Tuner?—No thanks, I can do without!

The author of this document is Emanuel Han, a musician studying *utasanshin* as part of traditional Ryūkyūan music, as well as the *radif* for *santur* in Persian *dastgâh* music. The document was created and is continuously expanded in order to help teachers and students talking about tonal systems as used in traditional musics and to highlight the importance of tuning by hearing when singing or playing traditional musics. To this end, the author prefers Persian and ancient Chinese terminology over western terms due to their inherent significance which is of high educational value. Some additional terminology is introduced by the author where needed. After working through this document, the reader will most likely be able to practise traditional Ryūkyūan and Persian *dastgâh* music without needing the document any further. Only when creating tuning tables for electronic instruments may it be necessary to look up the numbers.

“Tuner?—No thanks, I can do without!”

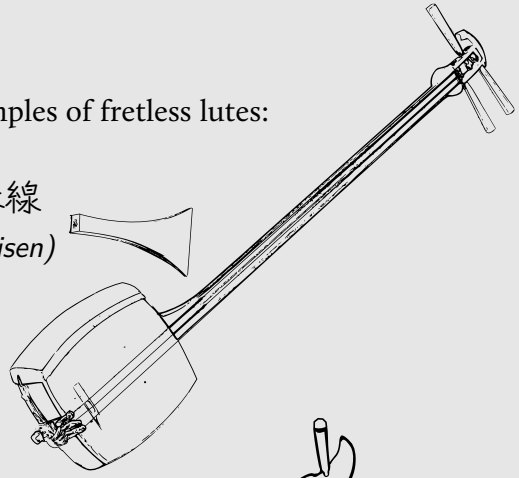
Let's explore how musical *tonalities* are constructed since three millenia and still practiced in traditional Ryūkyūan, Persian and many other musics.

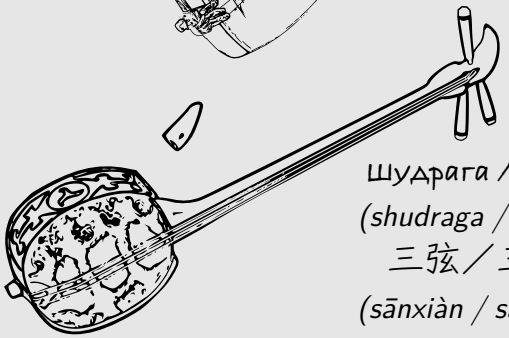
Simple and memorable designations used in ancient China and Persia will help us doing so.

vers. 2025-10-26

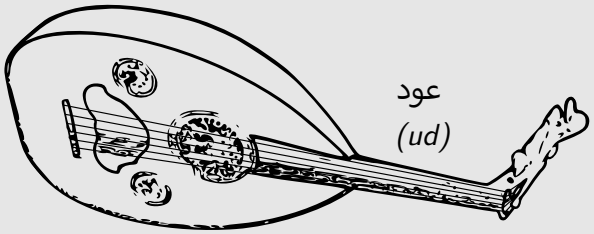
Examples of fretless lutes:

三味線
(shamisen)

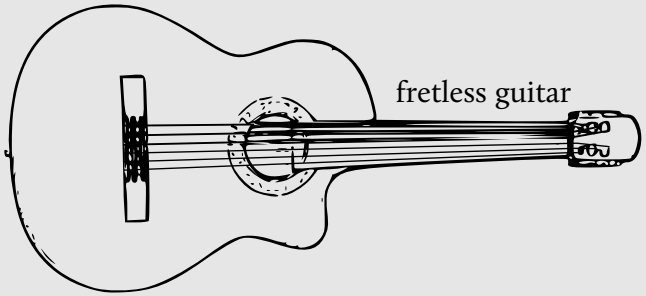




Шудрага / Шанз
(shudraga / shanz)
三弦／三線
(sānxiàn / sanshin)
Đàn tam



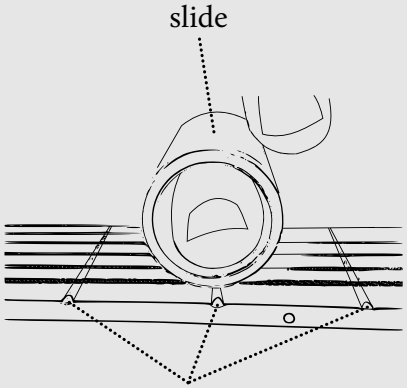
عود
(ud)



fretless guitar

Grab a fretless *lute* or *fiddle*.
Here are some examples.

In case you're not able to get one, playing a fretted guitar with a “slide” instead of fingers might do the job.

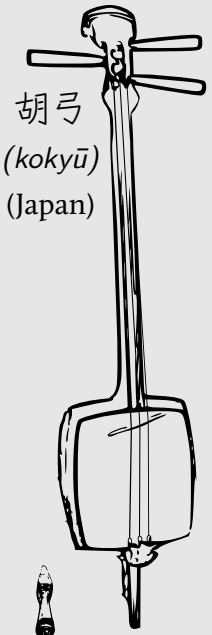


While sliding with a finger on a *string* on the *fingerboard*, hit or strike that string! Hear how the *pitch* changes as a consequence of shortening or lengthening the vibrating section of the string.

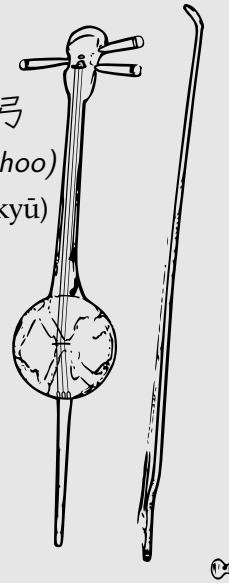
Such pitch changes are actually used in the Ryūkyūan singing techniques 次第下ぎ／上ぎ (*shidee sagi / agi*: steadily changing) and ネー牛 (*neewi*: changing quickly towards the end).

Examples of fretless fiddles:

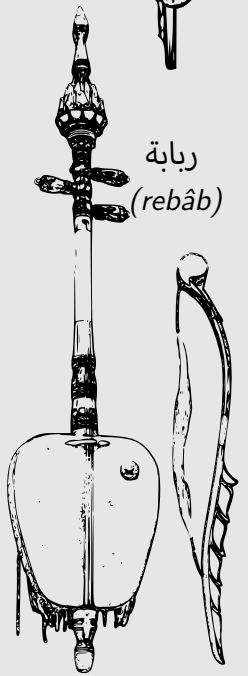
胡弓
(kokyū)
(Japan)



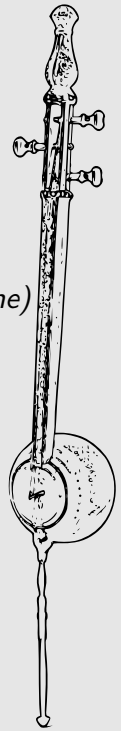
胡弓
(kuuchoo)
(Ryūkyū)



ربابة
(rebâb)



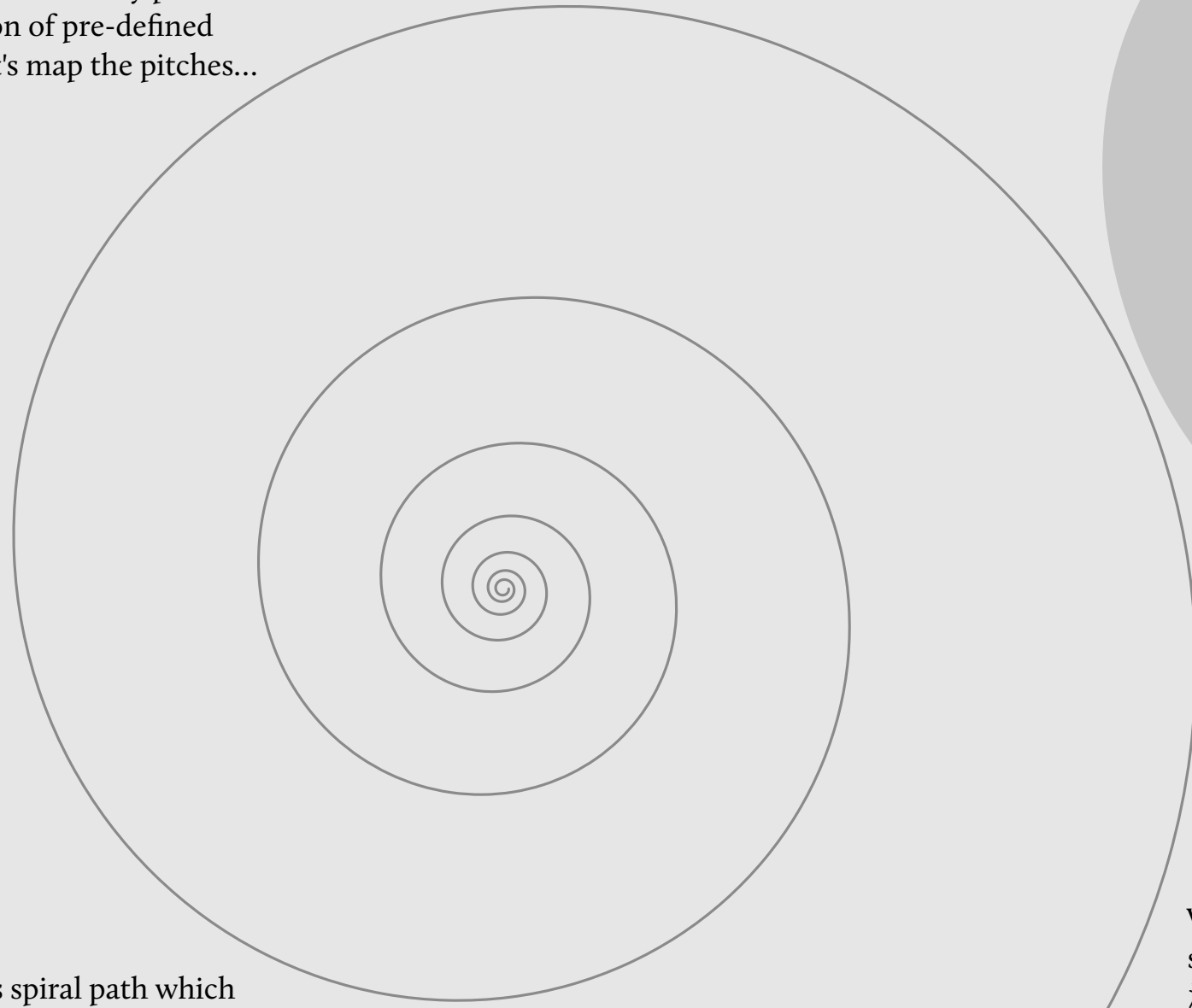
كمانچه
(kamânche)



violin

vers. 2025-10-26

Fretless lutes and fiddles provide a continuous range of pitches, while fretted ones only provide a selection of pre-defined pitches. Let's map the pitches…



…onto this spiral path which represents the world of pitches. As the length of the vibrating section of a string shortens, we move inwards on the path.

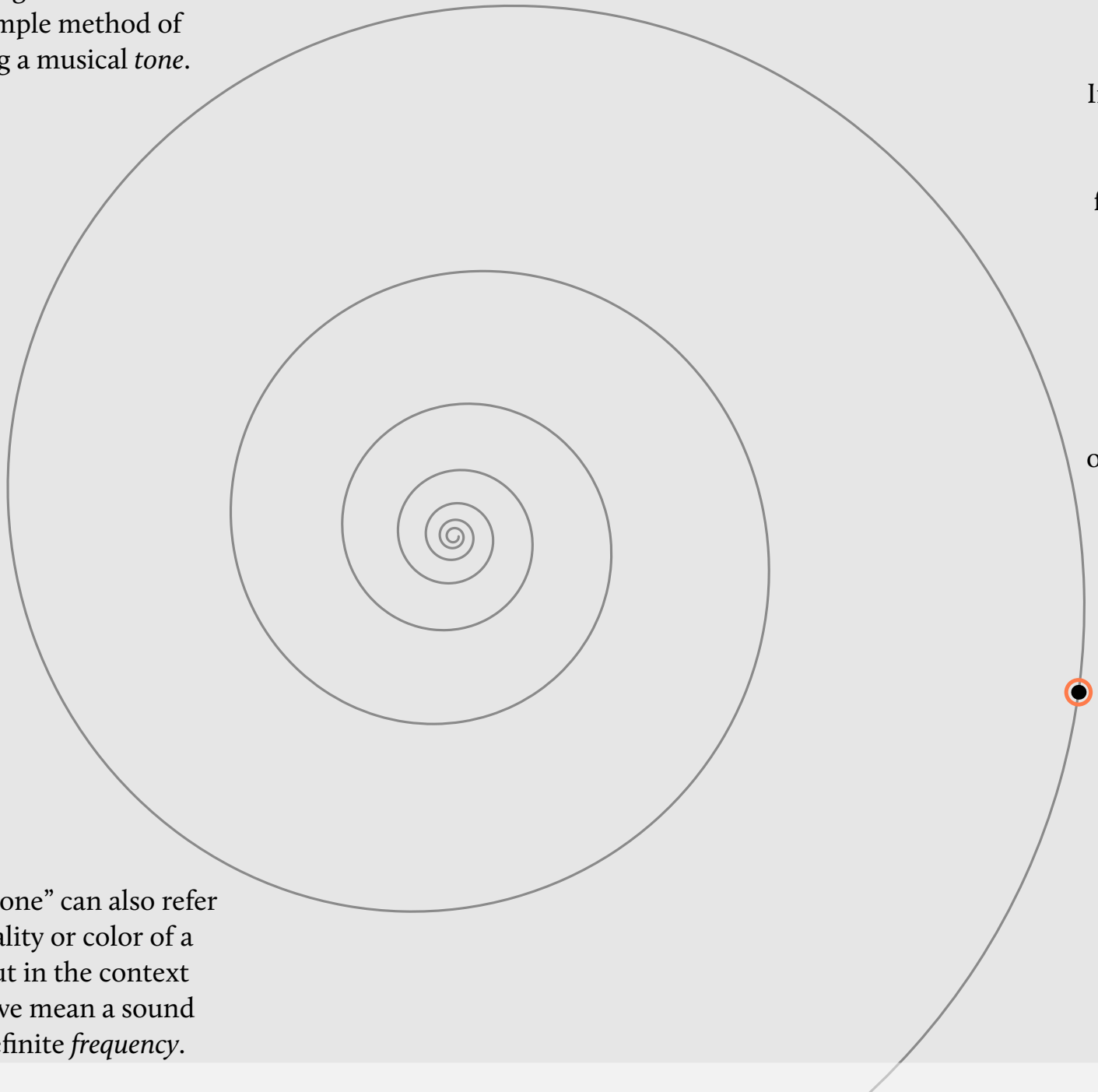
清	濁	
qīng “clear, pure, cleaned”	*zhuó* “muddy, turbid, filthy”	Ancient Chinese
acutus “cutting, sharpened”	*gravis* “heavy, serious”	Ancient Romans
hoch “high”	*tief* “low”	Hermann von Helmholtz (1863)

When we move inwards on the spiral path, the pitch gets more 清, as the ancient Chinese said, or *acutior*, as the Romans said. Nowadays, many people would say “it gets *higher*!”

