F 2 G G A# Bb C D	

Western, not Turkish accidentals used throughout.
All Turkish Jins sound a tone above Arabic Jins.

Intervals measured by Holdrian commas [2^(1/53) equals about 1/9 of a tone (22.64 cents)]
Theoretical and practical intervals mostly differ.

Turkish Jins Sound P4 Lower	Tetrachords Perfect 4th = 22 Commas	Pentachords Perfect 5th = 31 Commas
Cargah on C	C 9 D 9 E 4 F	C 9 D 9 E 4 F 9 G
Pencgah on G	C 9 D 9 E 8 F#	C 9 D 9 E 8 F# 5 G
Busalik on A	A 9 B 4 C 9 D	A 9 B 4 C 9 D 9 E
Nikriz on G	G 9 A 5 Bb 12 C#	G 9 A 5 Bb 12 C# 5 D
Kurdi on A	A 4 Bb 9 C 9 D	A 4 Bb 9 C 9 D 9 E
Hicaz on A	A 5 Bb 12(13) C# 5(4) D	A 5 Bb 12(13) C# 5(4) D 9 E
Rast on G Rast on D	G 9 A 8(7) Bb 5(6) C D E F+ G	G 9 A 8(7) Bb 5(6) C 9 D D E F+ G A
Ussak / Huseyni on A	A 8(7) Bb 5(6) C 9 D	A 8(7) Bb 5(6) C 9 D 9 E
Saba on A	A 8(7) Bb 5(6) C 5 Db	
Segah on Bb	Bb 5(6) C 9 D 8(7) Eb	Bb 5(6) C 9 D 8(7) Eb 9 F+
Ferahnak on F+	F+ 5(6) G 9 A 9 B	F+ 5(6) G 9 A 9 B 8(7) C+
Huzzam on Bb	Bb 5(6) C 9 D 5(4) Eb	Bb 5(6) C 9 D 5(4) Eb 12 F+
Mustear on Bb	Bb 9 C+ 5(6) D 8(7) Eb	Bb 9 C+ 5(6) D 8(7) Eb 9 F+

Maqams by Mode

/ → disjunct ghammaz   = → conjunct ghammaz   Variations outside the mode

I - Ajam / Ajam Modal Family

Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb

Ajam	Bb	2	C	2	D		Eb	2	F	2	G	2	A													
Nahawand			C	2	D	1	Eb	2	F		G	2	A	1	Bb	2	C									
Kurd					D	1	Eb	2	F	2	G		A	1	Bb	2	C	2	D							
Lami													A	1	Bb	2	C	2	D	1	Eb					

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

Ajam	Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	Ajam / Ajam
(Jiharkah Ajam)	F		G		A		Bb		C		D		E		F	
(Mahur)	C		D		E		F		G		A		B		C	
	G		A		B		C		D		E		F#		G	
(Ionian)																
Ajam Ushayran	Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	Ajam = Kurd = Nahawand

Acem Asiran on F	Cargah / Cargah
Cargah on C	Cargah / Cargah
Mahur on G	Cargah / Cargah

(Lydian)	**Shawq Awr**	Eb	2	F	2	G	2	A	1	Bb	2	C	2	D	1	Eb	Ajam Murassa / Ajam
		Bb		C		D		E		F		G		A		Bb	

(Mixolydian)	**Ajam Nahawand**	Bb		C		D		Eb		F		G		Ab		Bb	
		F	2	G	2	A	1	Bb	2	C	2	D	1	Eb	2	F	Ajam / Nahawand
		C		D		E		F		G		A		Bb		C	
		G		A		B		C		D		E		F		G	

Nahawand Kabir	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	2	C	Nahawand / Nahawand
(Dorian)																

	Nahawand-Kurd↓	C		D		Eb		F		G		Ab		Bb		C	(Nahawand = Nahawand)
(Aeolian)	Farahfaza↓	G	2	A	1	Bb	2	C	2	D	1	Eb	2	F	2	G	Nahawand / Kurd
	Busalik↓	D		E		F↓		G		A		Bb		C		D	Busalik / Kurd

Nihavend on G	Buselik / Kurdi
Ferahfeza on D	Buselik / Kurdi
Buselik↓ on A	Buselik / Kurdi

	Kurd-Kurd	C	1	Db	2	Eb	2	F	2	G	1	Ab	2	Bb	2	C	Kurd / Kurd
		C		Db		Eb		F		G		Ab		Bb		C	
		G		Ab		Bb		C		D		Eb		F		G	
(Phrygian)	**Kurd**	D	1	Eb	2	F	2	G	2	A	1	Bb	2	C	2	D	Kurd = Nahawand
		A		Bb		C		D		E		F		G		A	

Kurdili Hicazcar on G	Kurdi = Buselik
Kurdi on D	Kurdi = Buselik
Kurdi on A	Kurdi = Buselik

Hijazkar Kurd	C	1	Db	2	Eb	2	F	2	G	1	Ab	3	B	1	C	1	Db	3	E	Kurd / Hijazkar

(Locrian)	**Lami**	D		Eb		F		G		Ab		Bb		C		D	(Kurd = Kurd)
		A	1	Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	Lami == Kurd

Maqams by Mode

/ → disjunct ghammaz = → conjunct ghammaz **Variations outside the mode**

II - Ajam / Hijaz Modal Family

Bb		**C**		**D**		**Eb**		**F**		**Gb**		**A**		**Bb**	C		D		Eb		F		Gb		A		Bb
	2		**2**		**1**		**2**		**1**		**3**		**1**		2		2		1		2		1		3		1	

Ajam	**Bb**	2	C	2	D											
Nahawand			**C**	2	D	1	Eb	2	F							
Nahawand Murassa			**C**	2	D	1	Eb	2	F	1	Gb					
Saba Zamzam					**D**	1	Eb	2	F	1	Gb					
Nawa Athar (Nikriz)							**Eb**	2	F	1	Gb	3	A	1	Bb	
Hijaz									**F**	1	Gb	3	A	1	Bb	
Kurd													**A**	1	Bb	2	C	2	D

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

Shawq Afza	**Bb**	2	**C**	2	**D**	1	**Eb**	2	**F**	1	**Gb**	3	**A**	1	**Bb**
	F		**G**		**A**		**Bb**		**C**		**Db**		**E**		**F**
	C		**D**		**E**		**F**		**G**		**Ab**		**B**		**C**

Ajam / Hijaz

Nahawand Murassah (Sunbulah)	**C**	2	**D**	1	**Eb**	2	**F**	1	**Gb**	3	**A**	1	**Bb**	2	**C**

Nahawand = Hijaz
(Nahawand Murassa == Hijaz)

Saba Zamzam	**D**	1	**Eb**	2	**F**	1	**Gb**	3	**A**	1	**Bb**	2	**C**	2	**D**

Saba Zamzam == Hijaz = Ajam

Saba Zamzam	**D**	1	**Eb**	2	**F**	1	**Gb**	3	**A**	1	**Bb**	2	**C**	1	**Db**	3	**E**	1	**F**

Saba Zamzam == Hijaz = Nawa Athar

Saba	**D**	1½	**Eb**	1½	**F**	1	**Gb**	3	**A**	1	**Bb**	2	**C**	2	**D**

Saba == Hijaz = Ajam

Saba	**D**	1½	**Eb**	1½	**F**	1	**Gb**	3	**A**	1	**Bb**	2	**C**	1	**Db**	3	**E**	1	**F**

Saba == Hijaz = Nawa Athar

Saba Busalik	**D**	2	**E**	1	**F**	1	**Gb**	3	**A**	1	**Bb**	2	**C**	2	**D**

Saba Busalik == Hijaz = Ajam

Eb	2	F	1	Gb	3	A	1	Bb	2	C	2	D	1	Eb

(Nawa Athar = Ajam)

Zanjaran	**F**	1	**Gb**	3	**A**	1	**Bb**	2	**C**	2	**D**	1	**Eb**	2	**F**
(Zankulah)	**C**		**Db**		**E**		**F**		**G**		**A**		**Bb**		**C**
(Zingarin)	**G**		**Ab**		**B**		**C**		**D**		**E**		**F**		**G**
	D		**Eb**		**F#**		**G**		**A**		**B**		**C**		**D**

Hijaz = Ajam
or
Hijaz / Nahawand

A	1	Bb	2	C	2	D	1	Eb	2	F	1	Gb	3	A

(Kurd = Saba Zamzam)

Shawq Tarab	**A**	1	**Bb**	2	**C**	2	**D**	1½	**Eb**	1½	**F**	1	**Gb**	3	**A**

Kurd = Saba

Saba Zemzeme on A	**Saba == Hicaz == Kurd**

Saba on A	**Saba == Hicaz / Hicaz**

Maqams by Mode

/ → disjunct ghammaz = → conjunct ghammaz **Variations outside the mode**

III - Nawa Athar = Nahawand Modal Family

C		D		Eb		F#		G		A		Bb		C	D		Eb		F#		G		A		Bb		C
	2		1		3		1		2		1		2		2	1		3		1		2	1		2	

Nawa Athar	**C**	2	D	1	Eb	3	F#	1	G																	
(Nikriz)																										
Hijaz			**D**	1	Eb	3	F#	1	G																	
Saba Zamzam							**F#**	1	G	2	A	1	Bb													
Nahawand									**G**	2	A	1	Bb	2	C											
Kurd											**A**	1	Bb	2	C	2	D									
Ajam													**Bb**	2	C	2	D									

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

	Bb		**C**		**Db**		**E**		**F**		**G**		**Ab**		**Bb**											
	F		**G**		**Ab**		**B**		**C**		**D**		**Eb**		**F**											
Nikriz	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**	2	**A**	1	**Bb**	2	**C**											
(Zawil / Basandida)	**G**		**A**		**Bb**		**C#**		**D**		**E**		**F**		**G**											

Nawa Athar = Nahawand

Nikiriz↓ on G **Nikiriz = Buselik**

	C		**Db**		**E**		**F**		**G**		**Ab**		**Bb**		**C**											
	G		**Ab**		**B**		**C**		**D**		**Eb**		**F**		**G**											
Hijaz-Nahawand↓	**D**	1	**Eb**	3	**F#**	1	**G**	2	**A**	1	**Bb**	2	**C**	2	**D**											
	A		**Bb**		**C#**		**D**		**E**		**F**		**G**		**A**											

Hijaz = Nahawand

Hicaz↓ on A **Hicaz = Buselik**
Humayun↑ on A **Hicaz = Buselik**

Hijaz Gharib	**D**	1½	**Eb**	2	**F♭**	1½	**G**	2	**A**	1	**Bb**	2	**C**	2	**D**											

Sikah / Nahawand

F#	1	G	2	A	1	Bb	2	C	2	D	1	Eb	3	F#												

(Saba Zamzam = Ajam)

(Harmonic Minor)

Nahawand-Hijaz↑	**C**		**D**		**Eb**		**F**		**G**		**Ab**		**B**		**C**											
Sultani Yakah↑	**G**	2	**A**	1	**Bb**	2	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**											
	D		**E**		**F**		**G**		**A**		**Bb**		**C#**		**D**											

Nahawand / Hijaz

Sultaniyegah on D **Buselik / Hicaz**
Buselik↑ on A **Buselik / Hicaz**
Sehnaz Buselik on A **Buselik / Hicaz**

Tarz Nawayn	**A**	1	**Bb**	2	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**	2	**A**											

Kurd = Hijaz

Tarz Jadid	**Bb**	2	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**	2	**A**	1	**Bb**											

Ajam = Hijaz

Maqams by Mode

/ → disjunct ghammaz = → conjunct ghammaz **Variations outside the mode**

IV - Nawa Athar = Hijaz Modal Family

C		D		Eb		F#		G		Ab		B		C		D		Eb		F#		G		Ab		B		C
	2		1		3		1			1		3		1		2		1		3		1		1		3		1	

Nawa Athar (Nikriz)	**C**	2	D	1	Eb	3	F#	1	G																			
Hijaz			**D**	1	Eb	3	F#	1	**G**	1	Ab	3	B	1	C													
Hijazkar					**Eb**	3	F#	1	G	1	Ab	3	B															
Saba Zamzam													**B**	1	C	2	D	1	Eb									

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

	F		**G**		**Ab**		**B**		**C**		**Db**		**E**		**F**													
Nawa Athar	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**	1	**Ab**	3	**B**	1	**C**													
(Zawil / Basandida)	**G**		**A**		**Bb**		**C#**		**D**		**Eb**		**F#**		**G**													
Hisar	**D**		**E**		**F**		**G#**		**A**		**Bb**		**C#**		**D**													

Nawa Athar = Hijaz
(Nawa Athar === Hijazkar)

Nawa Athar-Kurd	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**	1	**Ab**	2	**Bb**	1	**C**													

Nawa Athar = Kurd

Bayati-Hijazkar	**D**	1½	**Eb**	1½	**F**	3	**G#**	1	**A**	1	**Bb**	3	**C#**	1	**D**													

Bayati = Hijazkar

Bayati-Hijaz	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	1	**Bb**	3	**C#**	1	**D**													

Bayati / Hijaz

Saba-Hijaz	**D**	1½	**Eb**	1½	**F**	1	**Gb**	3	**A**	1	**Bb**	3	**C#**	1	**D**													

Saba / Hijaz

	F		**Gb**		**Ab**		**B**		**C**		**Db**		**E**		**F**													
Athar Kurd	**C**	1	**Db**	2	**Eb**	3	**F#**	1	**G**	1	**Ab**	3	**B**	1	**C**													
(Kurdili Nawa Athar)	**G**		**Ab**		**Bb**		**C#**		**D**		**Eb**		**F#**		**G**													
	D		**Eb**		**F**		**G#**		**A**		**Bb**		**C#**		**D**													

Athar Kurd = Hijaz

D	1	Eb	3	F#	1	G	1	Ab	3	B	1	C	2	D														

(Hijaz = Hijaz)