When moving outwards on the spiral path, the pitch gets more 濁, as the ancient Chinese said, or *gravior*, as the Romans said. The same people of nowadays would say “it gets *lower*!”

vers. 2025-10-26

Now play an *open* string, that's with no finger shortening its vibrating section. This is one simple method of producing a musical *tone*.



Non-Western music is taught traditionally without notation. In the context of such music, the term “tone” is preferred over the term “note”, which comes from “to note”, as in “notation”.

Another method of producing a tone would be by placing a finger on a specific spot on one of the strings on the fingerboard.

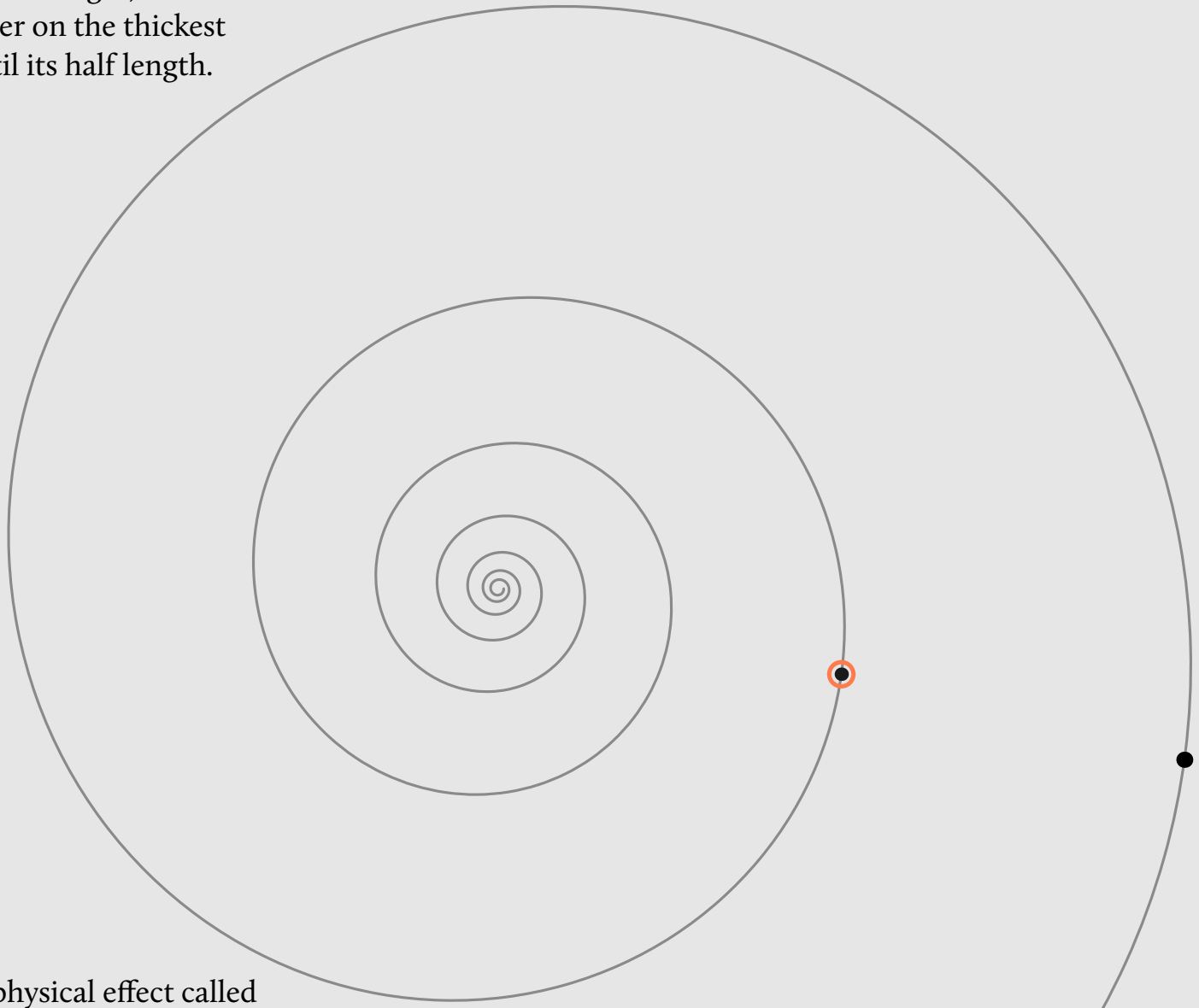
We will represent any tone with a dot on our spiral path.

Let's say this dot here represents the tone generated by playing the thickest open string. This tone will serve us as a point of departure for a trip through a collection of tones.

The term “tone” can also refer to the quality or color of a sound, but in the context of pitch, we mean a sound with a definite *frequency*.

vers. 2025-10-26

While letting the tone of our point of departure resonate, e.g. by humming it, slide with a finger on the thickest string until its half length.



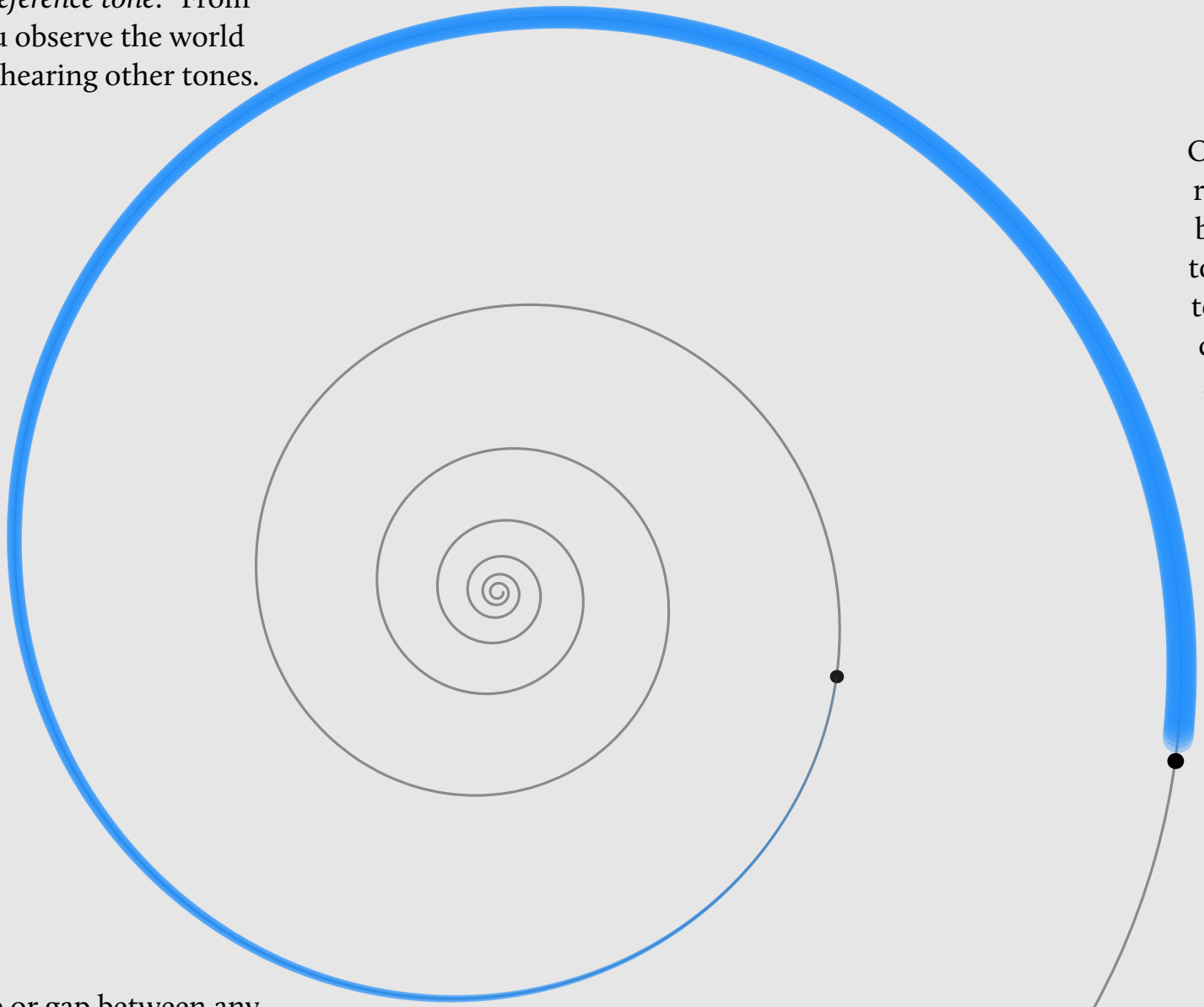
Tune the thinnest string by hearing to this newly found tone. Playing both thickest and thinnest open strings in quick succession allows us to hear their pitches simultaneously. Bring the pitch of the open thinnest string closer and closer to the intended tone by adjusting its tuning peg.

Thanks to a physical effect called *harmony*, you'll find this position on the string by *hearing*, which is by far the most accurate sense that humans have.

If in harmony, one of these two open strings will resonate when only the other is played. This method helps us to check if a string is *in tune* (=tuned correctly).

vers. 2025-10-26

Imagine yourself in the world of pitches, hearing a tone, which becomes a *reference tone*. From its spot, you observe the world around you, hearing other tones.



The distance or gap between any reference tone and any *compared tone* is called *musical interval*, *frequency interval*, or just *interval*.

On our spiral path, an interval is represented by a spiral segment between a dot for the reference tone and a dot for the compared tone. The spiral segment is not defined by its length, but by its spanning angle $\theta_{\text{<interval>}}$, and the interval unfolds its effect differently when we apply it

inwards

or

outwards.

The direction depends on the choice of the reference tone and the compared tone. Just before, we compared one tone with another one on our instrument. Thus, we encountered an interval.

vers. 2025-10-26

h

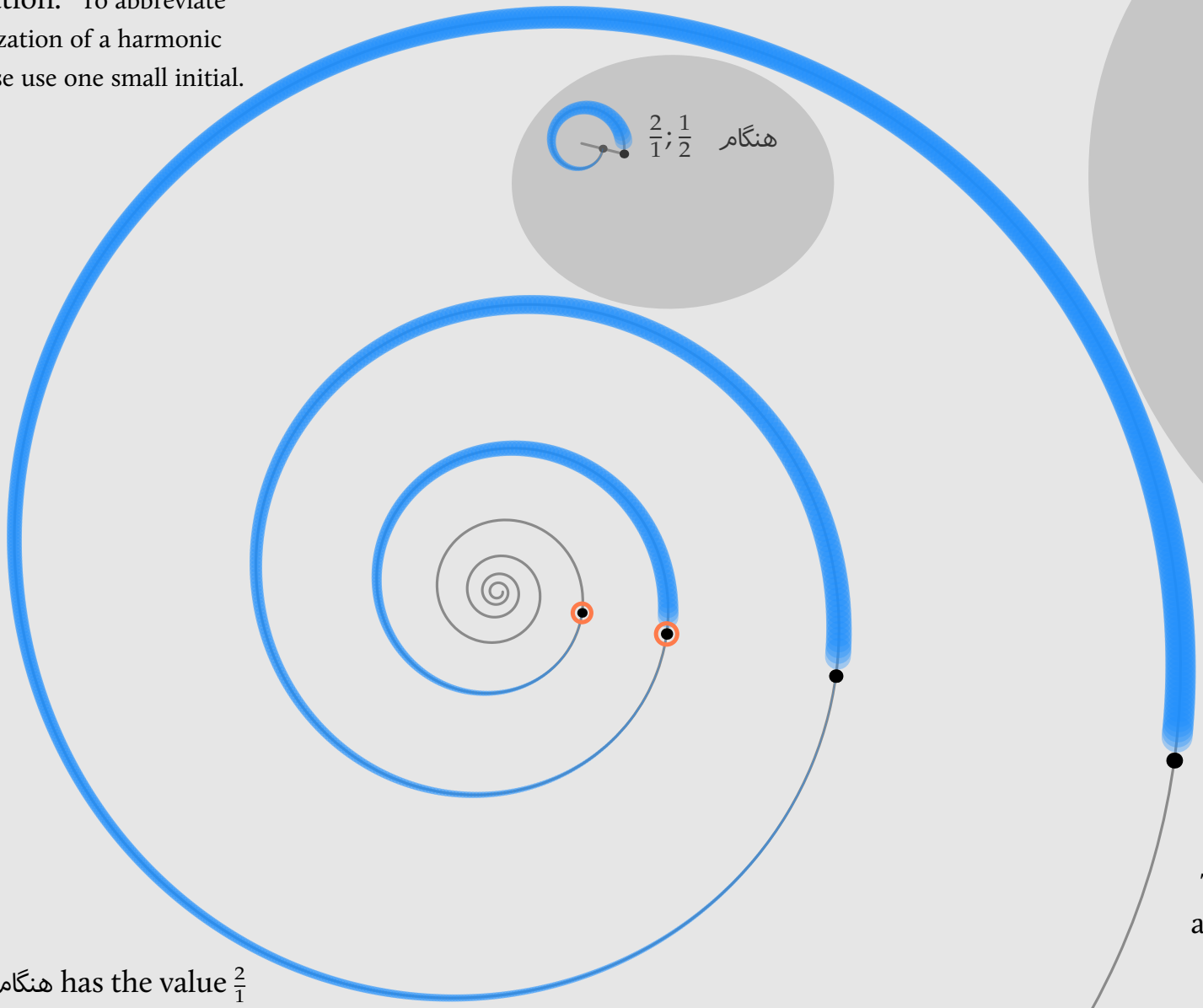
هنگام

hangâm

in Western music theory:
διαπασῶν, octave

"time, hour, season"

It is called هنگام in Persian. The angle $\theta_{\text{هنگام}} := 360°$ spans a full spiral rotation. To abbreviate the romanization of a harmonic interval, please use one small initial.



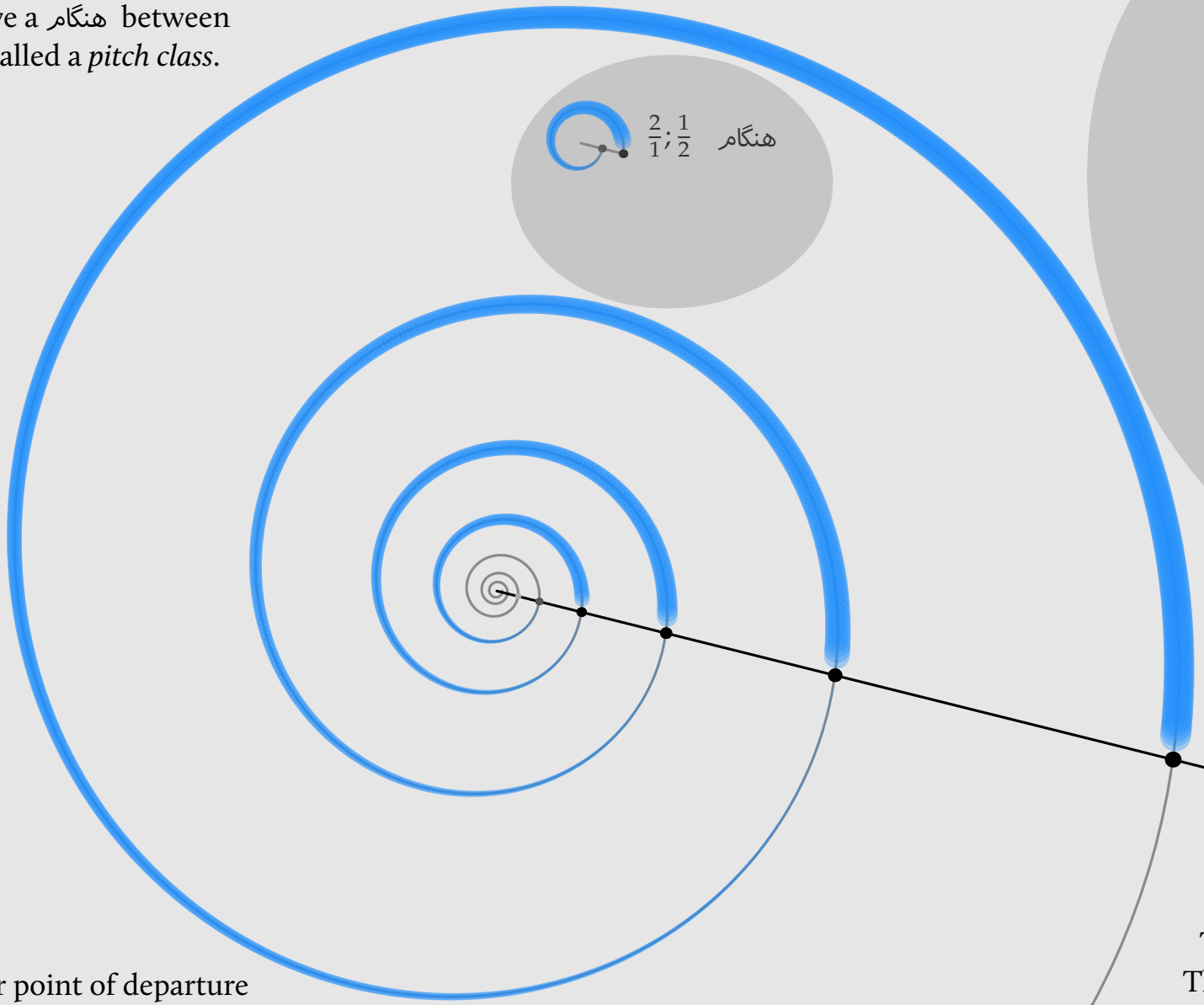
Physically, هنگام has the value $\frac{2}{1}$ when the compared tone is "higher" or more inside on the spiral, and $\frac{1}{2}$ when it is "lower" or more outside.

Let's find more tones by applying two more هنگام by halving the thinnest open string and then halving again its vibrating section.

Then play all discovered tones again in the reverse order. Isn't it exciting to rediscover this cyclical characteristic of هنگام in its literal meaning, which is "time", "hour", or "season"?

vers. 2025-10-26

Such a subset of tones, in which two adjacent tones always have a هنگام between them, is called a *pitch class*.



G

宮

gōng

キュウ

ᄀᆞᆼ

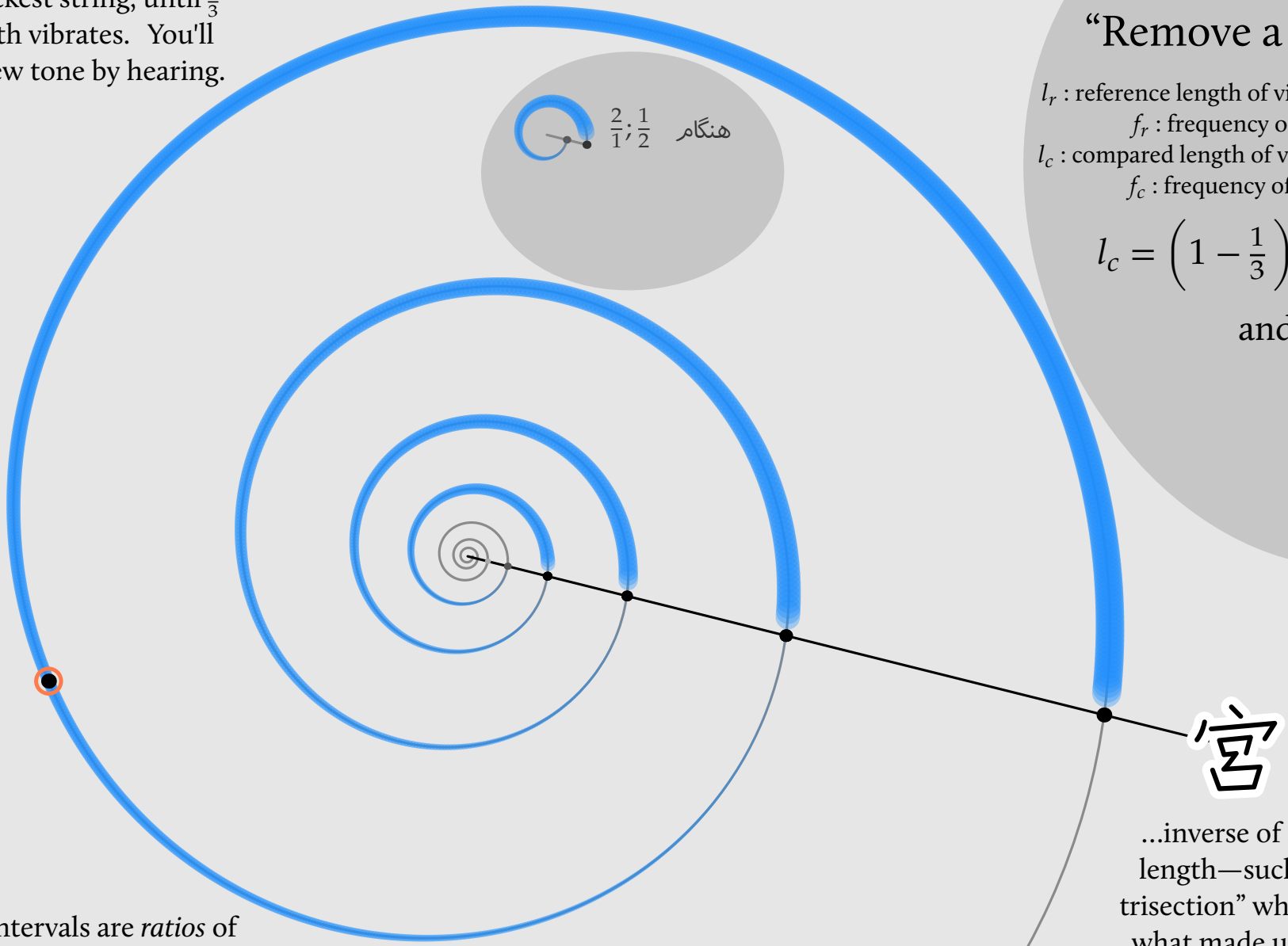
“palace”

in Western music theory: do, C

The one our point of departure belongs to is called 宮 by the ancient Chinese. To abbreviate the romanization of a pitch class, please use one capital initial for now.

The meaning of 宮 is “palace”. This fits well to the pitch class of our point of departure, right?

While letting the tone of our point of departure resonate, slide on the thickest string, until $\frac{2}{3}$ of its length vibrates. You'll find this new tone by hearing.



“Remove a trisection”

l_r : reference length of vibrating section of string
f_r : frequency of reference tone
l_c : compared length of vibrating section of string
f_c : frequency of compared tone

$$l_c = \left(1 - \frac{1}{3}\right) \cdot l_r \iff \frac{l_c}{l_r} = \frac{2}{3}$$

and $f \propto \frac{1}{l}$

$$\Longrightarrow$$

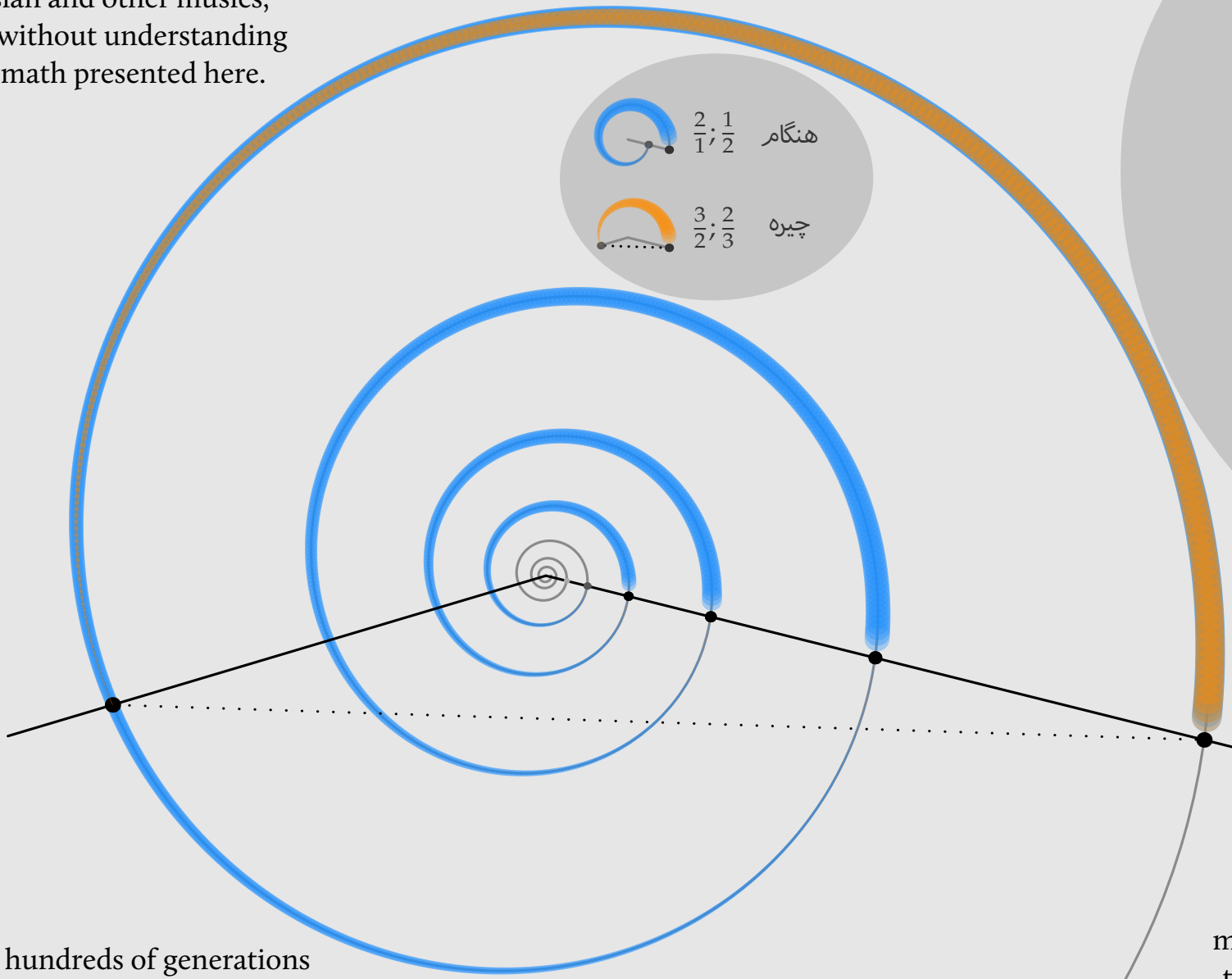
$$\frac{f_c}{f_r} = \frac{3}{2}$$

Physically, intervals are *ratios* of *frequencies*. Latter are *inverse proportional* to the length of the vibrating section of a string. That's why intervals are the...