Jiharkah Turki	**F**		**Gb**		**A**		**Bb**		**C**		**Db**		**E**		**F**													
Hijaz Kar	**C**		**Db**		**E**		**F**		**G**		**Ab**		**B**		**C**													
Shadd 'Araban	**G**	1	**Ab**	3	**B**	1	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**													
Shahnaz	**D**		**Eb**		**F#**		**G**		**A**		**Bb**		**C#**		**D**													
Suzidil	**A**		**Bb**		**C#**		**D**		**E**		**F**		**G#**		**A**													

Hijaz / Hijaz

Sikah Baladi	**G**	1½	**Ab**	2	**Bb**	1½	**C**	2	**D**	1½	**Eb**	2	**F♮**	1½	**G**													

Sikah / Sikah

Shahnaz Kurdi	**D**	1	**Eb**	2	**F**	2	**G**	2	**A**	1	**Bb**	3	**C#**	1	**D**													

Kurd / Hijaz

B	1	C	2	D	1	Eb	3	F#	1	G	1	Ab	3	B														

(Saba Zamzam = Hijazkar)

Nev'eser on G	**Nikiriz = Hicaz**

Hicazkar on C	**Hicaz / Hicaz**
Hicazkar on G	**Hicaz / Hicaz**
Sederaban on D	**Hicaz / Hicaz**
Zirguleli Hicaz on A	**Hicaz / Hicaz**
Suz-i Dil on E	**Hicaz / Hicaz**

Maqams by Mode

/ → disjunct ghammaz **= → conjunct ghammaz** **Variations outside the mode**

V - Rast / Ajam Modal Family

C		**D**		**Eb**		**F**		**G**		**A**		**B**		**C**	D		Eb		F		G		A		B		C
2		**1½**		**1½**		**2**		**2**		**2**		**1**			2		1½		1½		2		2		2		1

Rast	**C**	2	D	1½	Eb	1½	F																			
Bayati			**D**	1½	Eb	1½	F	2	G																	
Sikah					**Eb**	1½	F	2	G																	
Ajam Murassa							**F**	2	**G**	2	A	2	B													
Nahawand											**A**	2	B	1	C	2	D									

Mahur	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	2	**B**	1	**C**
	G		**A**		**Bb**		**C**		**D**		**E**		**F#**		**G**

Rast / Ajam

Nahfat	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	2	**B**	1	**C**	2	**D**

Bayati = Ajam
(Bayati / Nahawand)

Eb	1½	F	2	G	2	A	2	B	1	C	2	D	1½	Eb
Bb		C		D		E		F#		G		A		Bb

(Sikah / Nahawand)

F	2	G	2	A	2	B	1	C	2	D	1½	Eb	1½	F

(Ajam Murassa / Rast)

G	2	A	2	B	1	C	2	D	1½	Eb	1½	F	2	G

(Ajam / Rast)

A	2	B	1	C	2	D	1½	Eb	1½	F	2	G	2	A

(Nahawand = Bayati)

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

Maqams by Mode

/ → disjunct ghammaz = → conjunct ghammaz **Variations outside the mode**

VI - Rast / Nahawand Modal Family

C	D	Eb	F	G	A	Bb	C	D	Eb	F	G	A	Bb	C
2	1½	1½	2	2	1	2	2	1½	1½	2	2	1	2	

Rast	**C**	2	D	1½	Eb	1½	F											
Bayati			**D**	1½	Eb	1½	F	2	G									
Sikah					**Eb**	1½	F	2	G									
Jiharkah							**F**	2	G	2	A		**Bb**	2	C	2	D	**Ajam**
Nahawand									**G**	2	A	1	Bb	2	C			**Busalik***
Kurd											**A**	1	Bb	2	C	2	D	

* The minor third of the Busalik tetrachord is about 1/9 of a tone (comma) lower than in Nahawand

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

	F		**G**		**Ab**		**Bb**		**C**		**D**		**Eb**		**F**			
Suzdilar↓	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	1	**Bb**	2	**C**			**Rast / Nahawand**
Yakah↓	**G**		**A**		**Bb**		**C**		**D**		**E**		**F**		**G**			
	D		**E**		**F♯**		**G**		**A**		**B**		**C**		**D**			

	C		**Db**		**Eb**		**F**			**G**		**Ab**		**Bb**		**C**		
	G		**Ab**		**Bb**		**C**			**D**		**Eb**		**F**		**G**		
Bayati	**D**	1½	**Eb**	1½	**F**	2	**G**	2		**A**	1	**Bb**	2	**C**	2	**D**		**Bayati = Nahawand**
(Isfahan / Nawa)	**A**		**Bb**		**C**		**D**			**E**		**F**		**G**		**A**		**or Bayati / Kurd**

Sikah-Nahawand↓	**Eb**	1½	**F**	2	**G**	2	**A**	1	**Bb**	2	**C**	2	**D**	1½	**Eb**			**Sikah = Nahawand**
(Mayah / Awshar)	**Bb**		**C**		**D**		**E**		**F**		**G**		**A**		**Bb**			

Musta'ar	**Eb**	2½	**F#**	1	**G**	2	**A**	1	**Bb**	2	**C**	2	**D**	1½	**Eb**			**Musta'ar = Nahawand**
	Bb		**C#**		**D**		**E**		**F**		**G**		**A**		**Bb**			

	Eb	2½	**F#**	1	**G**	1½	**Ab**	2	**Bb**	1½	**C**	3	**D#**	½	**Eb**			
	Bb		**C#**		**D**		**Eb**		**F♮**		**G**		**A#**		**Bb**			

Jiharkah	**F**	2	**G**	2	**A**	1	**Bb**	2	**C**	2	**D**	1½	**Eb**	1½	**F**			**Jiharkah / Rast**
	Bb	2	C	2	D	1½	Eb	1½	F	2	G	2	A	1	Bb			(Ajam = Bayati)

Ushaq Masri	**G**	2	**A**	1	**Bb(↓)**	2	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**			**Nahawand / Bayati**
	D		**E**		**F(↓)**		**G**		**A**		**Bb**		**C**		**D**			(Busalik / Bayati)

A	1	Bb	2	C	2	D	1½	Eb	1½	F	2	G	2	A				(Kurd = Bayati)

Acemli Rast↓ on G	**Rast / Buselik**
Nisaburek↓ on A	**Rast / Buselik**
Ussak or Bayati on A	**Ussak = Buselik**
Neva↓ on A	**Ussak = Buselik**
Huseyni↓ on A	**Huseyni = Kurd**
Mustear on Bb	**Mustear / Hicaz**

Maqams by Mode

/ → disjunct ghammaz = → conjunct ghammaz **Variations outside the mode**

VII - Rast / Hijaz Modal Family

C	D	Eb	F	G	Ab	B	C	D	Eb	F	G	Ab	B	C
	2	1½	1½	2	1	3	1	2	1½	1½	2	1	3	1

Rast	**C**	2	D	1½	Eb	1½	F							
Bayati			**D**	1½	Eb	1½	F	2	G					
Sikah					**Eb**	1½	F	2	G					
Nawa Athar (Nikriz)							**F**	2	G	1	Ab	3	B	1	C
Hijaz									**G**	1	Ab	3	B	1	C

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

Suznak	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	1	**Ab**	3	**B**	1	**C**	**Rast / Hijaz**
	G		**A**		**Bb**		**C**		**D**		**Eb**		**F#**		**G**	
Rast Beshayer	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	1	**Ab**	2	**Bb**	2	**C**	**Rast / Kurd**
	G		**A**		**Bb**		**C**		**D**		**Eb**		**F**		**G**	

Suz-nak on G — **Rast / Hicaz**

Bayati Shuri	**G**		**Ab**		**Bb**		**C**		**Db**		**E**		**F**		**G**		
	D	1½	**Eb**	1½	**F**	2	**G**	1	**Ab**	3	**B**	1	**C**	2	**D**	**Bayati = Hijaz**	
	A		**Bb**		**C**		**D**		**Eb**		**F#**		**G**		**A**		

Karcigar on A — **Ussak = Hicaz**

Huzam	**Eb**	1½	**F**	2	**G**	1	**Ab**	3	**B**	1	**C**	2	**D**	1½	**Eb**	**Sikah = Hijaz**	
Rahat El Arwah	**Bb**		**C**		**D**		**Eb**		**F#**		**G**		**A**		**Bb**		
														1	Bb		
Awj 'Iraq	**Eb**	1½	**F**	2	**G**	1	**Ab**	3	**B**	1	**C**	3	**D#**	½	**Eb**	**Sikah = Hijaz = Sazkar**	
	Bb		**C**		**D**		**Eb**		**F#**		**G**		**A#**		**Bb**		

Huzzam on Bb — **Huzzam == Hicaz**

Nikriz-Rast	**F**	2	**G**	1	**Ab**	3	**B**	1	**C**	2	**D**	1½	**Eb**	1½	**F**	**Nawa Athar = Rast**	
	C		**D**		**Eb**		**F#**		**G**		**A**		**Bb**		**C**		

Nikiriz↑ on G — **Nikiriz = Rast**

Hijaz-Rast↑	**C**		**Db**		**E**		**F**		**G**		**Ab**		**Bb**		**C**	(Hijaz / Bayati)	
(Hijaz Awji)	**G**	1	**Ab**	3	**B**	1	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	**Hijaz = Rast**	
	D		**Eb**		**F#**		**G**		**A**		**Bb**		**C**		**D**		
	A		**Bb**		**C#**		**D**		**E**		**F♯**		**G**		**A**		

Uzzal on A	**Hicaz / Ussak**
Hicaz↑ on A	**Hicaz = Rast**
Humayun↓ on A	**Hicaz = Rast**

Maqams by Mode

/ → disjunct ghammaz = → conjunct ghammaz **Variations outside the mode**

VIII - Rast / Rast Modal Family

C	D	Eb	F	G	A	Bb	C	D	Eb	F	G	A	Bb	C
2	1½	1½	2	2	1½	1½	2	1½	1½	2	2	1½	1½	

Rast	**C**	2	D	1½	Eb	1½	F		**G**	2	A	1½	Bb	1½	C											
Bayati			**D**	1½	Eb	1½	F	2	G		**A**	1½	Bb	1½	C	2	D									
Sikah					**Eb**	1½	F	2	G				**Bb**	1½	C	2	D									
Jiharkah							**F**	2	G	2	A															

Arabic Oud in Concert C
Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Turkish Makams
(Sound P4 Lower)

(Kirdan on C)	**F**		**G**		**Ab**		**Bb**		**C**		**D**		**Eb**		**F**											
Rast-Rast↑	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	1½	**Bb**	1½	**C**											
Yakah↑	**G**		**A**		**Bb**		**C**		**D**		**E**		**F♭**		**G**											
	D		**E**		**F♭**		**G**		**A**		**B**		**C♭**		**D**											

Rast / Rast

Sazkar	**C**	3	**D#**	½	**Eb**	1½	**F**	2	**G**	2	**A**	1½	**Bb**	1½	**C**											

Sazkar = Rast

Dalanshin	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	1½	**Bb**	1½	**C**	1	**Db**	3	**E**	1	**F**					

Rast / Saba Dalanshin

Rast↑ on G — **Rast / Rast**

Nisaburek↑ on A — **Rast / Rast**

	G		**Ab**		**Bb**		**C**		**D**		**Eb**		**F**		**G**											
Husayni	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	1½	**Bb**	1½	**C**	2	**D**											

Bayati / Bayati

(Rahaw)	**G**		**Ab**		**Bb**		**C**		**D**		**Eb**		**F**		**G**											
Muhayar	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	1½	**Bb**	1½	**C**	2	**D**											

Bayati = Rast

Bayatayn (Arazbar)	**D**		**Eb**		**F**		**G**		**Ab**		**Bb**		**C**		**D**											
Husayni Ushayran	**A**	1½	**Bb**	1½	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**											

Bayati = Bayati

Muhayyer on A — **Huseyni = Ussak**

Huseyni↑ on A — **Huseyni = Ussak**

Tahir on A — **Ussak = Rast**

Neva↑ on A — **Ussak = Rast**

Azarbar on A — **Ussak = Ussak**

Segah on Bb — **Segah = Hicaz**

Sikah-Rast↑	**Eb**	1½	**F**	2	**G**	2	**A**	1½	**Bb**	1½	**C**	2	**D**	1½	**Eb**											
Farahnak↑	**Bb**		**C**		**D**		**E**		**F♭**		**G**		**A**		**Bb**											

Sikah = Rast

Ferahnak on F♭ — **Segah = Rast**

Iraq	**Bb**	1½	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**	2	**A**	1½	**Bb**											

Sikah = Bayati

Irak (Evic) on F♭ — **Segah = Ussak**

Awj Ara	**Bb**	1½	**C**	3	**D#**	½	**Eb**	2½	**F#**	1	**G**	3	**A#**	½	**Bb**											

Awj = Musta'ar

Bastanikar	**Bb**	1½	**C**	2	**D**	1½	**Eb**	1½	**F**	1	**Gb**	3	**A**	1	**Bb**											

Sikah = Saba == Hicaz

Bestenigar on F♭ — **Segah = Saba == Hicaz**

F	2	G	2	A	1½	Bb	1½	C	2	D	1½	Eb	1½	F												

(Jiharkah = Bayati)

Nairuz (Nerz Rast)	**C**		**D**		**Eb**		**F**		**G**		**Ab**		**Bb**		**C**											
Yakah	**G**	2	**A**	1½	**Bb**	1½	**C**	2	**D**	1½	**Eb**	1½	**F**	2	**G**											
Nishaburk	**D**		**E**		**F♭**		**G**		**A**		**Bb**		**C**		**D**											

Rast / Bayati
(Rast = Rast)

8 Modal Families

/ → disjunct ghammaz = → conjunct ghammaz

I - Ajam / Ajam Modal Family

Bb 2 C 2 D 1 Eb 2 | F 2 G 2 A 1 Bb

II - Ajam / Hijaz Modal Family

Bb 2 C 2 D 1 Eb 2 | F 1 Gb 3 A 1 Bb

III - Nawa Athar = Nahawand Modal Family

C 2 D 1 Eb 3 F# 1 | G 2 A 1 Bb 2 C

IV - Nawa Athar = Hijaz Modal Family

C 2 D 1 Eb 3 F# 1 | G 1 Ab 3 B 1 C

V - Rast / Ajam Modal Family

C 2 D 1½ Eb 1½ F 2 | G 2 A 2 B 1 C

VI - Rast / Nahawand Modal Family

C 2 D 1½ Eb 1½ F 2 | G 2 A 1 Bb 2 C

VII - Rast / Hijaz Modal Family

C 2 D 1½ Eb 1½ F 2 | G 1 Ab 3 B 1 C

(Awj 'Iraq variation with D# can be also found here)