...inverse of a change of that length—such as “removing a trisection” what we just did and what made us find an interval which has the value of $\frac{3}{2}$, and we found it just by hearing.

vers. 2025-10-26

You'll be able to sing or play traditional Ryūkyūan, Persian and other musics, even without understanding the math presented here.



c

چیره

chireh

in Western music theory:
διαπέντε, perfect fifth

“prevailing, dominant, victorious”

Several hundreds of generations before you localised, tuned and played all tones and intervals presented here correctly, just by hearing and without a tuner.

So did we an instant ago with the $\frac{3}{2}$ or $\frac{2}{3}$ interval, which is so much “prevailing” or “dominant” that the Persians named it چیره . It's the other interval beside هنگام which is very easily tunable.

vers. 2025-10-26

An interval value above $\frac{1}{1}$ results in a “higher” compared tone, while a value below $\frac{1}{1}$ results in a “lower” compared tone. By *inversing* an interval value,...

	more 清	more 濁
	acutior	*gravior*
	“higher”	“lower”
هنگام	$\overline{h} := \frac{2}{1}$	$\underline{h} := \frac{1}{2}$
چیره	$\overline{c} := \frac{3}{2}$	$\underline{c} := \frac{2}{3}$
⋮	⋮	⋮

Use an overbar to indicate an inwards and an underbar to indicate an outwards direction.

Intervals can be put in a sequence. The resulting interval corresponds to the...

...*multiplication* of the values of the intervals of that sequence.

A multiplication in the interval domain corresponds to an *addition* in the spiral angle domain. See the next page for an example.

...we are changing the direction of movement on our spiral path.

That's because an inversion in the interval domain corresponds to a *sign change* in the spiral angle domain.

vers. 2025-10-26

d

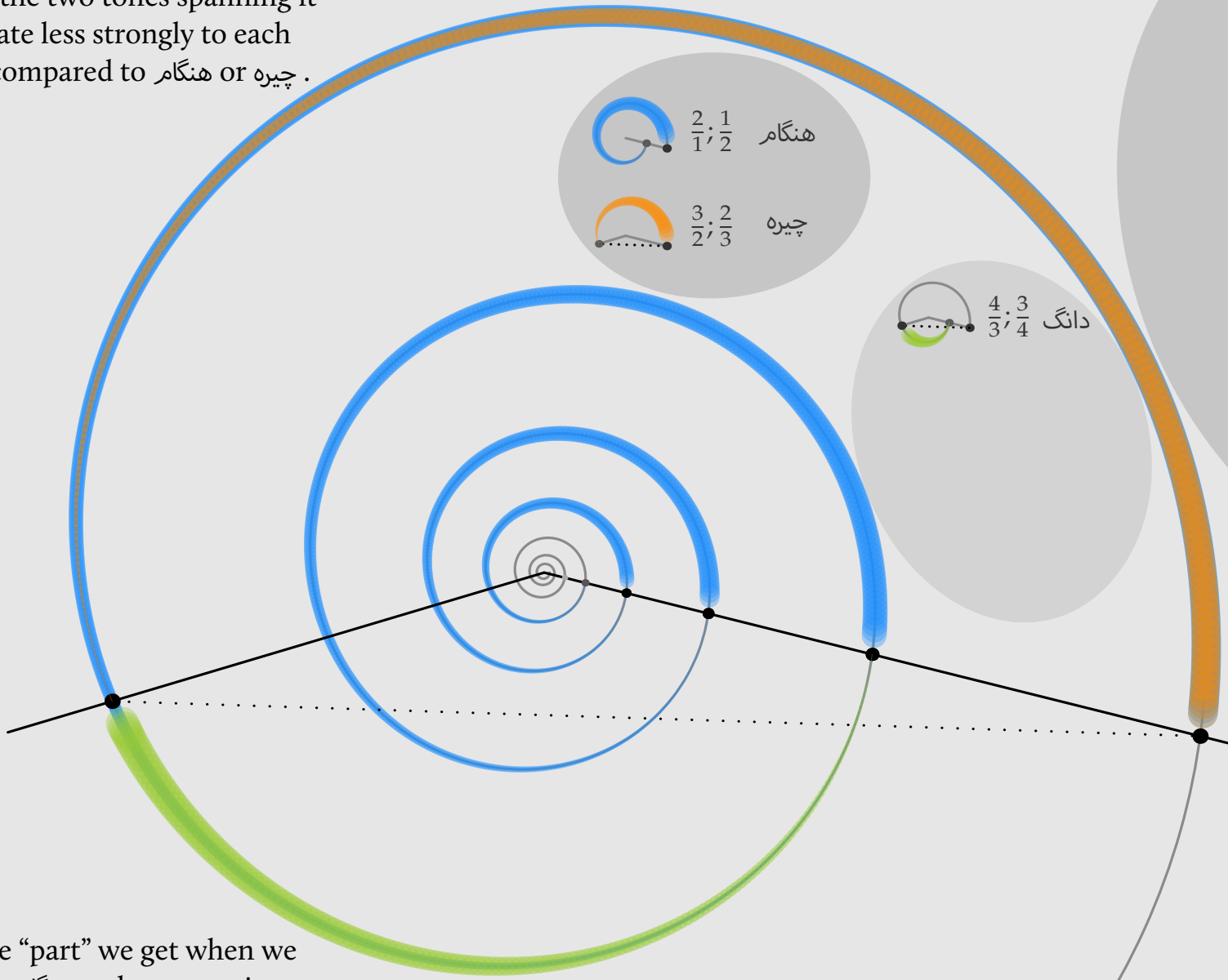
دانگ

dâng

in Western music theory:
διατεσσάρων, perfect fourth

"share, part"

دانگ , which has a value of $\frac{4}{3}$ or $\frac{3}{4}$, is used for tuning too, even though the two tones spanning it resonate less strongly to each other, compared to هنگام or چیره .



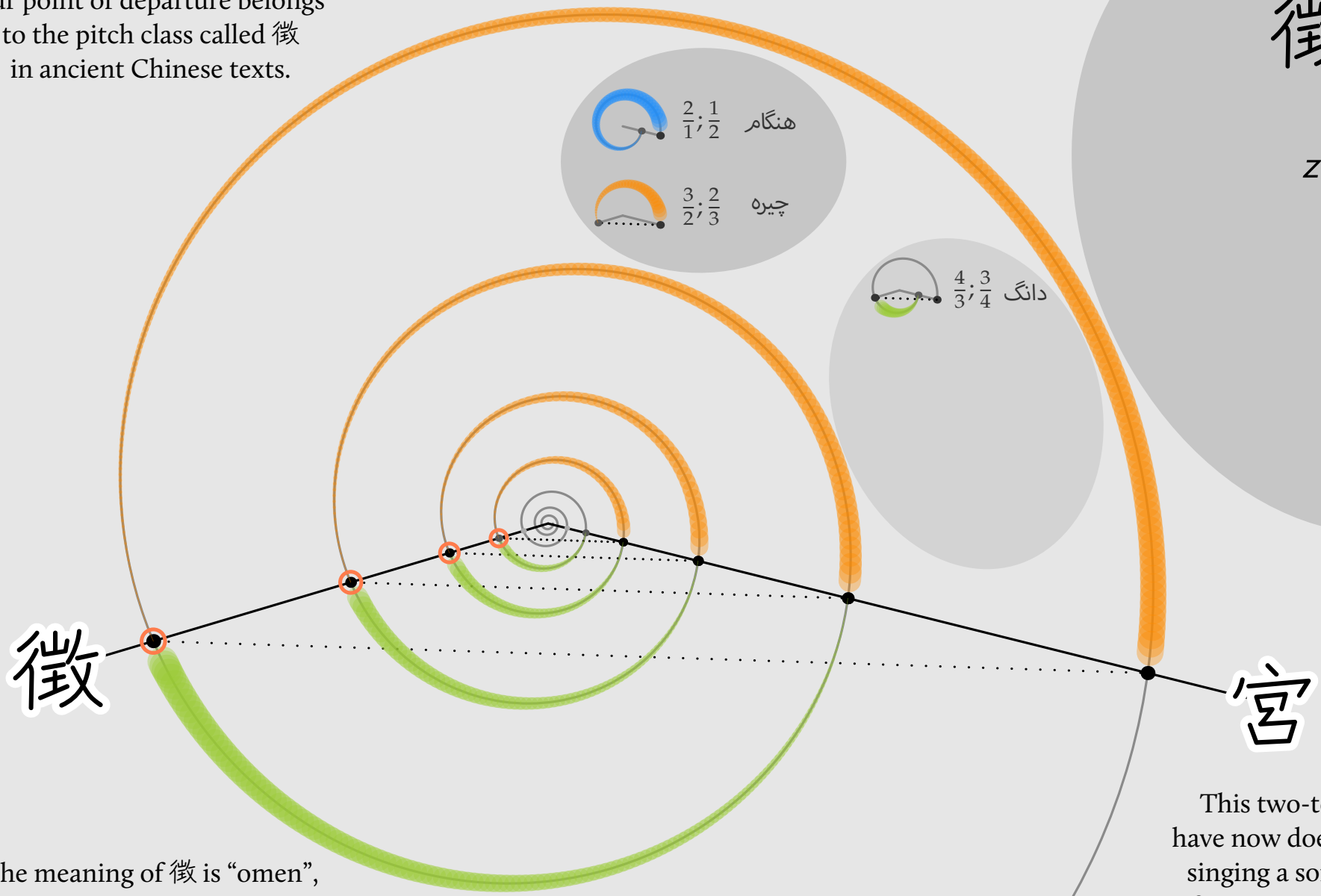
In the spiral angle domain, it's $\theta_{\underline{d}} := \theta_{\underline{h}} + \theta_{\overline{c}} = \theta_{\underline{h}} - \theta_{\underline{c}}$

A such outwards headed دانگ is equivalent to "adding a trisection" to the vibrating section of the string (that's how the ancient Chinese described it): $\frac{l_c}{l_r} = \frac{4}{3} = 1 + \frac{1}{3}$

It's the "part" we get when we put a هنگام and an opposite headed چیره in a sequence. Outwards headed, it's $\underline{d} := \underline{h} \cdot \overline{c} = \underline{h}/\underline{c} = \frac{1}{2} \cdot \frac{3}{2} = \frac{1}{2}/\frac{2}{3} = \frac{3}{4}$

vers. 2025-10-26

The tone we found by “removing a trisection” from our point of departure belongs to the pitch class called 徵 in ancient Chinese texts.



Z

徵

zhǐ

チ

ㄓ

“omen”

in Western music theory: sol, G

The meaning of 徵 is “omen”, which fits to the first milestone after leaving the “palace” and before moving to the next milestone of our journey.

This two-tone system we have now doesn't serve yet for singing a song, but it serves for tuning a three-stringed instrument like the 三線.

vers. 2025-10-26

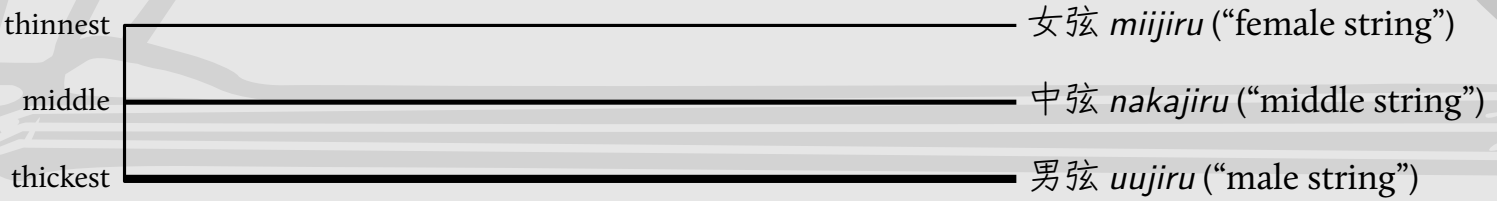
The 三線 is an omnipresent lute on the Ryūkyū Islands. Its three strings have the same length, but a different thickness.

ちんだみ

chindami

"to tune; tuning"

They're called as follows in *uchinaaguchi*, the language spoken on the biggest of the Ryūkyū lslands:



Tuning a fretless lute or fiddle means establishing harmony between the open strings by adjusting their tension with the help of the tuning pegs.

There are different ways to tune an instrument. This results in different *tunings*. *To tune an instrument* as well as a tuning is called ちんだみ on the Ryūkyū Islands.

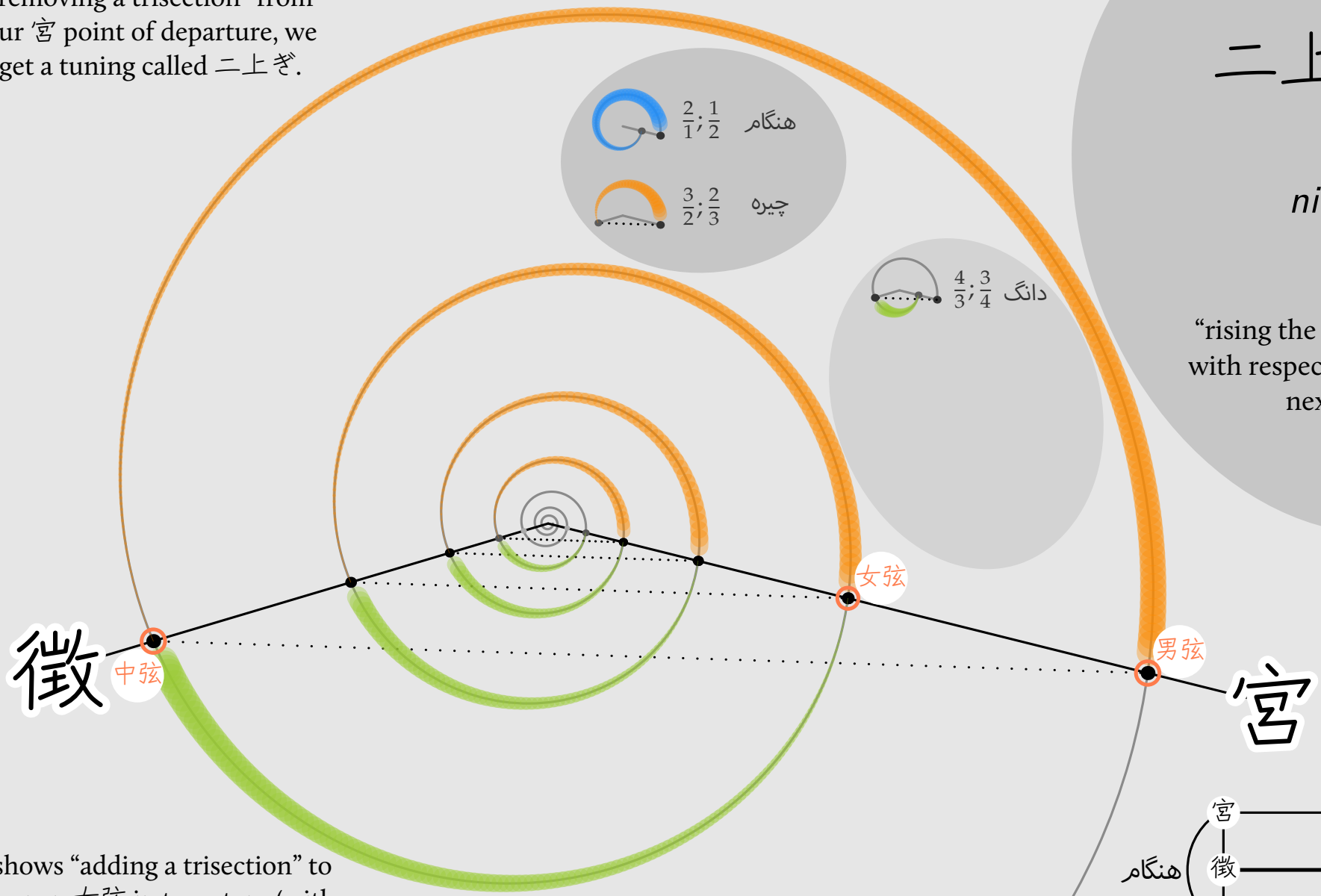
vers. 2025-10-26

When we tune the open 中弦 to the 徴 tone found by "removing a trisection" from our 宮 point of departure, we get a tuning called 二上ぎ.

二上ぎ

ni agi

"rising the second" (string with respect to 本調子, see next page)



It shows "adding a trisection" to the open 女弦 in two steps (with the open 男弦 as intermediate and the open 中弦 as final):

$G_{\text{open 女弦}} \cdot \underline{h} = G_{\text{open 男弦}}$ and $G_{\text{open 男弦}} \cdot \overline{c} = Z_{\text{open 中弦}} \Longrightarrow G_{\text{open 女弦}} \cdot \underline{d} = Z_{\text{open 中弦}}$

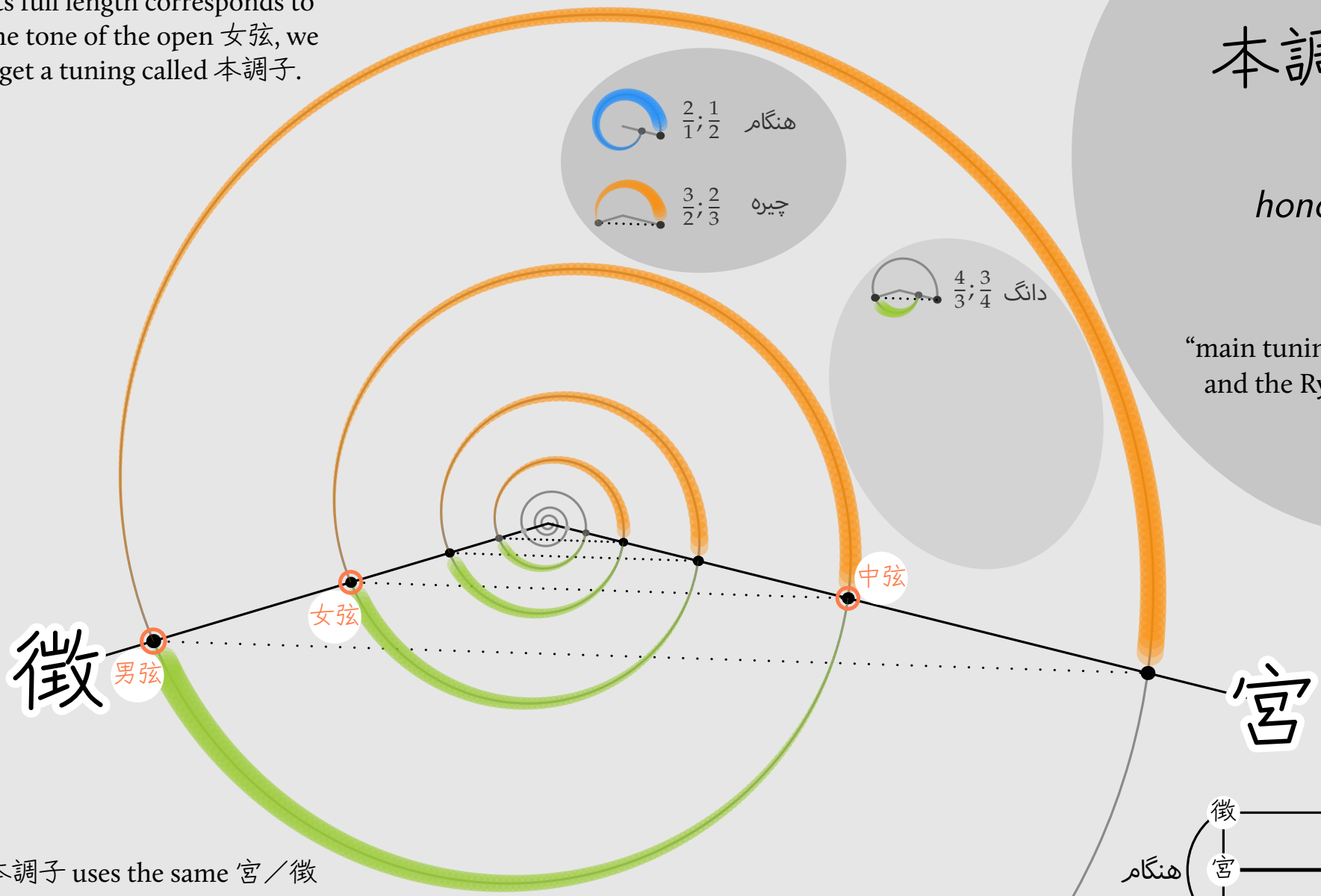
vers. 2025-10-26

本調子

honchōshi

"main tuning" (for the 三線 and the Ryūkyūan 胡弓)

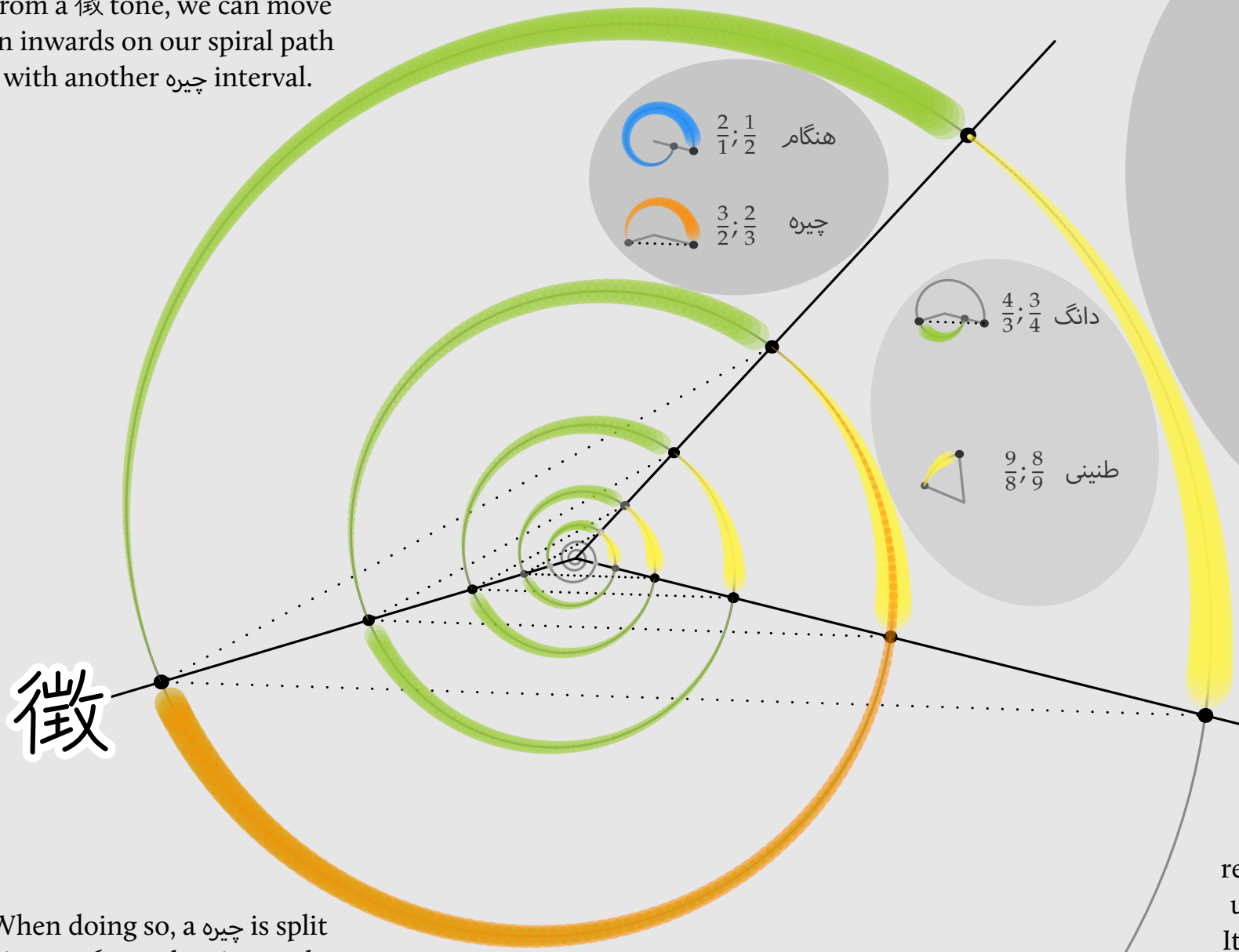
But when we tune the open 中弦 so that the tone of $\frac{2}{3}$ of its full length corresponds to the tone of the open 女弦, we get a tuning called 本調子.



本調子 uses the same 宮／徴 two-tone system, it just maps it differently onto the instrument: The open 男弦 and 女弦 are now a 徴, while the open 中弦 is a 宮.

vers. 2025-10-26

Let's continue our trip through the world of tones. From a 徵 tone, we can move on inwards on our spiral path with another چیره interval.



When doing so, a چیره is split into a دانگ and an interval called طنینی . So a هنگام can be said to be consisting of two دانگ and one طنینی .

t

طنینی

tanini

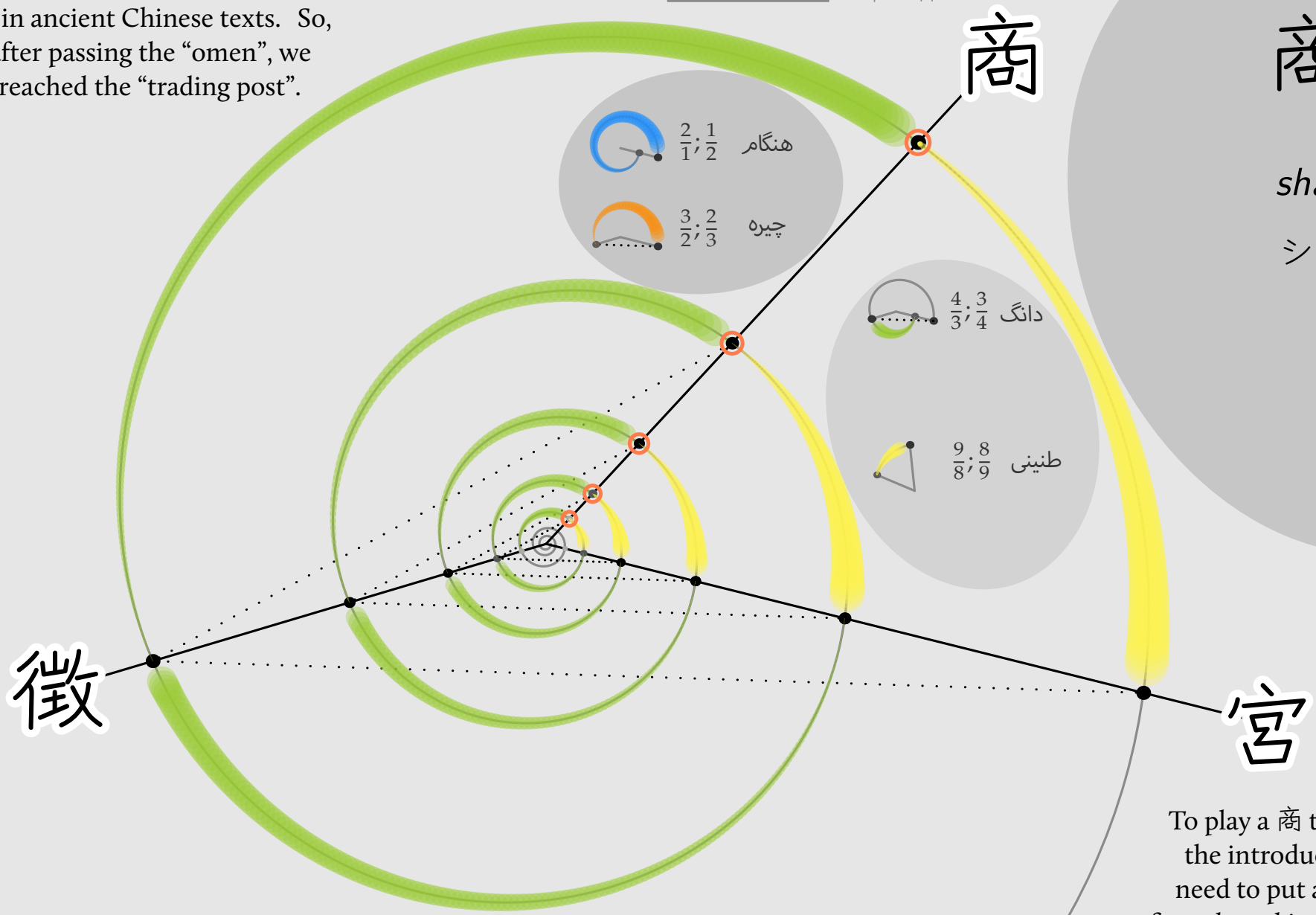
“resonant, reverberative, tonally nice”

in Western music theory: ἐπόγδοον, major whole tone

طنینی means “resonant, reverberative, tonally nice”. It's used a lot in traditional songs. It's easy to train our vocal cords to sing it. We'll encounter it some more times on our journey.

vers. 2025-10-26

With the previous step, we found a new pitch class, which is called 商 in ancient Chinese texts. So, after passing the “omen”, we reached the “trading post”.