VIII - Rast / Rast Modal Family

C 2 D 1½ Eb 1½ F 2 | G 2 A 1½ Bb 1½ C

(Awj Ara variation with A# can be also found here)

Bb root Modes transposed to A D G C F (Bb)

G# C# F# B E | A D G C F | Bb Eb | Ab Db | Gb

D# G# C# | F# B (E) A D G | C F Bb Eb Ab | Db Gb

C root Modes transposed to A D G (C) F Bb

Primary Quarter-tones on C

F𝄲 B𝄭 E𝄭 A𝄭 D𝄭 G𝄭

(G𝄲) C𝄲 F𝄲 | B𝄭 E𝄭 | A𝄭 D𝄭

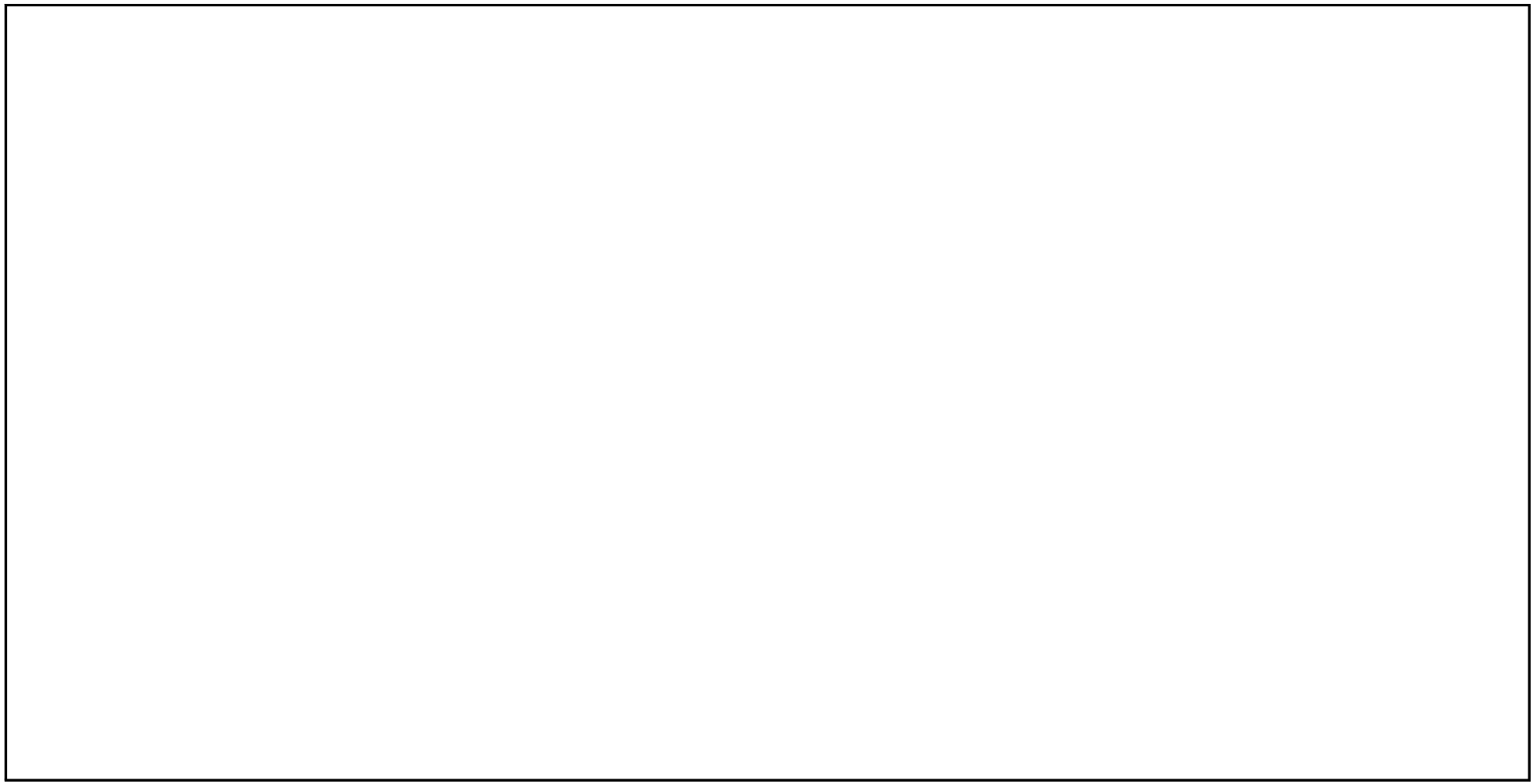
C root Quarter-tones transposed to A D G (C) F Bb

D# G# C# F# B E A D G C F Bb Eb Ab Db Gb Cb Fb

Complete Chromatic pitch set on A D G C F Bb roots

D𝄲 G𝄲 C𝄲 | F𝄲 B𝄭 E𝄭 A𝄭 D𝄭 G𝄭 | C𝄭 F𝄭

Complete Primary Quarter-tones on A D G C F Bb roots



Maqams - A Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams																	Turkish Makams (Sound P4 lower)	
- I -																			
	Kurd	**A**	1	**Bb**	2	**C**	2	**D**	2	**E**	1	**F**	2	**G**	2	**A**	**Kurd = Nahawand**	**Kurdi on E**	**Kurdi = Buselik**
	Lami	**A**	1	**Bb**	2	**C**	2	**D**	1	**Eb**	2	**F**	2	**G**	2	**A**	**Lami == Kurd**		
- II -																			
		A	1	Bb	2	C	2	D	1	Eb	2	F	1	Gb	3	A	(Kurd = Saba Zamzam)		
	Shawq Tarab	**A**	1	**Bb**	2	**C**	2	**D**	1½	**Eb**	1½	**F**	1	**Gb**	3	**A**	**Kurd = Saba**		
- III -																			
	Hijaz-Nahawand↓	**A**	1	**Bb**	3	**C#**	1	**D**	2	**E**	1	**F**	2	**G**	2	**A**	**Hijaz = Nahawand**	**Hicaz↓ on E**	**Hicaz = Buselik**
	Tarz Nawayn	**A**	1	**Bb**	2	**C**	2	**D**	1	**Eb**	3	**F#**	1	**G**	2	**A**	**Kurd = Hijaz**		
- IV -																			
	Suzidil	**A**	1	**Bb**	3	**C#**	1	**D**	2	**E**	1	**F**	3	**G#**	1	**A**	**Hijaz / Hijaz**	**Suz-i Dil on E**	**Hicaz / Hicaz**

Maqams - A Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams															Turkish Makams (Sound P4 lower)		
- V -		A	2	B	1	C	2	D	1½	E♭	1½	F	2	G	2	A	(Nahawand = Bayati)	
- VI -																	(Bayati / Kurd)	
	Bayati	**A**	1½	**B♭**	1½	**C**	2	**D**	2	**E**	1	**F**	2	**G**	2	**A**	**Bayati = Nahawand**	**Ussak or Bayati on E** / **Ussak = Buselik**
		A	1	B♭	2	C	2	D	1½	E♭	1½	F	2	G	2	A	(Kurd = Bayati)	
- VII -	**Bayati Shuri**	**A**	1½	**B♭**	1½	**C**	2	**D**	1	**E♭**	3	**F#**	1	**G**	2	**A**	**Bayati = Hijaz**	
	Hijaz-Rast↑	**A**	1	**B♭**	3	**C#**	1	**D**	2	**E**	1½	**F♯**	1½	**G**	2	**A**	**Hijaz = Rast**	**Hicaz↑ on E** / **Hicaz = Rast**
- VIII -	**Husayni Ushayran**	**A**	1½	**B♭**	1½	**C**	2	**D**	1½	**E♭**	1½	**F**	2	**G**	2	**A**	**Bayati = Bayati**	

Maqams - D Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams																				Turkish Makams (Sound P4 lower)	
- I -																						
	Busalik↓	D	2	E	1	F↓	2	G	2	A	1	Bb	2	C	2	D					Busalik / Kurd	Buselik↓ on A / Buselik / Kurdi
	Kurd	D	1	Eb	2	F	2	G	2	A	1	Bb	2	C	2	D					Kurd = Nahawand	Kurdi on A / Kurdi = Buselik
	Lami	D	1	Eb	2	F	2	G	1	Ab	2	Bb	2	C	2	D					Lami == Kurd	
- II -																						
	Saba Zamzam	D	1	Eb	2	F	1	Gb	3	A	1	Bb	2	C	2	D					Saba Zamzam == Hijaz = Ajam	
	Saba Zamzam	D	1	Eb	2	F	1	Gb	3	A	1	Bb	2	C	1	Db	3	E	1	F	Saba Zamzam == Hijaz = Nawa Athar	
	Saba	D	1½	Eb	1½	F	1	Gb	3	A	1	Bb	2	C	2	D					Saba == Hijaz = Ajam	Saba Zemzeme on A / Saba == Hicaz == Kurd
	Saba	D	1½	Eb	1½	F	1	Gb	3	A	1	Bb	2	C	1	Db	3	E	1	F	Saba == Hijaz = Nawa Athar	Saba on A / Saba == Hicaz / Hicaz
	Saba Busalik	D	2	E	1	F	1	Gb	3	A	1	Bb	2	C	2	D					Saba Busalik == Hijaz = Ajam	
	Zanjaran	D	1	Eb	3	F#	1	G	2	A	2	B	1	C	2	D					Hijaz = Ajam or Hijaz / Nahawand	
- III -																						
	Hijaz-Nahawand↓	D	1	Eb	3	F#	1	G	2	A	1	Bb	2	C	2	D					Hijaz = Nahawand	Hicaz↓ on A / Humayun↑ on A / Hicaz = Buselik
	Hijaz Gharib	D	1½	Eb	2	F♯	1½	G	2	A	1	Bb	2	C	2	D					Sikah / Nahawand	
	Nahawand-Hijaz↑	D	2	E	1	F	2	G	2	A	1	Bb	3	C#	1	D					Nahawand / Hijaz	Sehnaz Buselik on A / Buselik↑ on A / Buselik / Hicaz
- IV -																						
	Hisar	D	2	E	1	F	3	G#	1	A	1	Bb	3	C#	1	D					Nawa Athar = Hijaz	Nev'eser on A / Nikiriz = Hicaz
	Athar Kurd	D	1	Eb	2	F	3	G#	1	A	1	Bb	3	C#	1	D					Athar Kurd = Hijaz	
	Bayati-Hijazkar	D	1½	Eb	1½	F	3	G#	1	A	1	Bb	3	C#	1	D					Bayati = Hijazkar	
	Bayati-Hijaz	D	1½	Eb	1½	F	2	G	2	A	1	Bb	3	C#	1	D					Bayati / Hijaz	
	Saba-Hijaz	D	1½	Eb	1½	F	1	Gb	3	A	1	Bb	3	C#	1	D					Saba / Hijaz	
		D	1	Eb	3	F#	1	G	1	Ab	3	B	1	C	2	D					(Hijaz = Hijaz)	
	Shahnaz	D	1	Eb	3	F#	1	G	2	A	1	Bb	3	C#	1	D					Hijaz / Hijaz	Zirguleli Hicaz on A / Hicaz / Hicaz
	Shahnaz Kurdi	D	1	Eb	2	F	2	G	2	A	1	Bb	3	C#	1	D					Kurd / Hijaz	

Maqams - D Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams																Turkish Makams (Sound P4 lower)		
- V -																			
	Nahfat	D	1½	E♭	1½	F	2	G	2	A	2	B	1	C	2	D	Bayati = Ajam (Bayati / Nahawand)		
- VI -																			
	Suzdilar↓	D	2	E	1½	F𝄲	1½	G	2	A	2	B	1	C	2	D	Rast / Nahawand	Nisaburek↓ on A	Rast / Buselik
	Bayati	D	1½	E♭	1½	F	2	G	2	A	1	B♭	2	C	2	D	Bayati = Nahawand or Bayati / Kurd	Ussak or Bayati on A	Neva↓ on A Huseyni↓ on A	Ussak = Buselik Huseyni = Kurd
	Ushaq Masri	D	2	E	1	F(↓)	2	G	2	A	1½	B♭	1½	C	2	D	Nahawand / Bayati (Busalik / Bayati)		
- VII -																			
	Bayati Shuri	D	1½	E♭	1½	F	2	G	1	A♭	3	B	1	C	2	D	Bayati = Hijaz	Karcigar on A	Ussak = Hicaz
	Hijaz-Rast↑ (Hijaz Awji)	D	1	E♭	3	F#	1	G	2	A	1½	B♭	1½	C	2	D	Hijaz = Rast (Hijaz / Bayati)	Hicaz↑ on A Uzzal on A	Humayun↓ on A	Hicaz = Rast Hicaz / Ussak
- VIII -																			
	Rast-Rast↑	D	2	E	1½	F𝄲	1½	G	2	A	2	B	1½	C𝄲	1½	D	Rast / Rast	Nisaburek↑ on A	Rast / Rast
	Muhayar	D	1½	E♭	1½	F	2	G	2	A	1½	B♭	1½	C	2	D	Bayati = Rast	Tahir on A	Neva↑ on A	Ussak = Rast
	Husayni	D	1½	E♭	1½	F	2	G	2	A	1½	B♭	1½	C	2	D	Bayati / Bayati	Muhayyer on A	Huseyni↑ on A	Huseyni = Ussak
	Bayatayn (Arazbar)	D	1½	E♭	1½	F	2	G	1½	A♭	1½	B♭	2	C	2	D	Bayati = Bayati (Rast = Rast)	Azarbar on A	Ussak = Ussak
	Nishaburk (Nairuz)	D	2	E	1½	F𝄲	1½	G	2	A	1½	B♭	1½	C	2	D	Rast / Bayati		

Maqams - G Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams															Turkish Makams (Sound P4 lower)	
- I -																	
	Ajam	G	2	A	2	B	1	C	2	D	2	E	2	F#	1	G	Ajam / Ajam	Cargah on D	Cargah / Cargah
	Ajam Nahawand	G	2	A	2	B	1	C	2	D	2	E	1	F	2	G	Ajam / Nahawand		
	Farahfaza↓	G	2	A	1	Bb	2	C	2	D	1	Eb	2	F	2	G	Nahawand / Kurd (Nahawand = Nahawand)	Ferahfeza on D	Buselik / Kurdi
	Kurd	G	1	Ab	2	Bb	2	C	2	D	1	Eb	2	F	2	G	Kurd = Nahawand	Kurdi on D	Kurdi = Buselik
- II -																	
	Zingarin	G	1	Ab	3	B	1	C	2	D	2	E	1	F	2	G	Hijaz = Ajam or Hijaz / Nahawand		
- III -																	
	Nikriz	G	2	A	1	Bb	3	C#	1	D	2	E	1	F	2	G	Nawa Athar = Nahawand		
	Hijaz-Nahawand↓	G	1	Ab	3	B	1	C	2	D	1	Eb	2	F	2	G	Hijaz = Nahawand	Hicaz↓ on D	Hicaz = Buselik
	Sultani Yakah↑	G	2	A	1	Bb	2	C	2	D	1	Eb	3	F#	1	G	Nahawand / Hijaz	Sultaniyegah on D	Buselik / Hicaz
- IV -	(Zawil / Basandida)																
	Nawa Athar	G	2	A	1	Bb	3	C#	1	D	1	Eb	3	F#	1	G	Nawa Athar = Hijaz	Nev'eser on D	Nikiriz = Hicaz
	Athar Kurd	G	1	Ab	2	Bb	3	C#	1	D	1	Eb	3	F#	1	G	Athar Kurd = Hijaz		
	Shadd 'Araban	G	1	Ab	3	B	1	C	2	D	1	Eb	3	F#	1	G	Hijaz / Hijaz	Sederaban on D	Hicaz / Hicaz
	Sikah Baladi	G	1½	Ab	2	Bb	1½	C	2	D	1½	Eb	2	F♭	1½	G	Sikah / Sikah		

Maqams - G Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams															Turkish Makams (Sound P4 lower)		
- V -	Mahur	G	2	A	1½	B♭	1½	C	2	D	2	E	2	F#	1	G	Rast / Ajam		
		G	2	A	2	B	1	C	2	D	1½	E♭	1½	F	2	G	(Ajam / Rast)		
- VI -	Yakah↓	G	2	A	1½	B♭	1½	C	2	D	2	E	1	F	2	G	Rast / Nahawand	Rast↓ on D	Rast / Buselik
	Bayati	G	1½	A♭	1½	B♭	2	C	2	D	1	E♭	2	F	2	G	Bayati = Nahawand or Bayati / Kurd	Ussak or Bayati on D: Neva↓ on D	Ussak = Buselik
																		Huseyni↓ on D	Huseyni = Kurd
	Ushaq Masri	G	2	A	1	B♭(↓)	2	C	2	D	1½	E♭	1½	F	2	G	Nahawand / Bayati (Busalik / Bayati)		
- VII -	Suznak	G	2	A	1½	B♭	1½	C	2	D	1	E♭	3	F#	1	G	Rast / Hijaz	Suz-nak on D	Rast / Hicaz
	Rast Beshayer	G	2	A	1½	B♭	1½	C	2	D	1	E♭	2	F	2	G	Rast / Kurd		
	Bayati Shuri	G	1½	A♭	1½	B♭	2	C	1	D♭	3	E	1	F	2	G	Bayati = Hijaz	Karcigar on D	Ussak = Hicaz
	Hijaz-Rast↑	G	1	A♭	3	B	1	C	2	D	1½	E♭	1½	F	2	G	Hijaz = Rast	Hicaz↑ on D	Hicaz = Rast
- VIII -	Yakah↑	G	2	A	1½	B♭	1½	C	2	D	2	E	1½	F♯	1½	G	Rast / Rast	Rast↑ on D	Rast / Rast
	Muhayer	G	1½	A♭	1½	B♭	2	C	2	D	1½	E♭	1½	F	2	G	Bayati = Rast	Tahir on D / Neva↑ on D	Ussak = Rast
	Husayni	G	1½	A♭	1½	B♭	2	C	2	D	1½	E♭	1½	F	2	G	Bayati / Bayati	Huseyni↑ on D / Muhayyer on D	Huseyni = Ussak
	Yakah (Nairuz)	G	2	A	1½	B♭	1½	C	2	D	1½	E♭	1½	F	2	G	Rast / Bayati (Rast = Rast)		

Maqams - C Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams																									Turkish Makams (Sound P4 lower)	
- I -																											
	Ajam (Mahur)	C	2	D	2	E	1	F	2	G	2	A	2	B	1	C										Ajam / Ajam	Mahur on G	Cargah / Cargah
	Ajam Nahawand	C	2	D	2	E	1	F	2	G	2	A	1	Bb	2	C										Ajam / Nahawand	
	Nahawand Kabir	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	2	C										Nahawand / Nahawand	
	Nahawand-Kurd↓	C	2	D	1	Eb	2	F	2	G	1	Ab	2	Bb	2	C										Nahawand / Kurd	Nihavend on G	Buselik / Kurdi
																										(Nahawand = Nahawand)	
	Kurd	C	1	Db	2	Eb	2	F	2	G	1	Ab	2	Bb	2	C										Kurd = Nahawand	Kurdili Hicazcar on G	Kurdi = Buselik
	Kurd-Kurd	C	1	Db	2	Eb	2	F	2	G	1	Ab	2	Bb	2	C										Kurd / Kurd	
	Hijazkar Kurd	C	1	Db	2	Eb	2	F	2	G	1	Ab	3	B	1	C	1	Db	3	E						Kurd / Hijazkar	
- II -																											
	Shawq Afza	C	2	D	2	E	1	F	2	G	1	Ab	3	B	1	C										Ajam / Hijaz	
	Nahawand Murassah (Sunbulah)	C	2	D	1	Eb	2	F	1	Gb	3	A	1	Bb	2	C										Nahawand = Hijaz	
																										(Nahawand Murassa == Hijaz)	
	Zankulah	C	1	Db	3	E	1	F	2	G	2	A	1	Bb	2	C										Hijaz = Ajam or Hijaz / Nahawand	
- III -																											
	Nikriz	C	2	D	1	Eb	3	F#	1	G	2	A	1	Bb	2	C										Nawa Athar = Nahawand	Nikiriz↓ on G	Nikiriz = Buselik
	Hijaz-Nahawand↓	C	1	Db	3	E	1	F	2	G	1	Ab	2	Bb	2	C										Hijaz = Nahawand	Hicaz↓ on G	Hicaz = Buselik
	Nahawand-Hijaz↑	C	2	D	1	Eb	2	F	2	G	1	Ab	3	B	1	C										Nahawand / Hijaz	Buselik↑ on G	Buselik / Hicaz
- IV -																											
	Nawa Athar	C	2	D	1	Eb	3	F#	1	G	1	Ab	3	B	1	C										Nawa Athar = Hijaz	Nev'eser on G	Nikiriz = Hicaz
	Athar Kurd	C	1	Db	2	Eb	3	F#	1	G	1	Ab	3	B	1	C										Athar Kurd = Hijaz	
	Nawa Athar-Kurd	C	2	D	1	Eb	3	F#	1	G	1	Ab	2	Bb	1	C										Nawa Athar = Kurd	
	Hijaz Kar	C	1	Db	3	E	1	F	2	G	1	Ab	3	B	1	C										Hijaz / Hijaz	Hicazkar on G	Hicaz / Hicaz

Maqams - C Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams															Turkish Makams (Sound P4 lower)		
- V -																		
	Mahur	C	2	D	1½	Eb	1½	F	2	G	2	A	2	B	1	C	Rast / Ajam	
- VI -																		
	Suzdilar↓	C	2	D	1½	Eb	1½	F	2	G	2	A	1	Bb	2	C	Rast / Nahawand	Acemli Rast↓ on G / Rast / Buselik
	Bayati	C	1½	Db	1½	Eb	2	F	2	G	1	Ab	2	Bb	2	C	Bayati = Nahawand or Bayati / Kurd	Ussak or Bayati on G / Ussak = Buselik
- VII -																		
	Suznak	C	2	D	1½	Eb	1½	F	2	G	1	Ab	3	B	1	C	Rast / Hijaz	Suz-nak on G / Rast / Hicaz
	Rast Beshayer	C	2	D	1½	Eb	1½	F	2	G	1	Ab	2	Bb	2	C	Rast / Kurd	
	Nikriz-Rast	C	2	D	1	Eb	3	F#	1	G	2	A	1½	Bb	1½	C	Nawa Athar = Rast	Nikiriz↑ on G / Nikiriz = Rast
	Hijaz-Rast↑	C	1	Db	3	E	1	F	2	G	1½	Ab	1½	Bb	2	C	Hijaz = Rast	Hicaz↑ on G / Hicaz = Rast
- VIII -																		
	Rast-Rast↑ (Kirdan)	C	2	D	1½	Eb	1½	F	2	G	2	A	1½	Bb	1½	C	Rast / Rast	Rast↑ on G / Rast / Rast
	Sazkar	C	3	D#	½	Eb	1½	F	2	G	2	A	1½	Bb	1½	C	Sazkar = Rast	
	Dalanshin	C	2	D	1½	Eb	1½	F	2	G	2	A	1½	Bb	1½	C 1 Db 3 E 1 F	Rast / Saba Dalanshin	
	Nairuz (Nerz Rast)	C	2	D	1½	Eb	1½	F	2	G	1½	Ab	1½	Bb	2	C	Rast / Bayati or Rast = Rast	

Maqams - F Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams																Turkish Makams (Sound P4 lower)		
- I -	Jiharkah Ajam	F	2	G	2	A	1	Bb	2	C	2	D	2	E	1	F	Ajam / Ajam	Cargah on C	Cargah / Cargah
	Ajam Nahawand	F	2	G	2	A	1	Bb	2	C	2	D	1	Eb	2	F	Ajam / Nahawand		
- II -	Shawq Afza	F	2	G	2	A	1	Bb	2	C	1	Db	3	E	1	F	Ajam / Hijaz		
	Zanjaran	F	1	Gb	3	A	1	Bb	2	C	2	D	1	Eb	2	F	Hijaz = Ajam or Hijaz / Nahawand		
- III -	Nikriz	F	2	G	1	Ab	3	B	1	C	2	D	1	Eb	2	F	Nawa Athar = Nahawand		
- IV -	Nawa Athar	F	2	G	1	Ab	3	B	1	C	1	Db	3	E	1	F	Nawa Athar = Hijaz	Nev'eser on C	Nikiriz = Hicaz
	Athar Kurd	F	1	Gb	2	Ab	3	B	1	C	1	Db	3	E	1	F	Athar Kurd = Hijaz		
	Jiharkah Turki	F	1	Gb	3	A	1	Bb	2	C	1	Db	3	E	1	F	Hijaz / Hijaz	Hicazkar on C	Hicaz / Hicaz
- V -		F	2	G	2	A	2	B	1	C	2	D	1½	Eb	1½	F	(Ajam Murrassa / Rast)		
- VI -	Suzdilar↓	F	2	G	1½	Ab	1½	Bb	2	C	2	D	1	Eb	2	F	Rast / Nahawand	Rast↓ on C	Rast / Buselik
	Jiharkah	F	2	G	2	A	1	Bb	2	C	2	D	1½	Eb	1½	F	Jiharkah / Rast		
- VII -	Nikriz-Rast	F	2	G	1	Ab	3	B	1	C	2	D	1½	Eb	1½	F	Nawa Athar = Rast		
- VIII -	Rast-Rast↑	F	2	G	1½	Ab	1½	Bb	2	C	2	D	1½	Eb	1½	F	Rast / Rast	Rast↑ on C	Rast / Rast
		F	2	G	2	A	1½	Bb	1½	C	2	D	1½	Eb	1½	F	(Jiharkah = Bayati)		

Maqams - Bb Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams															Turkish Makams (Sound P4 lower)
- I -	Ajam	Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	Ajam / Ajam
	Ajam Ushayran	Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	Ajam = Kurd = Nahawand
	Ajam Nahawand	Bb	2	C	2	D	1	Eb	2	F	2	G	1	Ab	2	Bb	Ajam / Nahawand
	Shawq Awr	Bb	2	C	2	D	2	E	1	F	2	G	2	A	1	Bb	Ajam Murassa / Ajam
- II -	Shawq Afza	Bb	2	C	2	D	1	Eb	2	F	1	Gb	3	A	1	Bb	Ajam / Hijaz
- III -	Nikriz	Bb	2	C	1	Db	3	E	1	F	2	G	1	Ab	2	Bb	Nawa Athar = Nahawand
	Tarz Jadid	Bb	2	C	2	D	1	Eb	3	F#	1	G	2	A	1	Bb	Ajam = Hijaz
- IV -																	
- V -																	
- VI -		Bb	2	C	2	D	1½	Eb	1½	F	2	G	2	A	1	Bb	(Ajam = Bayati)
- VII -																	
- VIII -																	