S

商

shāng

ショウ

상

“trade”

in Western music theory: re, D

Thus, we've expanded the two- to a three-tone system.

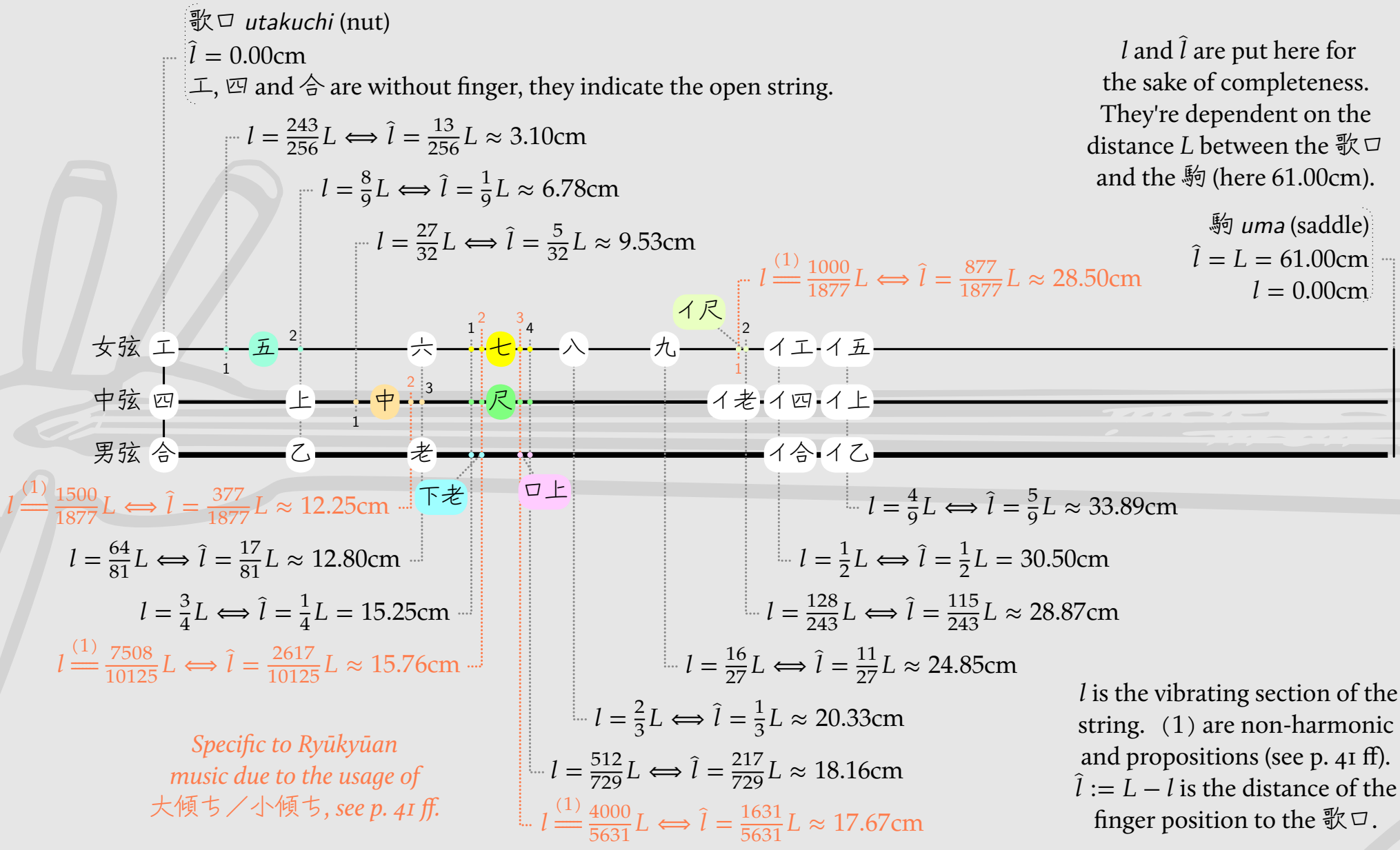
To play a 商 tone using one of the introduced tunings, we need to put a finger onto the fingerboard in a specific position. Open strings can't be used.

vers. 2025-10-26

Here's an overview of finger positions used on the Ryūkyū Islands for 三線 and 胡弓. The colored designations are used for more than one position.

Be aware that we adjust all finger positions by hearing. To train our hearing, it is important to not use any visual markers on the neck of the instrument.

l and $\hat{l}$ are put here for the sake of completeness. They're dependent on the distance L between the 歌口 and the 駒 (here 61.00cm).

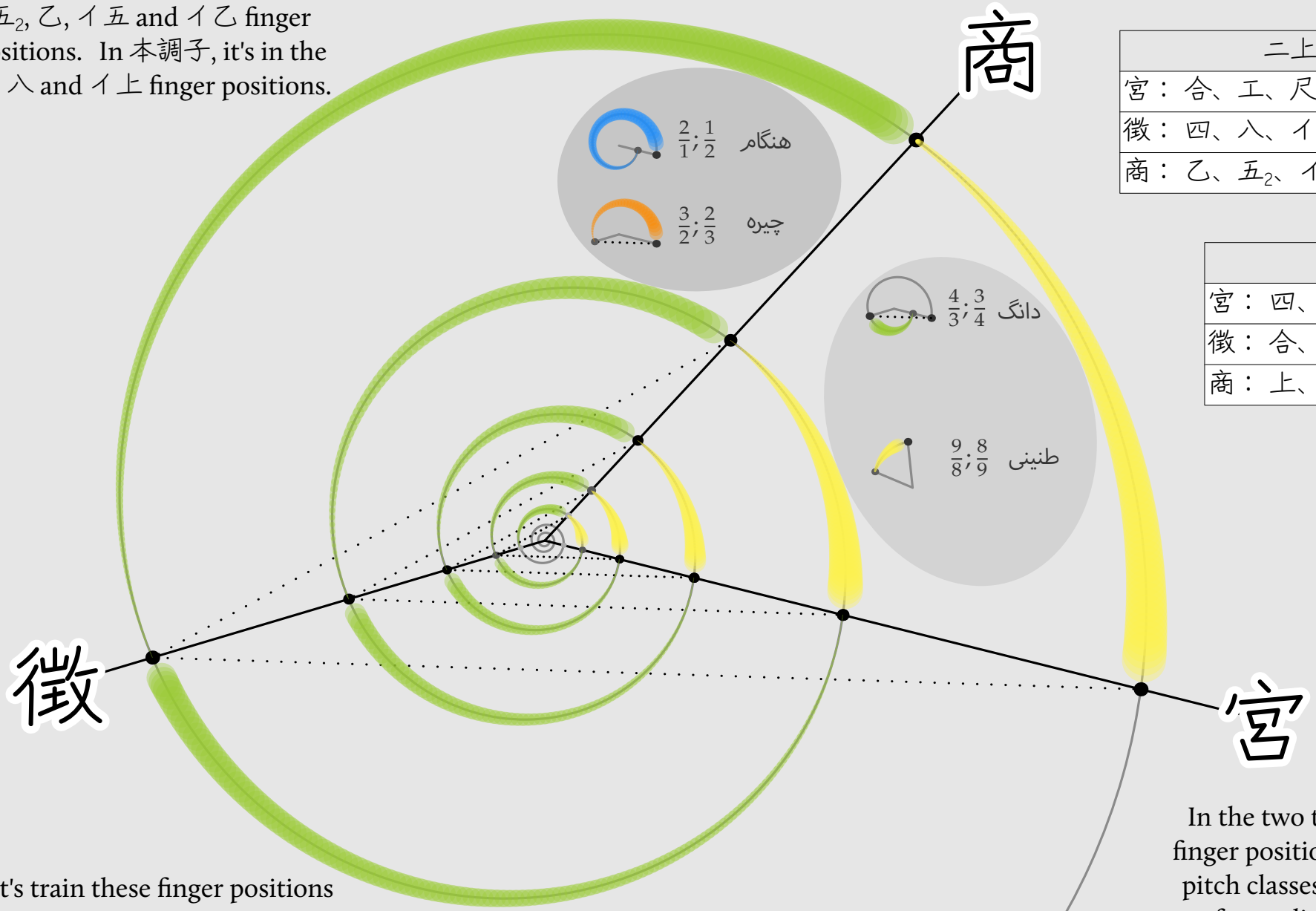


Specific to Ryūkyūan music due to the usage of 大傾ち／小傾ち, see p. 41 ff.

l is the vibrating section of the string. (1) are non-harmonic and propositions (see p. 41 ff). $\hat{l} := L - l$ is the distance of the finger position to the 歌口.

vers. 2025-10-26

In the 二上ぎ tuning, we can play the 商 pitch class in the $五_2$, 乙, イ五 and イ乙 finger positions. In 本調子, it's in the 上, 八 and イ上 finger positions.



二上ぎ
宮： 合、工、$尺_1$、イ合、イ工
徴： 四、八、イ四
商： 乙、$五_2$、イ乙、イ五

本調子
宮： 四、$老_1$、$七_1$、イ四
徴： 合、工、イ合、イ工
商： 上、八、イ上

Let's train these finger positions by playing its tone together with the adjacent “lower” or exterior 徴 tone, so we hear the چیره. We can't do that with 乙 though.

In the two tables above, all finger positions for the three pitch classes we discovered so far are listed for the two tunings 二上ぎ and 本調子.

三分損益法

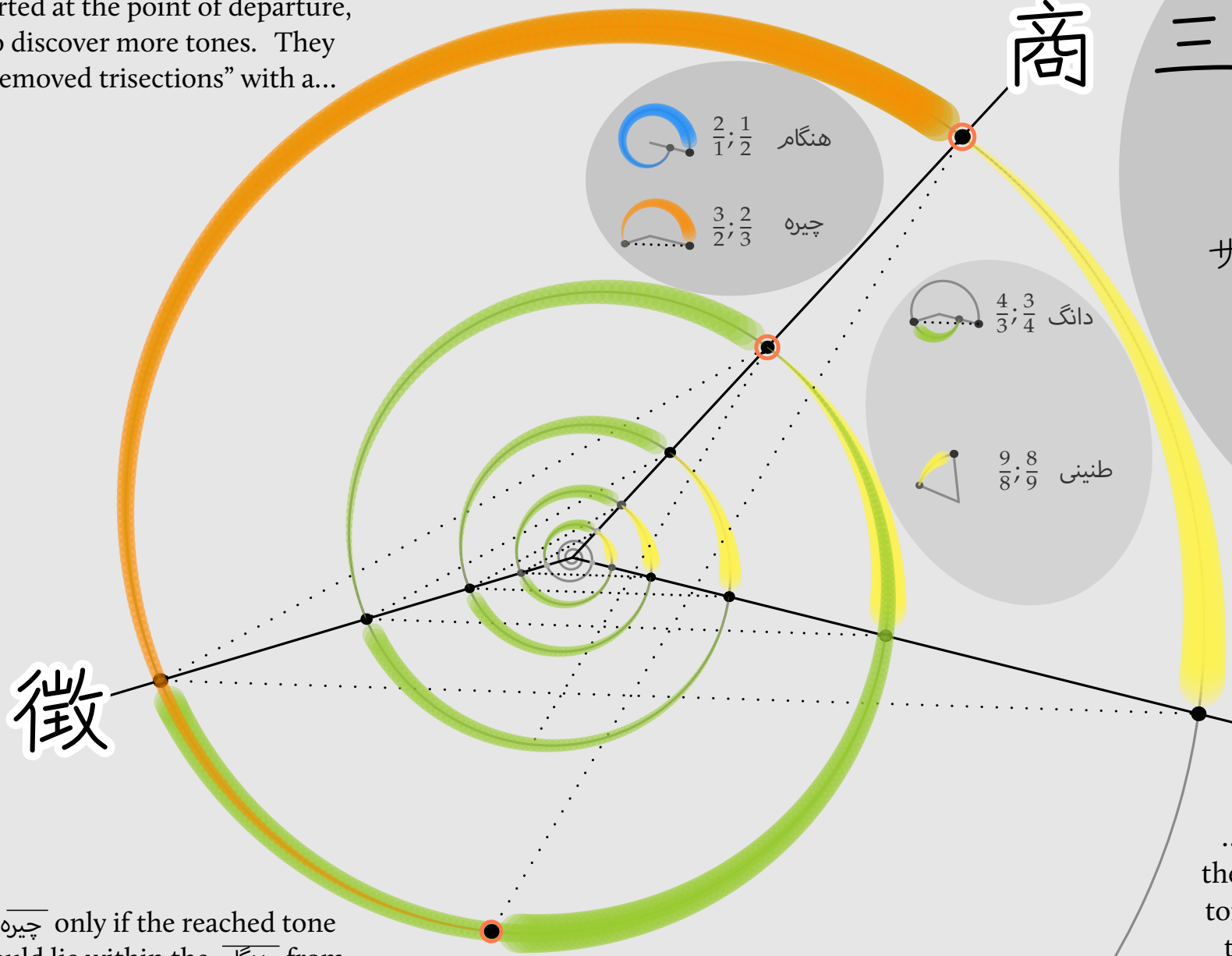
sān-fēn sǔn-yì-fǎ

サンブンソンエキホウ

삼분손익법

“method of removing and adding trisections”

The ancient Chinese continued this sequence of چیره , which started at the point of departure, to discover more tones. They “removed trisections” with a...