Acem Asiran on F	Cargah / Cargah

Maqams - B♭ Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams														Turkish Makams (Sound P4 lower)	
- V -		B♭	1½	C	2	D	2	E	2	F#	1	G	2	A	1½	B♭	(Sikah / Nahawand)	
- VI -																		
	Sikah-Nahawand↓	B♭	1½	C	2	D	2	E	1	F	2	G	2	A	1½	B♭	Sikah = Nahawand	
	Musta'ar	B♭	2½	C#	1	D	2	E	1	F	2	G	2	A	1½	B♭	Musta'ar = Nahawand	
		B♭	2½	C#	1	D	1½	E♭	2	F𝄲	1½	G	3	A#	½	B♭		Mustear on F𝄲 / Mustear / Hicaz
- VII -																		
	Rahat El Arwah	B♭	1½	C	2	D	1	E♭	3	F#	1	G	2	A	1½	B♭	Sikah = Hijaz	Huzzam on F𝄲 / Huzzam == Hicaz
	Awj 'Iraq	B♭	1½	C	2	D	1	E♭	3	F#	1	G	3	A#	½	B♭	Sikah = Hijaz = Sazkar	
- VIII -																		
	Farahnak↑	B♭	1½	C	2	D	2	E	1½	F𝄲	1½	G	2	A	1½	B♭	Sikah = Rast	Ferahnak on F𝄲 / Segah = Rast
	Iraq	B♭	1½	C	2	D	1½	E♭	1½	F	2	G	2	A	1½	B♭	Sikah = Bayati	Irak (Evic) on F𝄲 / Segah = Ussak
	Awj Ara	B♭	1½	C	3	D#	½	E♭	2½	F#	1	G	3	A#	½	B♭	Awj = Musta'ar	
	Bastanikar	B♭	1½	C	2	D	1½	E♭	1½	F	1	G♭	3	A	1	B♭	Sikah = Saba == Hicaz	Bestenigar on F𝄲 / Segah = Saba == Hicaz

Maqams - E♭ Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams															Turkish Makams (Sound P4 lower)	
- V -		E♭	1½	F	2	G	2	A	2	B	1	C	2	D	1½	E♭	(Sikah / Nahawand)	
- VI -	Sikah-Nahawand↓	E♭	1½	F	2	G	2	A	1	B♭	2	C	2	D	1½	E♭	Sikah = Nahawand	
	Musta'ar	E♭	2½	F#	1	G	2	A	1	B	2	C	2	D	1½	E♭	Musta'ar = Nahawand	
		E♭	2½	F#	1	G	1½	A♭	2	B♭	1½	C	3	D#	½	E♭	Mustear on B♭	Mustear / Hicaz
- VII -	Huzam	E♭	1½	F	2	G	1	A♭	3	B	1	C	2	D	1½	E♭	Sikah = Hijaz	Huzzam on B♭ / Huzzam == Hicaz
	Awj 'Iraq	E♭	1½	F	2	G	1	A♭	3	B	1	C	3	D#	½	E♭	Sikah = Hijaz = Sazkar	
- VIII -	Sikah-Rast↑	E♭	1½	F	2	G	2	A	1½	B♭	1½	C	2	D	1½	E♭	Sikah = Rast	Ferahnak on B♭ / Segah = Rast

Maqams - Eb Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams															Turkish Makams (Sound P4 lower)
- I -	**Shawq Awr**	**Eb**	2	**F**	2	**G**	2	**A**	1	**Bb**	2	**C**	2	**D**	1	**Eb**	**Ajam Murassa / Ajam**
- II -		Eb	2	F	1	Gb	3	A	1	Bb	2	C	2	D	1	Eb	(Nawa Athar = Ajam)
- III -																	
- IV -																	

Maqams - F# / B Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	Turkish Makams (Sound P4 lower)
- I -		
- II -		
- III -	F# 1 G 2 A 1 Bb 2 C 2 D 1 Eb 3 F#	(Saba Zamzam = Ajam)
- IV -	B 1 C 2 D 1 Eb 3 F# 1 G 1 Ab 3 B	(Saba Zamzam = Hijazkar)

Maqams

Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams A Root															Turkish Makams (Sound P4 lower)		
VII	Hijaz-Rast↑	A	1	Bb	3	C#	1	D	2	E	1½	F♯	1½	G	2	A	Hijaz = Rast	Hicaz↑ on E	Hicaz = Rast
III	Hijaz-Nahawand↓	A	1	Bb	3	C#	1	D	2	E	1	F	2	G	2	A	Hijaz = Nahawand	Hicaz↓ on E	Hicaz = Buselik

Maqams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	D Root														Turkish Makams (Sound P4 lower)	
																Hicaz↑ on A	
VII	Hijaz-Rast↑	D	1	Eb	3	F#	1	G	2	A	1½	Bb	1½	C	2	D	Hijaz = Rast	Humayun↓ on A	Hicaz = Rast
III	Hijaz-Nahawand↓	D	1	Eb	3	F#	1	G	2	A	1	Bb	2	C	2	D	Hijaz = Nahawand	Hicaz↓ on A	Hicaz = Buselik
																		Humayun↑ on A	
III	Nahawand-Hijaz↑	D	2	E	1	F	2	G	2	A	1	Bb	3	C#	1	D	Nahawand / Hijaz	Buselik↑ on A	Buselik / Hicaz
I	Busalik↓	D	2	E	1	F↓	2	G	2	A	1	Bb	2	C	2	D	Busalik / Kurd	Buselik↓ on A	Buselik / Kurdi
VIII	Rast-Rast↑	D	2	E	1½	F𝄽	1½	G	2	A	2	B	1½	C𝄽	1½	D	Rast / Rast	Nisaburek↑ on A	Rast / Rast
VI	Suzdilar↓	D	2	E	1½	F𝄽	1½	G	2	A	2	B	1	C	2	D	Rast / Nahawand	Nisaburek↓ on A	Rast / Buselik
VIII	Muhayar	D	1½	E𝄭	1½	F	2	G	2	A	1½	B𝄭	1½	C	2	D	Bayati = Rast	Neva↑ on A	Ussak = Rast
VI	Bayati	D	1½	E𝄭	1½	F	2	G	2	A	1	Bb	2	C	2	D	Bayati = Nahawand	Neva↓ on A	Ussak = Buselik
VIII	Husayni	D	1½	E𝄭	1½	F	2	G	2	A	1½	B𝄭	1½	C	2	D	Bayati / Bayati	Huseyni↑ on A	Huseyni = Ussak
VI	Bayati	D	1½	E𝄭	1½	F	2	G	2	A	1	Bb	2	C	2	D	Bayati / Kurd	Huseyni↓ on A	Huseyni = Kurd

Maqams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams G Root																Turkish Makams (Sound P4 lower)		
VII	Hijaz-Rast↑	G	1	Ab	3	B	1	C	2	D	1½	Eb	1½	F	2	G	Hijaz = Rast	Hicaz↑ on D	Hicaz = Rast
III	Hijaz-Nahawand↓	G	1	Ab	3	B	1	C	2	D	1	Eb	2	F	2	G	Hijaz = Nahawand	Hicaz↓ on D	Hicaz = Buselik
III	Sultani Yakah↑	G	2	A	1	Bb	2	C	2	D	1	Eb	3	F#	1	G	Nahawand / Hijaz	Sultaniyegah on D	Buselik / Hicaz
I	Farahfaza↓	G	2	A	1	Bb	2	C	2	D	1	Eb	2	F	2	G	Nahawand / Kurd	Ferahfeza on D	Buselik / Kurdi
VIII	Yakah↑	G	2	A	1½	B𝄭	1½	C	2	D	2	E	1½	F𝄲	1½	G	Rast / Rast	Rast↑ on D	Rast / Rast
VI	Yakah↓	G	2	A	1½	B𝄭	1½	C	2	D	2	E	1	F	2	G	Rast / Nahawand	Rast↓ on D	Rast / Buselik
VIII	Rahaw	G	1½	A𝄭	1½	Bb	2	C	2	D	1½	Eb	1½	F	2	G	Bayati = Rast	Neva↑ on D	Ussak = Rast
VI	Bayati	G	1½	A𝄭	1½	Bb	2	C	2	D	1	Eb	2	F	2	G	Bayati = Nahawand	Neva↓ on D	Ussak = Buselik
VIII	Husayni	G	1½	A𝄭	1½	Bb	2	C	2	D	1½	Eb	1½	F	2	G	Bayati / Bayati	Huseyni↑ on D	Huseyni = Ussak
VI	Bayati	G	1½	A𝄭	1½	Bb	2	C	2	D	1	Eb	2	F	2	G	Bayati / Kurd	Huseyni↓ on D	Huseyni = Kurd

Maqams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	C Root														Turkish Makams (Sound P4 lower)		
VII	Hijaz-Rast↑	C	1	Db	3	E	1	F	2	G	1½	Ab	1½	Bb	2	C	Hijaz = Rast	Hicaz↑ on G	Hicaz = Rast
III	Hijaz-Nahawand↓	C	1	Db	3	E	1	F	2	G	1	Ab	2	Bb	2	C	Hijaz = Nahawand	Hicaz↓ on G	Hicaz = Buselik
III	Nahawand-Hijaz↑	C	2	D	1	Eb	2	F	2	G	1	Ab	3	B	1	C	Nahawand / Hijaz	Buselik↑ on G	Buselik / Hicaz
I	Nahawand-Kurd↓	C	2	D	1	Eb	2	F	2	G	1	Ab	2	Bb	2	C	Nahawand / Kurd	Nihavend↓ on G	Buselik / Kurdi
VIII	Rast-Rast↑ (Kirdan)	C	2	D	1½	E♭	1½	F	2	G	2	A	1½	B♭	1½	C	Rast / Rast	Rast↑ on G	Rast / Rast
III	Suzdilar↓	C	2	D	1½	E♭	1½	F	2	G	2	A	1	Bb	2	C	Rast / Nahawand	Acemli Rast↓ on G	Rast / Buselik
VII	Nikriz-Rast	C	2	D	1	Eb	3	F#	1	G	2	A	1½	B♭	1½	C	Nawa Athar = Rast	Nikiriz↑ on G	Nikiriz = Rast
III	Nikriz	C	2	D	1	Eb	3	F#	1	G	2	A	1	Bb	2	C	Nawa Athar = Nahawand	Nikiriz↓ on G	Nikiriz = Buselik

Maqams

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Ascending / Descending

	Arabic Maqams F Root															**Turkish Makams** (Sound P4 lower)		
Mode																		
VIII	**Rast-Rast↑**	**F**	2	**G**	1½	**A♭**	1½	**B♭**	2	**C**	2	**D**	1½	**E♭**	1½	**F**	**Rast / Rast**	**Rast↑ on C**	**Rast / Rast**
III	**Suzdilar↓**	**F**	2	**G**	1½	**A♭**	1½	**B♭**	2	**C**	2	**D**	1	**E♭**	2	**F**	**Rast / Nahawand**	**Rast↓ on C**	**Rast / Buselik**

Maqams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams Bb Root	Turkish Makams (Sound P4 lower)

Maqams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	B♭ Root														Turkish Makams	(Sound P4 lower)
VIII	Farahnak↑	B♭	1½	C	2	D	2	E	1½	F♯	1½	G	2	A	1½	B♭	Sikah = Rast	Ferahnak on F♯	Segah = Rast
VI	Sikah-Nahawand↓	B♭	1½	C	2	D	2	E	1	F	2	G	2	A	1½	B♭	Sikah = Nahawand		

Maqams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	E♭ Root														Turkish Makams (Sound P4 lower)		
VIII	Sikah-Rast↑	E♭	1½	F	2	G	2	A	1½	B♭	1½	C	2	D	1½	E♭	Sikah = Rast	Ferahnak on B♭	Segah = Rast
VI	Sikah-Nahawand↓	E♭	1½	F	2	G	2	A	1	B♭	2	C	2	D	1½	E♭	Sikah = Nahawand		

Maqams
Ascending / Descending

/ → disjunct ghammaz = → conjunct ghammaz

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Arabic Maqams **Additional Ascending / Descending Maqams** **Turkish Makams** (Sound P4 lower)

Mode	Maqam																	Turkish Makam	
I	Lami↑	A	1	Bb	2	C	2	D	1	Eb	2	F	2	G	2	A	Kurd = Kurd (Lami == Kurd)		
II	Shawq Tarab↓	A	1	Bb	2	C	2	D	1½	Eƀ	1½	F	1	Gb	3	A	Kurd = Saba		
VIII	Husayni Ushayran↑	A	1½	Bƀ	1½	C	2	D	1½	Eƀ	1½	F	2	G	2	A	Bayati = Bayati		
VI	Bayati↓	A	1½	Bƀ	1½	C	2	D	2	E	1	F	2	G	2	A	Bayati = Nahawand		
VII	Bayati Shuri↑	A	1½	Bƀ	1½	C	2	D	1	Eb	3	F#	1	G	2	A	Bayati = Hijaz		
VIII	Husayni Ushayran↓	A	1½	Bƀ	1½	C	2	D	1½	Eƀ	1½	F	2	G	2	A	Bayati = Bayati		
IV	Shahnaz↑	D	1	Eb	3	F#	1	G	2	A	1	Bb	3	C#	1	D	Hijaz / Hijaz	Zirguleli Hicaz↑ on A	Hicaz / Hicaz
VII	Hijaz-Rast↓ (Hijaz Awji)	D	1	Eb	3	F#	1	G	2	A	1½	Bƀ	1½	C	2	D	Hijaz = Rast (Hijaz / Bayati)	Humayun↓ on A	Hicaz = Rast
VIII	Nishaburk↑	D	2	E	1½	F†	1½	G	2	A	1½	Bƀ	1½	C	2	D	Rast / Bayati		
VII	Rast Beshayer↓	D	2	E	1½	F†	1½	G	2	A	1	Bb	2	C	2	D	Rast / Kurd		
VII	Bayati Shuri↑	D	1½	Eƀ	1½	F	2	G	1	Ab	3	B	1	C	2	D	Bayati = Hijaz	Karcigar↑ on A	Ussak = Hicaz
VI	Bayati↓	D	1½	Eƀ	1½	F	2	G	2	A	1	Bb	2	C	2	D	Bayati = Nahawand	Neva↓ on A	Ussak = Buselik
IV	Shadd 'Araban↑	G	1	Ab	3	B	1	C	2	D	1	Eb	3	F#	1	G	Hijaz / Hijaz	Sederaban↑ on D	Hicaz / Hicaz
III	Hijaz-Nahawand↓	G	1	Ab	3	B	1	C	2	D	1	Eb	2	F	2	C	Hijaz = Nahawand (Hijaz / Kurd)	Hicaz↓ on D	Hicaz = Buselik

(Alternative for Shawq Afza between D and F: D 1½ Eƀ 1½ F)

Mode	Maqam																
II	Shawq Afza	Bb	2	C	2	D	1	Eb	2	F	1	Gb	3	A	1	Bb	Ajam / Hijaz
I	Ajam Nahawand	Bb	2	C	2	D	1	Eb	2	F	2	G	1	Ab	2	Bb	Ajam / Nahawand

Maqams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams / Additional Ascending / Descending Maqams															Turkish Makams (Sound P4 lower)		
VIII	Rast-Rast↑	C	2	D	1½	Eb	1½	F	2	G	2	A	1½	Bb	1½	C	Rast / Rast	Rast↑ on G	Rast / Rast
III	Basandida↓ (Nikriz)	C	2	D	1	Eb	3	F#	1	G	2	A	1	Bb	2	C	Nawa Athar = Nahawand	Nikiriz↓ on G	Nikiriz = Buselik
I	Mahur↑ (Ajam)	C	2	D	2	E	1	F	2	G	2	A	2	B	1	C	Ajam / Ajam	Mahur↑ on G	Cargah / Cargah
VI	Suzdilar↓	C	2	D	1½	Eb	1½	F	2	G	2	A	1	Bb	2	C	Rast / Nahawand	Acemli Rast↓ on G	Rast / Buselik
I	Ajam Nahawand↑	C	2	D	2	E	1	F	2	G	2	A	1	Bb	2	C	Ajam / Nahawand		
VI	Suzdilar↓	C	2	D	1½	Eb	1½	F	2	G	2	A	1	Bb	2	C	Rast / Nahawand		
VI	Jiharkah↑ on C	C	2	D	2	E	1	F	2	G	2	A	1½	Bb	1½	C	Ajam / Rast		
VI	Suzdilar↓	C	2	D	1½	Eb	1½	F	2	G	2	A	1	Bb	2	C	Rast / Nahawand		
VII	Suznak↑	C	2	D	1½	Eb	1½	F	2	G	1	Ab	3	B	1	C	Rast / Hijaz	Suz-nak↑ on G	Rast / Hicaz
VI	Suzdilar↓	C	2	D	1½	Eb	1½	F	2	G	2	A	1	Bb	2	C	Rast / Nahawand	Acemli Rast↓ on G	Rast / Buselik
III	Nahawand-Hijaz↑	C	2	D	1	Eb	2	F	2	G	1	Ab	3	B	1	C	Nahawand / Hijaz (Nahawand = Nawa Athar)		
II	Nahawand Murassah↓ (Sunbulah)	C	2	D	1	Eb	2	F	1	Gb	3	A	1	Bb	2	C	Nahawand = Hijaz		
III	Nahawand-Hijaz↑	C	2	D	1	Eb	2	F	2	G	1	Ab	3	B	1	C	Nahawand / Hijaz		
I	Nahawand Kabir↓	C	2	D	1	Eb	2	F	2	G	2	A	1	Bb	2	C	Nahawand / Nahawand		
IV	Nawa Athar↑	C	2	D	1	Eb	3	F#	1	G	1	Ab	3	B	1	C	Nawa Athar / Hijaz		
IV	Nawa Athar-Kurd↓	C	2	D	1	Eb	3	F#	1	G	1	Ab	2	Bb	2	C	Nawa Athar / Kurd		
IV	Hijaz Kar↑	C	1	Db	3	E	1	F	2	G	1	Ab	3	B	1	C	Hijaz / Hijaz	Hicazkar↑ on G	Hicaz / Hicaz
III	Hijaz-Nahawand↓	C	1	Db	3	E	1	F	2	G	1	Ab	2	Bb	2	C	Hijaz = Nahawand	Hicaz↓ on G	Hicaz = Buselik

Maqams
Extended Scales

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Arabic Maqams **Turkish Makams** (Sound P4 lower)

Mode	Arabic Maqams																								Turkish Makams	
I	Hijazkar Kurd	C	1	Db	2	Eb	2	F	2	G	1	Ab	3	B	1	C	1	Db	3	E					Kurd / Hijazkar	
II	Saba Zamzam	D	1	Eb	2	F	1	Gb	3	A	1	Bb	2	C	1	Db	3	E	1	F					Saba Zamzam == Hijaz = Nawa Athar	
II	Saba	D	1½	Eƀ	1½	F	1	Gb	3	A	1	Bb	2	C	1	Db	3	E	1	F					Saba == Hijaz = Nawa Athar	Saba on A / Saba == Hicaz / Hicaz
IV	Hijazkar	C	1	Db	3	E	1	F	2	G	1	Ab	3	B	1	C	1	Db	3	E					Hijaz / Hijazkar	
VII	Awj 'Iraq	Eƀ	1½	F	2	G	1	Ab	3	B	1	C	3	D#	½	Eƀ	1½	F	2	G					Sikah = Hijaz = Sazkar	
		Bƀ	1½	C	2	D	1	Eb	3	F#	1	G	3	A#	½	Bƀ	1½	C	2	D						
VIII	Dalanshin↑	C	2	D	1½	Eƀ	1½	F	2	G	2	A	1½	Bƀ	1½	C	1	Db	3	E	1	F			Rast / Saba Dalanshin	
VIII	Rast-Nahawand↓	C	2	D	1½	Eƀ	1½	F	2	G	2	A	1½	Bb	2	C	2	D	1½	Eƀ	1½	F			Rast / Nahawand = Rast	
VIII	Bastanikar	Bƀ	1½	C	2	D	1½	Eƀ	1½	F	1	Gb	3	A	1	Bb	2	C	1	Db	3	E	1	F	Sikah = Saba == Hicaz = Nawa Athar	Bestenigar on Fƚ / Segah = Saba == Hicaz
VIII	Awj Ara	Bƀ	1½	C	3	D#	½	Eƀ	2½	F#	1	G	3	A#	½	Bƀ	2½	C#	1	D	2	C	1½	Bƀ	Awj = Musta'ar / (Musta'ar↑ = Sikah↓)	

Maqams

/ → disjunct ghammaz **= → conjunct ghammaz**

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Extended Scales

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Arabic Maqams **Turkish Makams** (Sound P4 lower)

Mode

Makams - E Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- I -					
	Kurd on A	**Kurd = Nahawand**	**E 1 F 2 G 2 A 2 B 1 C 2 D 2 E**	**Kurdi on E**	**Kurdi = Buselik**
	Lami on A	**Lami == Kurd**	**E 1 F 2 G 2 A 1 Bb 2 C 2 D 2 E**		
- II -					
		(Kurd = Saba Zamzam)	E 1 F 2 G 2 A 1 Bb 2 C 1 Db 3 E		
	Shawq Tarab on A	**Kurd = Saba**	**E 1 F 2 G 2 A 1½ Bb 1½ C 1 Db 3 E**		
- III -					
	Hijaz-Nahawand↓ on A	**Hijaz = Nahawand**	**E 1 F 3 G# 1 A 2 B 1 C 2 D 2 E**	**Hicaz↓ on E**	**Hicaz = Buselik**
	Tarz Nawayn on A	**Kurd = Hijaz**	**E 1 F 2 G 2 A 1 Bb 3 C# 1 D 2 E**		
- IV -					
	Suzidil on A	**Hijaz / Hijaz**	**E 1 F 3 G# 1 A 2 B 1 C 3 D# 1 E**	**Suz-i Dil on E**	**Hicaz / Hicaz**

Makams - E Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- V -		(Nahawand = Bayati)	E 2 F# 1 G 2 A 1½ B♭ 1½ C 2 D 2 E		
- VI -		(Bayati / Kurd)			
	Bayati on A	**Bayati = Nahawand**	**E** 1½ **F♯** 1½ **G** 2 **A** 2 **B** 1 **C** 2 **D** 2 **E**	**Ussak or Bayati on E**	**Ussak = Buselik**
		(Kurd = Bayati)	E 1 F 2 G 2 A 1½ B♭ 1½ C 2 D 2 E		
- VII -					
	Bayati Shuri on A	**Bayati = Hijaz**	**E** 1½ **F♯** 1½ **G** 2 **A** 1 **B♭** 3 **C#** 1 **D** 2 **E**		
	Hijaz-Rast↑ on A	**Hijaz = Rast**	**E** 1 **F** 3 **G#** 1 **A** 2 **B** 1½ **C♯** 1½ **D** 2 **E**	**Hicaz↑ on E**	**Hicaz = Rast**
- VIII -					
	Husayni Ushayran on A	**Bayati = Bayati**	**E** 1½ **F♯** 1½ **G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 2 **E**		

Makams - A Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- I -				
Busalik↓ on D	Busalik / Kurd	A 2 B 1 C↓ 2 D 2 E 1 F 2 G 2 A	Buselik↓ on A	Buselik / Kurdi
Kurd on D	Kurd = Nahawand	A 1 Bb 2 C 2 D 2 E 1 F 2 G 2 A	Kurdi on A	Kurdi = Buselik
Lami on D	Lami == Kurd	A 1 Bb 2 C 2 D 1 Eb 2 F 2 G 2 A		
- II -				
Saba Zamzam on D	Saba Zamzam == Hijaz = Ajam	A 1 Bb 2 C 1 Db 3 E 1 F 2 G 2 A		
Saba Zamzam on D	Saba Zamzam == Hijaz = Nawa Athar	A 1 Bb 2 C 1 Db 3 E 1 F 2 G 1 Ab 3 B 1 C		
Saba on D	Saba == Hijaz = Ajam	A 1½ Bb 1½ C 1 Db 3 E 1 F 2 G 2 A	Saba Zemzeme on A	Saba == Hicaz == Kurd
Saba on D	Saba == Hijaz = Nawa Athar	A 1½ Bb 1½ C 1 Db 3 E 1 F 2 G 1 Ab 3 B 1 C	Saba on A	Saba == Hicaz / Hicaz
Saba Busalik on D	Saba Busalik == Hijaz = Ajam	A 2 B 1 C 1 Db 3 E 1 F 2 G 2 A		
Zanjaran on D	Hijaz = Ajam or Hijaz / Nahawand	A 1 Bb 3 C# 1 D 2 E 2 F# 1 G 2 A		
- III -				
Hijaz-Nahawand↓ on D	Hijaz = Nahawand	A 1 Bb 3 C# 1 D 2 E 1 F 2 G 2 A	Hicaz↓ on A	Humayun↑ on A / Hicaz = Buselik
Hijaz Gharib on D	Sikah / Nahawand	A 1½ Bb 2 C♯ 1½ D 2 E 1 F 2 G 2 A		
Nahawand-Hijaz↑ on D	Nahawand / Hijaz	A 2 B 1 C 2 D 2 E 1 F 3 G# 1 A	Sehnaz Buselik on A	Buselik↑ on A / Buselik / Hicaz
- IV -				
Hisar on D	Nawa Athar = Hijaz	A 2 B 1 C 3 D# 1 E 1 F 3 G# 1 A	Nev'eser on A	Nikiriz = Hicaz
Athar Kurd on D	Athar Kurd = Hijaz	A 1 Bb 2 C 3 D# 1 E 1 F 3 G# 1 A		
Bayati-Hijazkar on D	Bayati = Hijazkar	A 1½ Bb 1½ C 3 D# 1 E 1 F 3 G# 1 A		
Bayati-Hijaz on D	Bayati / Hijaz	A 1½ Bb 1½ C 2 D 2 E 1 F 3 G# 1 A		
Saba-Hijaz on D	Saba / Hijaz	A 1½ Bb 1½ C 1 Db 3 E 1 F 3 G# 1 A		
	(Hijaz = Hijaz)	A 1 Bb 3 C# 1 D 1 Eb 3 F# 1 G 2 A		
Shahnaz on D	Hijaz / Hijaz	A 1 Bb 3 C# 1 D 2 E 1 F 3 G# 1 A	Zirguleli Hicaz on A	Hicaz / Hicaz
Shahnaz Kurdi on D	Kurd / Hijaz	A 1 Bb 2 C 2 D 2 E 1 F 3 G# 1 A		

Makams - A Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		Turkish Tuning written (sounds P4 lower)	Turkish Makams		
- V -						
	Nahfat on D	**Bayati = Ajam** (Bayati / Nahawand)	**A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 2 **F#** 1 **G** 2 **A**			
- VI -						
	Suzdilar↓ on D	**Rast / Nahawand**	**A** 2 **B** 1½ **C♯** 1½ **D** 2 **E** 2 **F#** 1 **G** 2 **A**		**Nisaburek↓ on A**	**Rast / Buselik**
	Bayati on D	**Bayati = Nahawand**	**A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 1 **F** 2 **G** 2 **A**	**Ussak or Bayati on A**	**Neva↓ on A**	**Ussak = Buselik**
		or Bayati / Kurd			**Huseyni↓ on A**	**Huseyni = Kurd**
	Ushaq Masri on D	**Nahawand / Bayati** (Busalik / Bayati)	**A** 2 **B** 1 **C(↓)** 2 **D** 2 **E** 1½ **F♯** 1½ **G** 2 **A**			
- VII -						
	Bayati Shuri on D	**Bayati = Hijaz**	**A** 1½ **B♭** 1½ **C** 2 **D** 1 **E♭** 3 **F#** 1 **G** 2 **A**		**Karcigar on A**	**Ussak = Hicaz**
	Hijaz-Rast↑ on D	**Hijaz = Rast**	**A** 1 **B** 3 **C#** 1 **D** 2 **E** 1½ **F♯** 1½ **G** 2 **A**	**Hicaz↑ on A**	**Humayun↓ on A**	**Hicaz = Rast**
	(Hijaz Awji)	(Hijaz / Bayati)		**Uzzal on A**		**Hicaz / Ussak**
- VIII -						
	Rast-Rast↑ on D	**Rast / Rast**	**A** 2 **B** 1½ **C♯** 1½ **D** 2 **E** 2 **F#** 1½ **G♯** 1½ **A**		**Nisaburek↑ on A**	**Rast / Rast**
	Muhayar on D	**Bayati = Rast**	**A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 1½ **F♯** 1½ **G** 2 **A**	**Tahir on A**	**Neva↑ on A**	**Ussak = Rast**
	Husayni on D	**Bayati / Bayati**	**A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 1½ **F♯** 1½ **G** 2 **A**	**Muhayyer on A**	**Huseyni↑ on A**	**Huseyni = Ussak**
	Bayatayn (Arazbar) on D	**Bayati = Bayati** (Rast = Rast)	**A** 1½ **B♭** 1½ **C** 2 **D** 1½ **E♭** 1½ **F** 2 **G** 2 **A**		**Azarbar on A**	**Ussak = Ussak**
	Nishaburk (Nairuz) on D	**Rast / Bayati**	**A** 2 **B** 1½ **C♯** 1½ **D** 2 **E** 1½ **F♯** 1½ **G** 2 **A**			