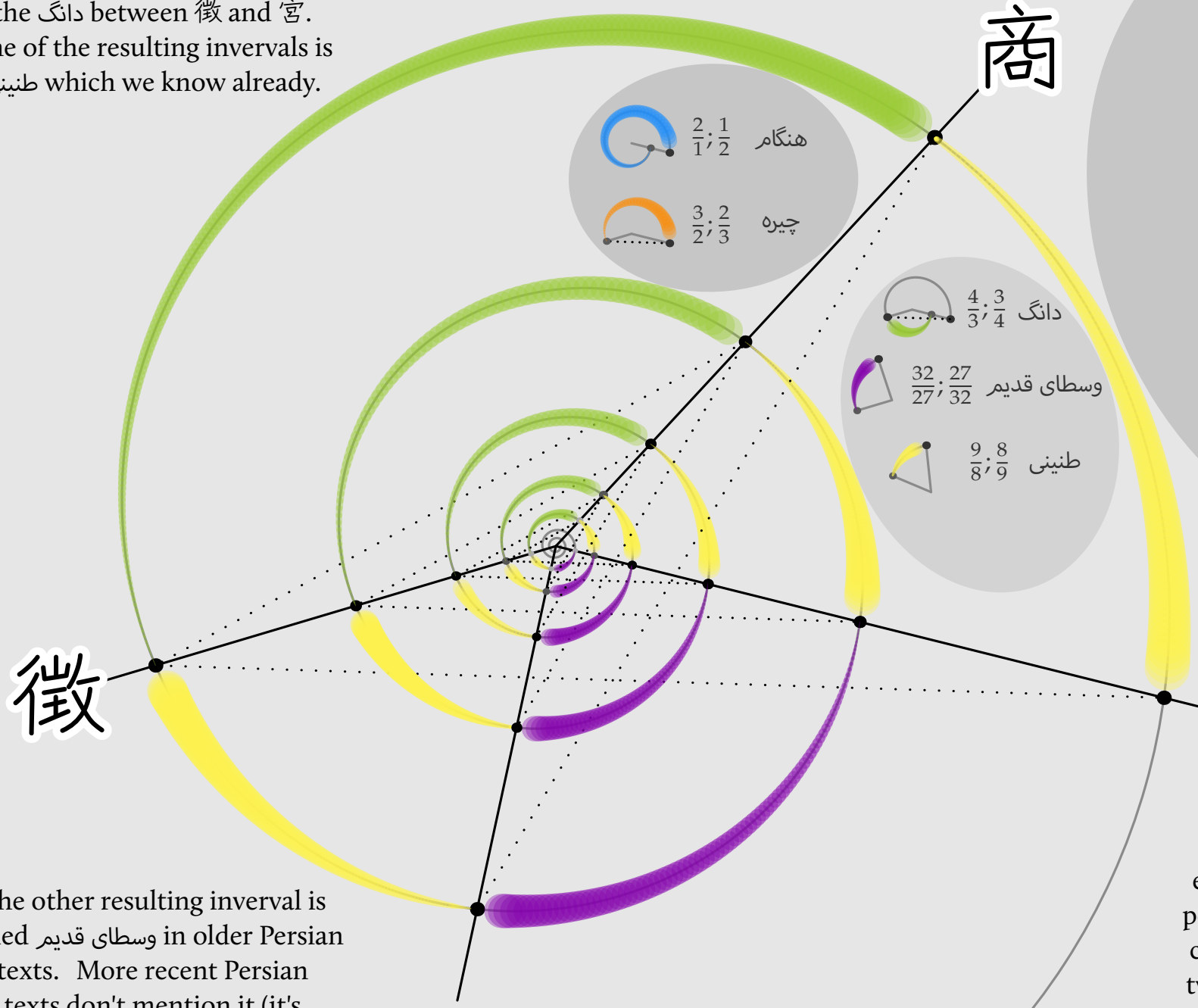


...pitch class (here 商) to the next “lower” or exterior tone and applied $\overline{\text{چیره}}$ from there—what's “adding a trisection” in two steps. That's why they named the whole procedure 三分損益法.

...$\overline{\text{چیره}}$ only if the reached tone would lie within the $\overline{\text{هنگام}}$ from the point of departure. If they would have reached a “higher” tone, they jumped within the...

vers. 2025-10-26

“Adding a trisection” from our last 商 tone results in splitting the دانگ between 徵 and 宮. One of the resulting invervals is طنینی which we know already.



وسطای قدیم

vostâ-ye qadim

(position of the)
“middle finger”
(on the fingerboard of a lute)

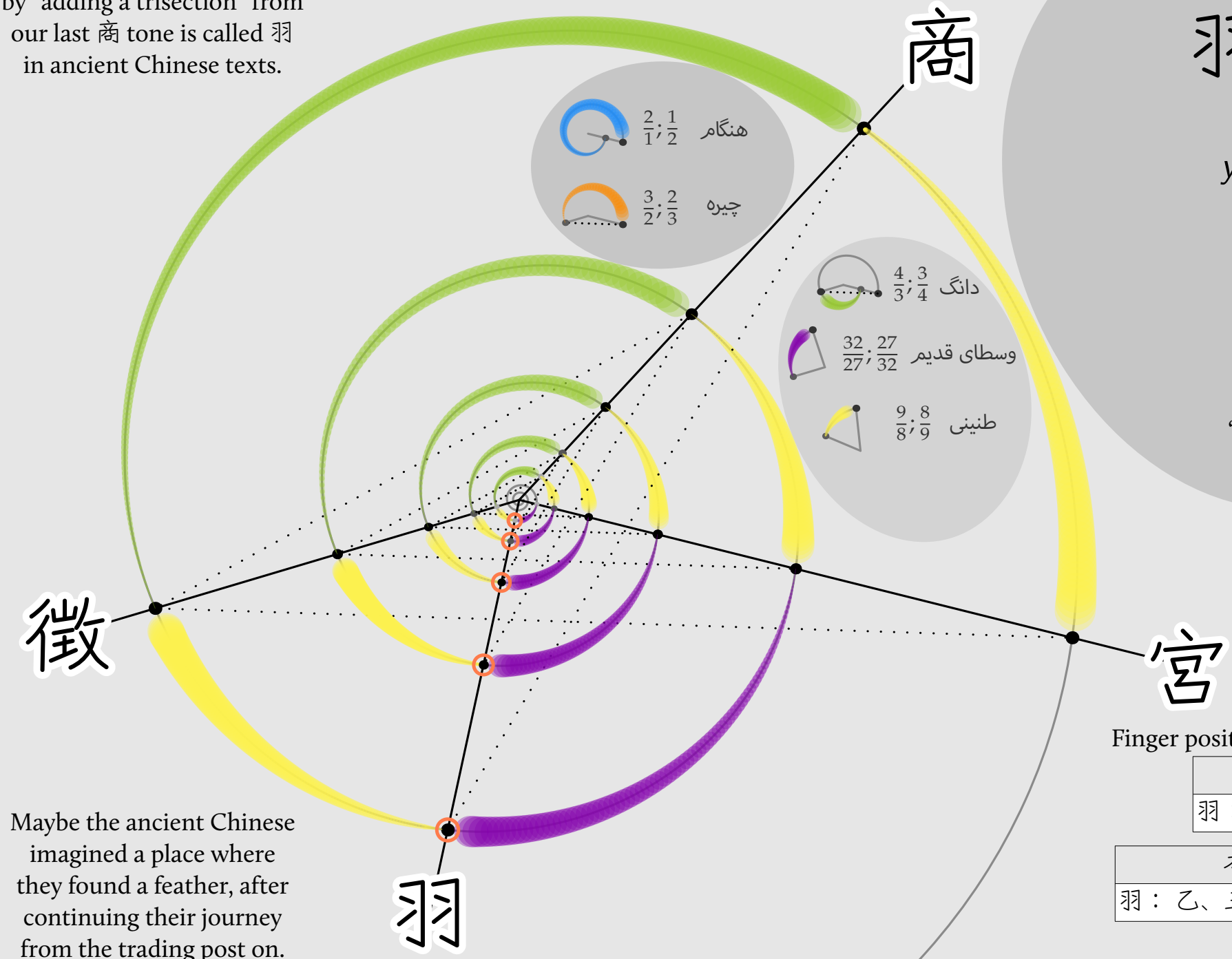
in Western music theory: Pythagorean minor third

The other resulting inverval is called وسطای قدیم in older Persian texts. More recent Persian texts don't mention it (it's often split itself, see p. 27 ff).

Its meaning shows that also in the past, intervals were explored together with finger positions. Be aware that a چیره can be said to be consisting of two طنینی and one وسطای قدیم.

vers. 2025-10-26

The pitch class we discovered by “adding a trisection” from our last 商 tone is called 羽 in ancient Chinese texts.



Y

羽

yǔ

ウ

우

“feather”

in Western music theory: la, A

Maybe the ancient Chinese imagined a place where they found a feather, after continuing their journey from the trading post on.

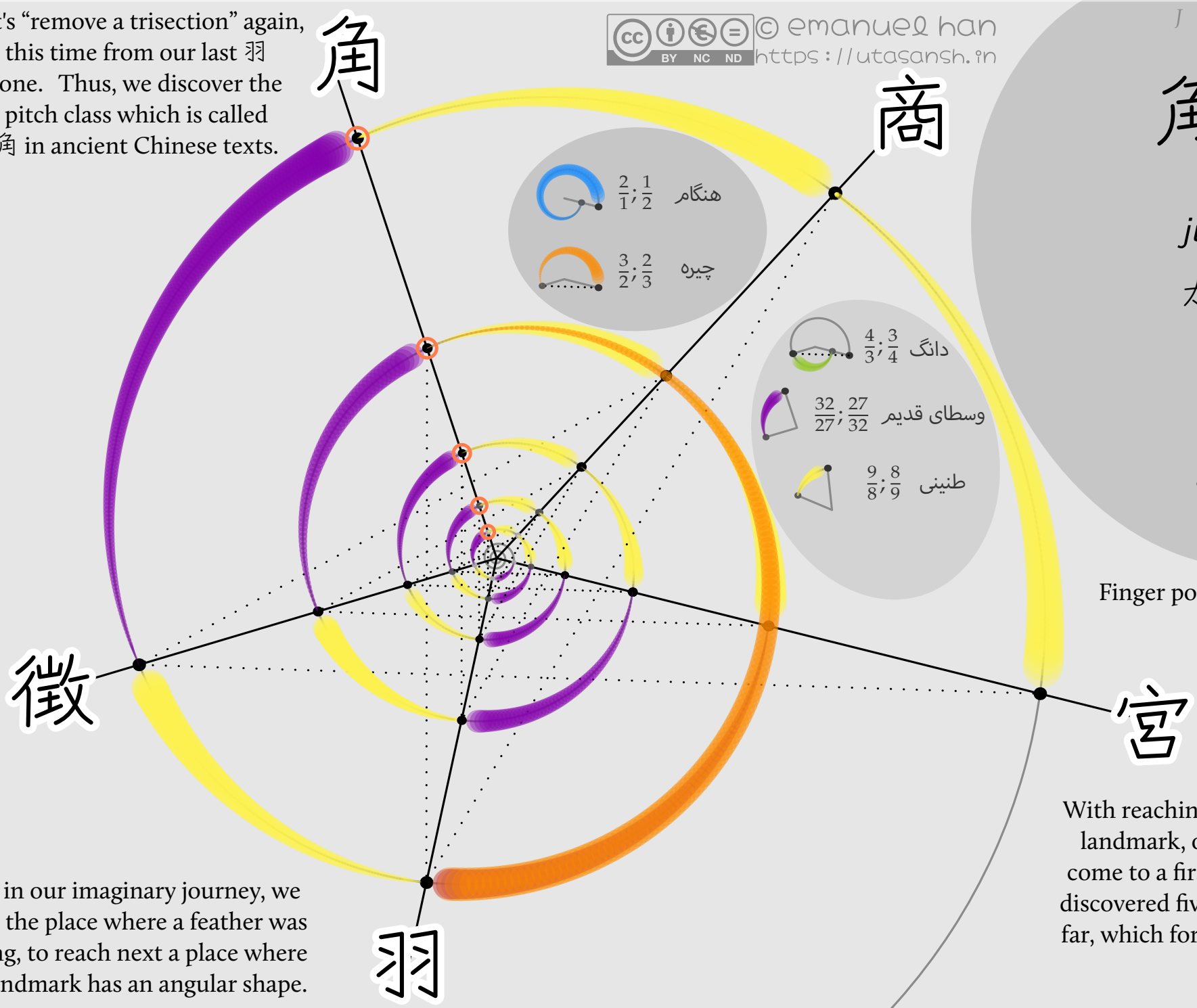
Finger positions for 羽 are:

二上ぎ
羽： 上、九、イ上

本調子
羽： 乙、五$_2$、イ乙、イ五

vers. 2025-10-26

Let's “remove a trisection” again, this time from our last 羽 tone. Thus, we discover the pitch class which is called 角 in ancient Chinese texts.