Makams - D Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- I -				
	Ajam on G	**Ajam / Ajam**	**D** 2 **E** 2 **F#** 1 **G** 2 **A** 2 **B** 2 **C#** 1 **D**	**Cargah on D**	**Cargah / Cargah**
	Ajam Nahawand on G	**Ajam / Nahawand**	**D** 2 **E** 2 **F#** 1 **G** 2 **A** 2 **B** 1 **C** 2 **D**		
	Farahfaza↓ on G	**Nahawand / Kurd**	**D** 2 **E** 1 **F** 2 **G** 2 **A** 1 **Bb** 2 **C** 2 **D**	**Ferahfeza on D**	**Buselik / Kurdi**
	(Nahawand = Nahawand)				
	Kurd on G	**Kurd = Nahawand**	**D** 1 **Eb** 2 **F** 2 **G** 2 **A** 1 **Bb** 2 **C** 2 **D**	**Kurdi on D**	**Kurdi = Buselik**
- II -					
	Zingarin on G	**Hijaz = Ajam**	**D** 1 **Eb** 3 **F#** 1 **G** 2 **A** 2 **B** 1 **C** 2 **D**		
		or Hijaz / Nahawand			
- III -					
	Nikriz on G	**Nawa Athar = Nahawand**	**D** 2 **E** 1 **F** 3 **G#** 1 **A** 2 **B** 1 **C** 2 **D**		
	Hijaz-Nahawand↓ on G	**Hijaz = Nahawand**	**D** 1 **Eb** 3 **F#** 1 **G** 2 **A** 1 **Bb** 2 **C** 2 **D**	**Hicaz↓ on D**	**Hicaz = Buselik**
	Sultani Yakah↑ on G	**Nahawand / Hijaz**	**D** 2 **E** 1 **F** 2 **G** 2 **A** 1 **Bb** 3 **C#** 1 **D**	**Sultaniyegah on D**	**Buselik / Hicaz**
- IV -	**(Zawil / Basandida)**				
	Nawa Athar on G	**Nawa Athar = Hijaz**	**D** 2 **E** 1 **F** 3 **G#** 1 **A** 1 **Bb** 3 **C#** 1 **D**	**Nev'eser on D**	**Nikiriz = Hicaz**
	Athar Kurd on G	**Athar Kurd = Hijaz**	**D** 1 **Eb** 2 **F** 3 **G#** 1 **A** 1 **Bb** 3 **C#** 1 **D**		
	Shadd 'Araban on G	**Hijaz / Hijaz**	**D** 1 **Eb** 3 **F#** 1 **G** 2 **A** 1 **Bb** 3 **C#** 1 **D**	**Sederaban on D**	**Hicaz / Hicaz**
	Sikah Baladi on G	**Sikah / Sikah**	**D** 1½ **Eb** 2 **F𝄲** 1½ **G** 2 **A** 1½ **Bb** 2 **C𝄲** 1½ **D**		

Makams - D Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- V -				
	Mahur on G	**Rast / Ajam**	**D 2 E 1½ F♯ 1½ G 2 A 2 B 2 C# 1 D**	
		(Ajam / Rast)	D 2 E 2 F# 1 G 2 A 1½ B♭ 1½ C 2 D	
- VI -				
	Yakah↓ on G	**Rast / Nahawand**	**D 2 E 1½ F♯ 1½ G 2 A 2 B 1 C 2 D**	**Rast↓ on D** / **Rast / Buselik**
	Bayati on G	**Bayati = Nahawand or Bayati / Kurd**	**D 1½ E♭ 1½ F 2 G 2 A 1 B♭ 2 C 2 D** — **Ussak or Bayati on D**	**Neva↓ on D** / **Ussak = Buselik**; **Huseyni↓ on D** / **Huseyni = Kurd**
	Ushaq Masri on G	**Nahawand / Bayati (Busalik / Bayati)**	**D 2 E 1 F(↓) 2 G 2 A 1½ B♭ 1½ C 2 D**	
- VII -				
	Suznak on G	**Rast / Hijaz**	**D 2 E 1½ F♯ 1½ G 2 A 1 B♭ 3 C# 1 D**	**Suz-nak on D** / **Rast / Hicaz**
	Rast Beshayer on G	**Rast / Kurd**	**D 2 E 1½ F♯ 1½ G 2 A 1 B♭ 2 C 2 D**	
	Bayati Shuri on G	**Bayati = Hijaz**	**D 1½ E 1½ F 2 G 1 A♭ 3 B 1 C 2 D**	**Karcigar on D** / **Ussak = Hicaz**
	Hijaz-Rast↑ on G	**Hijaz = Rast**	**D 1 E♭ 3 F# 1 G 2 A 1½ B♭ 1½ C 2 D**	**Hicaz↑ on D** / **Hicaz = Rast**
- VIII -				
	Yakah↑ on G	**Rast / Rast**	**D 2 E 1½ F♯ 1½ G 2 A 2 B 1½ C♯ 1½ D**	**Rast↑ on D** / **Rast / Rast**
	Muhayer on G	**Bayati = Rast**	**D 1½ E♭ 1½ F 2 G 2 A 1½ B♭ 1½ C 2 D** — **Tahir on D**	**Neva↑ on D** / **Ussak = Rast**
	Husayni on G	**Bayati / Bayati**	**D 1½ E♭ 1½ F 2 G 2 A 1½ B♭ 1½ C 2 D** — **Muhayyer on D**	**Huseyni↑ on D** / **Huseyni = Ussak**
	Yakah (Nairuz) on G	**Rast / Bayati** (Rast = Rast)	**D 2 E 1½ F♯ 1½ G 2 A 1½ B♭ 1½ C 2 D**	

Makams - G Root

/ → disjunct ghammaz = → conjunct ghammaz

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- I -				
Ajam (Mahur) on C	Ajam / Ajam	G 2 A 2 B 1 C 2 D 2 E 2 F# 1 G	Mahur on G	Cargah / Cargah
Ajam Nahawand on C	Ajam / Nahawand	G 2 A 2 B 1 C 2 D 2 E 1 F 2 G		
Nahawand Kabir on C	Nahawand / Nahawand	G 2 A 1 Bb 2 C 2 D 2 E 1 F 2 G		
Nahawand-Kurd↓ on C	Nahawand / Kurd (Nahawand = Nahawand)	G 2 A 1 Bb 2 C 2 D 1 Eb 2 F 2 G	Nihavend on G	Buselik / Kurdi
Kurd on C	Kurd = Nahawand	G 1 Ab 2 Bb 2 C 2 D 1 Eb 2 F 2 G	Kurdili Hicazcar on G	Kurdi = Buselik
Kurd-Kurd on C	Kurd / Kurd	G 1 Ab 2 Bb 2 C 2 D 1 Eb 2 F 2 G		
Hijazkar Kurd on C	Kurd / Hijazkar	G 1 Ab 2 Bb 2 C 2 D 1 Eb 3 F# 1 G 1 Ab 3 B		
- II -				
Shawq Afza on C	Ajam / Hijaz	G 2 A 2 B 1 C 2 D 1 Eb 3 F# 1 G		
Nahawand Murassah on C (Sunbulah)	Nahawand = Hijaz (Nahawand Murassa == Hijaz)	G 2 A 1 Bb 2 C 1 Db 3 E 1 F 2 G		
Zankulah on C	Hijaz = Ajam or Hijaz / Nahawand	G 1 Ab 3 B 1 C 2 D 2 E 1 F 2 G		
- III -				
Nikriz on C	Nawa Athar = Nahawand	G 2 A 1 Bb 3 C# 1 D 2 E 1 F 2 G	Nikiriz↓ on G	Nikiriz = Buselik
Hijaz-Nahawand↓ on C	Hijaz = Nahawand	G 1 Ab 3 B 1 C 2 D 1 Eb 2 F 2 G	Hicaz↓ on G	Hicaz = Buselik
Nahawand-Hijaz↑ on C	Nahawand / Hijaz	G 2 A 1 Bb 2 C 2 D 1 Eb 3 F# 1 G	Buselik↑ on G	Buselik / Hicaz
- IV -				
Nawa Athar on C	Nawa Athar = Hijaz	G 2 A 1 Bb 3 C# 1 D 1 Eb 3 F# 1 G	Nev'eser on G	Nikiriz = Hicaz
Athar Kurd on C	Athar Kurd = Hijaz	G 1 Ab 2 Bb 3 C# 1 D 1 Eb 3 F# 1 G		
Nawa Athar-Kurd on C	Nawa Athar = Kurd	G 2 A 1 Bb 3 C# 1 D 1 Eb 2 F 1 G		
Hijaz Kar on C	Hijaz / Hijaz	G 1 Ab 3 B 1 C 2 D 1 Eb 3 F# 1 G	Hicazkar on G	Hicaz / Hicaz

Makams - G Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	Turkish Tuning written (sounds P4 lower)	Turkish Makams
- V -			
	Mahur on C	**Rast / Ajam**	**G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 2 **F#** 1 **G**	
- VI -			
	Suzdilar↓ on C	**Rast / Nahawand**	**G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 1 **F** 2 **G**	**Acemli Rast↓ on G**	**Rast / Buselik**
	Bayati on C	**Bayati = Nahawand** or **Bayati / Kurd**	**G** 1½ **A♭** 1½ **B♭** 2 **C** 2 **D** 1 **E♭** 2 **F** 2 **G**	**Ussak or Bayati on G**	**Ussak = Buselik**
- VII -			
	Suznak on C	**Rast / Hijaz**	**G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 1 **E♭** 3 **F#** 1 **G**	**Suz-nak on G**	**Rast / Hicaz**
	Rast Beshayer on C	**Rast / Kurd**	**G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 1 **E♭** 2 **F** 2 **G**	
	Nikriz-Rast on C	**Nawa Athar = Rast**	**G** 2 **A** 1 **B♭** 3 **C#** 1 **D** 2 **E** 1½ **F𝄲** 1½ **G**	**Nikiriz↑ on G**	**Nikiriz = Rast**
	Hijaz-Rast↑ on C	**Hijaz = Rast**	**G** 1 **A♭** 3 **B** 1 **C** 2 **D** 1½ **E♭** 1½ **F** 2 **G**	**Hicaz↑ on G**	**Hicaz = Rast**
- VIII -			
	Rast-Rast↑ (Kirdan) on C	**Rast / Rast**	**G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 1½ **F𝄲** 1½ **G**	**Rast↑ on G**	**Rast / Rast**
	Sazkar on C	**Sazkar = Rast**	**G** 3 **A#** ½ **B♭** 1½ **C** 2 **D** 2 **E** 1½ **F𝄲** 1½ **G**	
	Dalanshin on C	**Rast / Saba Dalanshin**	**G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 1½ **F𝄲** 1½ **G** 1 **A♭** 3 **B** 1 **C**	
	Nairuz (Nerz Rast) on C	**Rast / Bayati** or **Rast = Rast**	**G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 1½ **E♭** 1½ **F** 2 **G**	

Makams - C Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		Turkish Tuning written (sounds P4 lower)													Turkish Makams	
- I -	Jiharkah Ajam on F	Ajam / Ajam	C	2	D	2	E	1	F	2	G	2	A	2	B	1	C	Cargah on C	Cargah / Cargah
	Ajam Nahawand on F	Ajam / Nahawand	C	2	D	2	E	1	F	2	G	2	A	1	B♭	2	C		
- II -	Shawq Afza on F	Ajam / Hijaz	C	2	D	2	E	1	F	2	G	1	A♭	3	B	1	C		
	Zanjaran on F	Hijaz = Ajam or Hijaz / Nahawand	C	1	D♭	3	E	1	F	2	G	2	A	1	B♭	2	C		
- III -	Nikriz on F	Nawa Athar = Nahawand	C	2	D	1	E♭	3	F#	1	G	2	A	1	B♭	2	C		
- IV -	Nawa Athar on F	Nawa Athar = Hijaz	C	2	D	1	E♭	3	F#	1	G	1	A♭	3	B	1	C	Nev'eser on C	Nikiriz = Hicaz
	Athar Kurd on F	Athar Kurd = Hijaz	C	1	D♭	2	E♭	3	F#	1	G	1	A♭	3	B	1	C		
	Jiharkah Turki on F	Hijaz / Hijaz	C	1	D♭	3	E	1	F	2	G	1	A♭	3	B	1	C	Hicazkar on C	Hicaz / Hicaz
- V -		(Ajam Murrassa / Rast)	C	2	D	2	E	2	F#	1	G	2	A	1½	B♭	1½	C		
- VI -	Suzdilar↓ on F	Rast / Nahawand	C	2	D	1½	E♭	1½	F	2	G	2	A	1	B♭	2	C	Rast↓ on C	Rast / Buselik
	Jiharkah on F	Jiharkah / Rast	C	2	D	2	E	1	F	2	G	2	A	1½	B♭	1½	C		
- VII -	Nikriz-Rast on F	Nawa Athar = Rast	C	2	D	1	E♭	3	F#	1	G	2	A	1½	B♭	1½	C		
- VIII -	Rast-Rast↑ on F	Rast / Rast	C	2	D	1½	E♭	1½	F	2	G	2	A	1½	B♭	1½	C	Rast↑ on C	Rast / Rast
		(Jiharkah = Bayati)	C	2	D	2	E	1½	F♯	1½	G	2	A	1½	B♭	1½	C		

Makams - F Root

/ → disjunct ghammaz = → conjunct ghammaz

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- I -	Ajam on Bb	Ajam / Ajam	F 2 G 2 A 1 Bb 2 C 2 D 2 E 1 F	Acem Asiran on F	Cargah / Cargah
	Ajam Ushayran on Bb	Ajam = Kurd = Nahawand	F 2 G 2 A 1 Bb 2 C 2 D 2 E 1 F		
	Ajam Nahawand on Bb	Ajam / Nahawand	F 2 G 2 A 1 Bb 2 C 2 D 1 Eb 2 F		
	Shawq Awr on Bb	Ajam Murassa / Ajam	F 2 G 2 A 2 B 1 C 2 D 2 E 1 F		
- II -	Shawq Afza on Bb	Ajam / Hijaz	F 2 G 2 A 1 Bb 2 C 1 Db 3 E 1 F		
- III -	Nikriz on Bb	Nawa Athar = Nahawand	F 2 G 1 Ab 3 B 1 C 2 D 1 Eb 2 F		
	Tarz Jadid on Bb	Ajam = Hijaz	F 2 G 2 A 1 Bb 3 C# 1 D 2 E 1 F		
- IV -					
- V -					
- VI -		(Ajam = Bayati)	F 2 G 2 A 1½ Bƀ 1½ C 2 D 2 E 1 F		
- VII -					
- VIII -					

Makams - F♯ Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams	Turkish Tuning written (sounds P4 lower)	Turkish Makams	
- V -	(Sikah / Nahawand)	F♯ 1½ G 2 A 2 B 2 C# 1 D 2 E 1½ F♯		
- VI -	**Sikah-Nahawand↓ on B♭** / **Sikah = Nahawand**	**F♯** 1½ **G** 2 **A** 2 **B** 1 **C** 2 **D** 2 **E** 1½ **F♯**		
	Musta'ar on B♭ / **Musta'ar = Nahawand**	**F♯** 2½ **G#** 1 **A** 2 **B** 1 **C** 2 **D** 2 **E** 1½ **F♯**		
		F♯ 2½ **G#** 1 **A** 1½ **B♭** 2 **C♯** 1½ **D** 3 **E#** ½ **F♯**	**Mustear on F♯**	**Mustear / Hicaz**
- VII -	**Rahat El Arwah on B♭** / **Sikah = Hijaz**	**F♯** 1½ **G** 2 **A** 1 **Bb** 3 **C#** 1 **D** 2 **E** 1½ **F♯**	**Huzzam on F♯**	**Huzzam == Hicaz**
	Awj 'Iraq on B♭ / **Sikah = Hijaz = Sazkar**	**F♯** 1½ **G** 2 **A** 1 **Bb** 3 **C#** 1 **D** 3 **E#** ½ **F♯**		
- VIII -	**Farahnak↑ on B♭** / **Sikah = Rast**	**F♯** 1½ **G** 2 **A** 2 **B** 1½ **C♯** 1½ **D** 2 **E** 1½ **F♯**	**Ferahnak on F♯**	**Segah = Rast**
	Iraq on B♭ / **Sikah = Bayati**	**F♯** 1½ **G** 2 **A** 1½ **B♭** 1½ **C** 2 **D** 2 **E** 1½ **F♯**	**Irak (Evic) on F♯**	**Segah = Ussak**
	Awj Ara on B♭ / **Awj = Musta'ar**	**F♯** 1½ **G** 3 **A#** ½ **B♭** 2½ **C#** 1 **D** 3 **E#** ½ **F♯**		
	Bastanikar on B♭ / **Sikah = Saba == Hicaz**	**F♯** 1½ **G** 2 **A** 1½ **B♭** 1½ **C** 1 **Db** 3 **E** 1 **F**	**Bestenigar on F♯**	**Segah = Saba == Hicaz**

Makams - B♭ Root

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		Turkish Tuning written (sounds P4 lower)															Turkish Makams	
- V -		(Sikah / Nahawand)	B♭	1½	C	2	D	2	E	2	F#	1	G	2	A	1½	B♭		
- VI -	Sikah-Nahawand↓ on E♭	Sikah = Nahawand	**B♭**	1½	**C**	2	**D**	2	**E**	1	**F**	2	**G**	2	**A**	1½	**B♭**		
	Musta'ar on E♭	Musta'ar = Nahawand	**B♭**	2½	**C#**	1	**D**	2	**E**	1	**F**	2	**G**	2	**A**	1½	**B♭**		
			B♭	2½	**C#**	1	**D**	1½	**E♭**	2	**F♯**	1½	**G**	3	**A#**	½	**B♭**	**Mustear on B♭**	**Mustear / Hicaz**
- VII -	Huzam on E♭	Sikah = Hijaz	**B♭**	1½	**C**	2	**D**	1	**E♭**	3	**F#**	1	**G**	2	**A**	1½	**B♭**	**Huzzam on B♭**	**Huzzam == Hicaz**
	Awj 'Iraq on E♭	Sikah = Hijaz = Sazkar	**B♭**	1½	**C**	2	**D**	1	**E♭**	3	**F#**	1	**G**	3	**A#**	½	**B♭**		
- VIII -	Sikah-Rast↑ on E♭	Sikah = Rast	**B♭**	1½	**C**	2	**D**	2	**E**	1½	**F♯**	1½	**G**	2	**A**	1½	**B♭**	**Ferahnak on B♭**	**Segah = Rast**

Makams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		E Root	Turkish Tuning written (sounds P4 lower)	Turkish Makams	
VII	Hijaz-Rast↑ on A	Hijaz = Rast	E 1 F 3 G# 1 A 2 B 1½ C𝄲 1½ D 2 E		Hicaz↑ on E	Hicaz = Rast
III	Hijaz-Nahawand↓ on A	Hijaz = Nahawand	E 1 F 3 G# 1 A 2 B 1 C 2 D 2 E		Hicaz↓ on E	Hicaz = Buselik

Makams
Ascending / Descending

/ → disjunct ghammaz = → conjunct ghammaz

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Arabic Maqams — **A Root** — **Turkish Tuning written (sounds P4 lower)** — **Turkish Makams**

Mode	Arabic Maqam	Arabic Structure																Turkish Makam	Turkish Structure
																		Hicaz↑ on A	
VII	Hijaz-Rast↑ on D	Hijaz = Rast	A	1	Bb	3	C#	1	D	2	E	1½	F†	1½	G	2	A	Humayun↓ on A	Hicaz = Rast
III	Hijaz-Nahawand↓ on D	Hijaz = Nahawand	A	1	Bb	3	C#	1	D	2	E	1	F	2	G	2	A	Hicaz↓ on A	Hicaz = Buselik
																		Humayun↑ on A	
III	Nahawand-Hijaz↑ on D	Nahawand / Hijaz	A	2	B	1	C	2	D	2	E	1	F	3	G#	1	A	Buselik↑ on A	Buselik / Hicaz
I	Busalik↓ on D	Busalik / Kurd	A	2	B	1	C↓	2	D	2	E	1	F	2	G	2	A	Buselik↓ on A	Buselik / Kurdi
VIII	Rast-Rast↑ on D	Rast / Rast	A	2	B	1½	C†	1½	D	2	E	2	F#	1½	G†	1½	A	Nisaburek↑ on A	Rast / Rast
VI	Suzdilar↓ on D	Rast / Nahawand	A	2	B	1½	C†	1½	D	2	E	2	F#	1	G	2	A	Nisaburek↓ on A	Rast / Buselik
VIII	Muhayar on D	Bayati = Rast	A	1½	Bƀ	1½	C	2	D	2	E	1½	F†	1½	G	2	A	Neva↑ on A	Ussak = Rast
VI	Bayati on D	Bayati = Nahawand	A	1½	Bƀ	1½	C	2	D	2	E	1	F	2	G	2	A	Neva↓ on A	Ussak = Buselik
VIII	Husayni on D	Bayati / Bayati	A	1½	Bƀ	1½	C	2	D	2	E	1½	F†	1½	G	2	A	Huseyni↑ on A	Huseyni = Ussak
VI	Bayati on D	Bayati / Kurd	A	1½	Bƀ	1½	C	2	D	2	E	1	F	2	G	2	A	Huseyni↓ on A	Huseyni = Kurd

Makams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		D Root / Turkish Tuning written (sounds P4 lower)																							Turkish Makams	
VII	Hijaz-Rast↑ on G	Hijaz = Rast	D	1	Eb	3	F#	1	G	2	A	1½	Bb	1½	C	2	D									Hicaz↑ on D	Hicaz = Rast
III	Hijaz-Nahawand↓ on G	Hijaz = Nahawand	D	1	Eb	3	F#	1	G	2	A	1	Bb	2	C	2	D									Hicaz↓ on D	Hicaz = Buselik
III	Sultani Yakah↑ on G	Nahawand / Hijaz	D	2	E	1	F	2	G	2	A	1	Bb	3	C#	1	D									Sultaniyegah on D	Buselik / Hicaz
I	Farahfaza↓ on G	Nahawand / Kurd	D	2	E	1	F	2	G	2	A	1	Bb	2	C	2	D									Ferahfeza on D	Buselik / Kurdi
VIII	Yakah↑ on G	Rast / Rast	D	2	E	1½	F𝄲	1½	G	2	A	2	B	1½	C𝄲	1½	D									Rast↑ on D	Rast / Rast
VI	Yakah↓ on G	Rast / Nahawand	D	2	E	1½	F𝄲	1½	G	2	A	2	B	1	C	2	D									Rast↓ on D	Rast / Buselik
VIII	Rahaw on G	Bayati = Rast	D	1½	Eb	1½	F	2	G	2	A	1½	Bb	1½	C	2	D									Neva↑ on D	Ussak = Rast
VI	Bayati on G	Bayati = Nahawand	D	1½	Eb	1½	F	2	G	2	A	1	Bb	2	C	2	D									Neva↓ on D	Ussak = Buselik
VIII	Husayni on G	Bayati / Bayati	D	1½	Eb	1½	F	2	G	2	A	1½	Bb	1½	C	2	D									Huseyni↑ on D	Huseyni = Ussak
VI	Bayati on G	Bayati / Kurd	D	1½	Eb	1½	F	2	G	2	A	1	Bb	2	C	2	D									Huseyni↓ on D	Huseyni = Kurd

Makams

Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		G Root	Turkish Tuning written (sounds P4 lower)																Turkish Makams	
VII	Hijaz-Rast↑ on C	Hijaz = Rast	G	1	Ab	3	B	1	C	2	D	1½	Eb	1½	F	2	G			Hicaz↑ on G	Hicaz = Rast
III	Hijaz-Nahawand↓ on C	Hijaz = Nahawand	G	1	Ab	3	B	1	C	2	D	1	Eb	2	F	2	G			Hicaz↓ on G	Hicaz = Buselik
III	Nahawand-Hijaz↑ on C	Nahawand / Hijaz	G	2	A	1	Bb	2	C	2	D	1	Eb	3	F#	1	G			Buselik↑ on G	Buselik / Hicaz
I	Nahawand-Kurd↓ on C	Nahawand / Kurd	G	2	A	1	Bb	2	C	2	D	1	Eb	2	F	2	G			Nihavend↓ on G	Buselik / Kurdi
VIII	Rast-Rast↑ (Kirdan) on C	Rast / Rast	G	2	A	1½	B𝄫	1½	C	2	D	2	E	1½	F𝄲	1½	G			Rast↑ on G	Rast / Rast
III	Suzdilar↓ on C	Rast / Nahawand	G	2	A	1½	B𝄫	1½	C	2	D	2	E	1	F	2	G			Acemli Rast↓ on G	Rast / Buselik
VII	Nikriz-Rast on C	Nawa Athar = Rast	G	2	A	1	Bb	3	C#	1	D	2	E	1½	F𝄲	1½	G			Nikiriz↑ on G	Nikiriz = Rast
III	Nikriz on C	Nawa Athar = Nahawand	G	2	A	1	Bb	3	C#	1	D	2	E	1	F	2	G			Nikiriz↓ on G	Nikiriz = Buselik

Makams

Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		C Root	Turkish Tuning written (sounds P4 lower)		Turkish Makams	
VIII	Rast-Rast↑ on F	Rast / Rast	C 2 D 1½ E♭ 1½ F 2 G 2 A 1½ B♭ 1½ C			Rast↑ on C	Rast / Rast
III	Suzdilar↓ on F	Rast / Nahawand	C 2 D 1½ E♭ 1½ F 2 G 2 A 1 B♭ 2 C			Rast↓ on C	Rast / Buselik

Makams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G
Arabic Maqams and Turkish Makams played in the same place one tone apart.

Arabic Maqams	**F Root**	**Turkish Tuning written (sounds P4 lower)**	**Turkish Makams**
Mode			
on Bb			

Makams

Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		F♯ Root	Turkish Tuning written (sounds P4 lower)														Turkish Makams	
VIII	Farahnak↑ on B♭	Sikah = Rast	F♯	1½	G	2	A	2	B	1½	C♯	1½	D	2	E	1½	F♯	Ferahnak on F♯	Segah = Rast
VI	Sikah-Nahawand↓ on B♭	Sikah = Nahawand	F♯	1½	G	2	A	2	B	1	C	2	D	2	E	1½	F♯		

Makams
Ascending / Descending

/ → disjunct ghammaz **= → conjunct ghammaz**

Western, not Turkish accidentals used throughout.

Arabic Oud in Concert C / Turkish Oud in Concert D written in G

Arabic Maqams and Turkish Makams played in the same place one tone apart.

Mode	Arabic Maqams		B♭ Root	Turkish Tuning written (sounds P4 lower)		Turkish Makams	
VIII	Sikah-Rast↑ on E♭	Sikah = Rast	B♭ 1½ C 2 D 2 E 1½ F♯ 1½ G 2 A 1½ B♭			Ferahnak on B♭	Segah = Rast
VI	Sikah-Nahawand↓ on E♭	Sikah = Nahawand	B♭ 1½ C 2 D 2 E 1 F 2 G 2 A 1½ B♭				