J

角

jué

カク

각

in Western music theory: mi, E

“corner”

Finger positions for 角 are:

二上ぎ
角： 老、六

本調子
角： 中$_3$、九

With reaching 角, the angular landmark, our journey has come to a first end. We have discovered five pitch classes so far, which form together the...

So in our imaginary journey, we left the place where a feather was lying, to reach next a place where a landmark has an angular shape.

vers. 2025-10-26

正音級

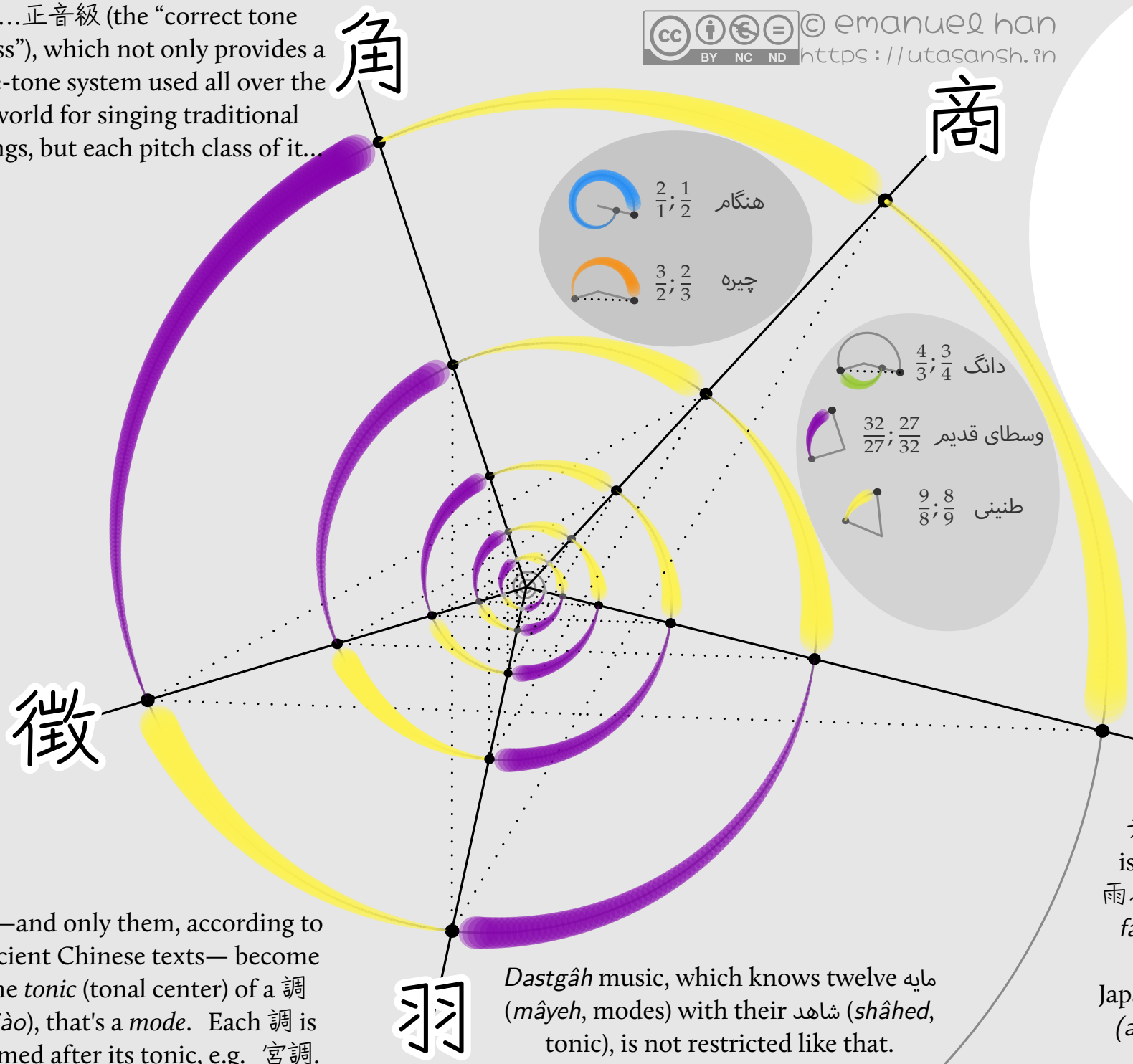
zhèng yīn jí

セイオンキュウ

정음급

"correct tone class"

…正音級 (the "correct tone class"), which not only provides a five-tone system used all over the world for singing traditional songs, but each pitch class of it...



...—and only them, according to ancient Chinese texts— become the *tonic* (tonal center) of a 調 (*diào*), that's a *mode*. Each 調 is named after its tonic, e.g. 宮調.

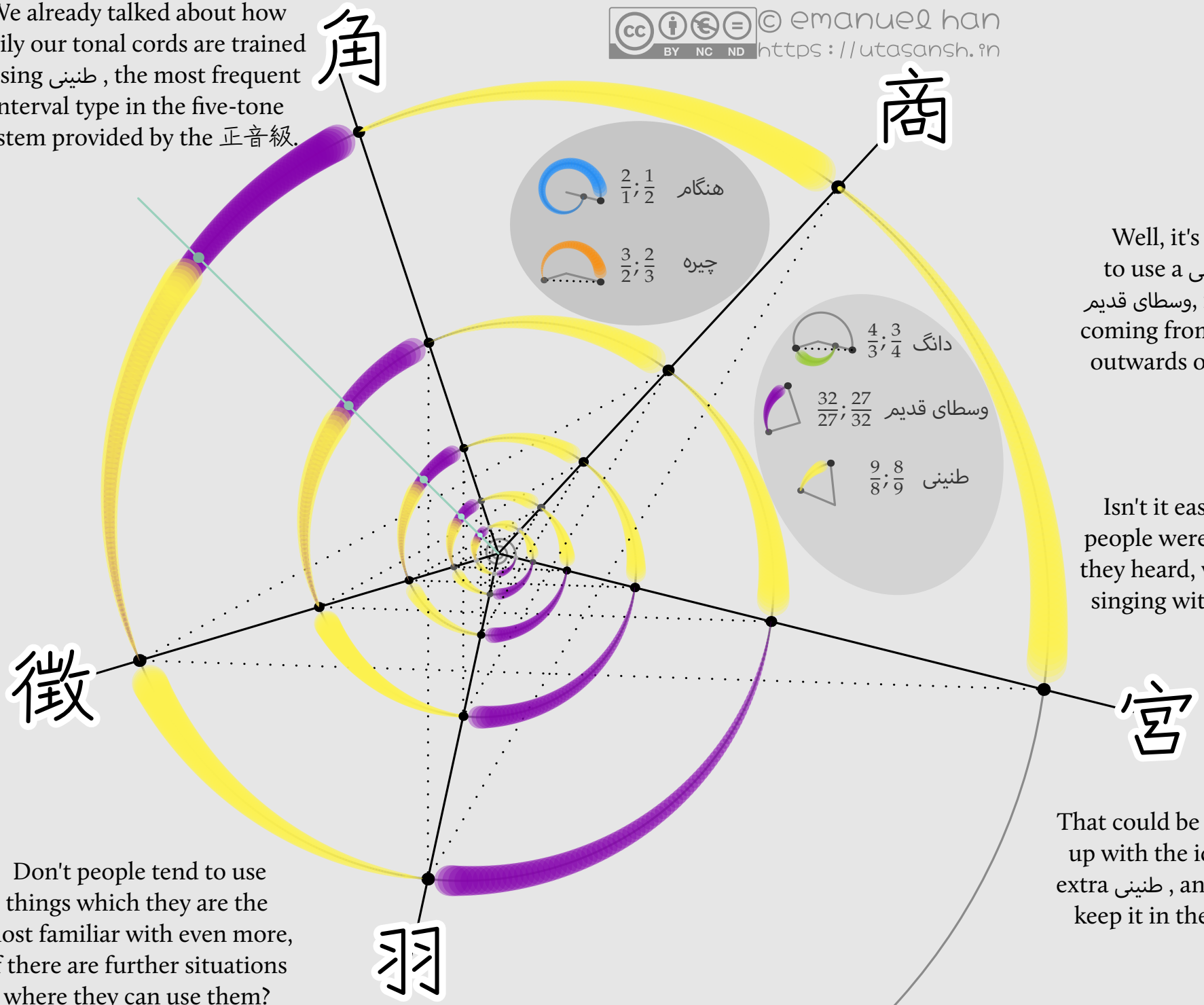
Dastgâh music, which knows twelve مایه (*mâyeh*, modes) with their شاهد (*shâhed*, tonic), is not restricted like that.

Here are some example songs in the five-tone-system:

デンサー節 *(densaa bushi)* is a Ryūkyūan song in 宮調, 雨々ふぁーふぁー *(aami aami faa faa)* in 角調 and 安波節 *(ahabushi)* in 徵調. The Japanese song あんた方どこさ *(antagata dokosa)* ondulates between 羽調 and 商調.

vers. 2025-10-26

We already talked about how easily our tonal cords are trained to sing طنینی , the most frequent interval type in the five-tone system provided by the 正音級.



Well, it's indeed possible to use a طنینی instead of a وسطای قدیم, for example when coming from a 徵 and moving outwards on the spiral path.

Isn't it easy to imagine that people were pleased with what they heard, when they tried out singing with that extra طنینی ?

That could be how people came up with the idea of using that extra طنینی , and then decided to keep it in their tonal system.

Don't people tend to use things which they are the most familiar with even more, if there are further situations where they can use them?

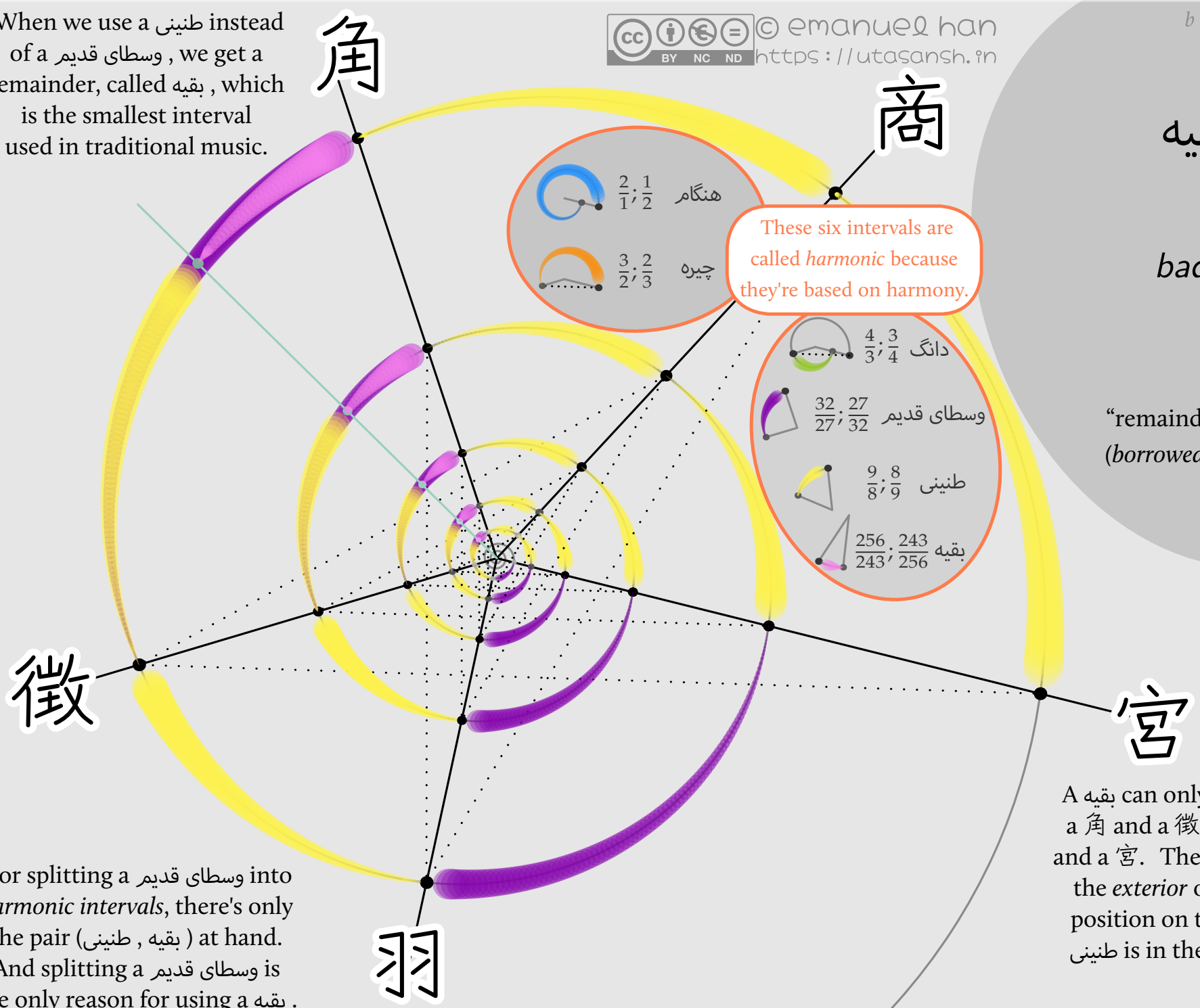
بقیه

baqiyeh

“remainder, remnant”
(*borrowed from Arabic*)

in Western music theory:
λείμμα, Pythagorean minor second

When we use a طنینی instead of a وسطای قدیم , we get a remainder, called بقیه , which is the smallest interval used in traditional music.



For splitting a وسطای قدیم into *harmonic intervals*, there's only the pair (طنینی , بقیه) at hand. And splitting a وسطای قدیم is the only reason for using a بقیه .

A بقیه can only appear between a 角 and a 徵 or between a 羽 and a 宮. There, بقیه is either in the *exterior* or in the *interior* position on the spiral path. طنینی is in the other position.

QJ

清角

qīng jué

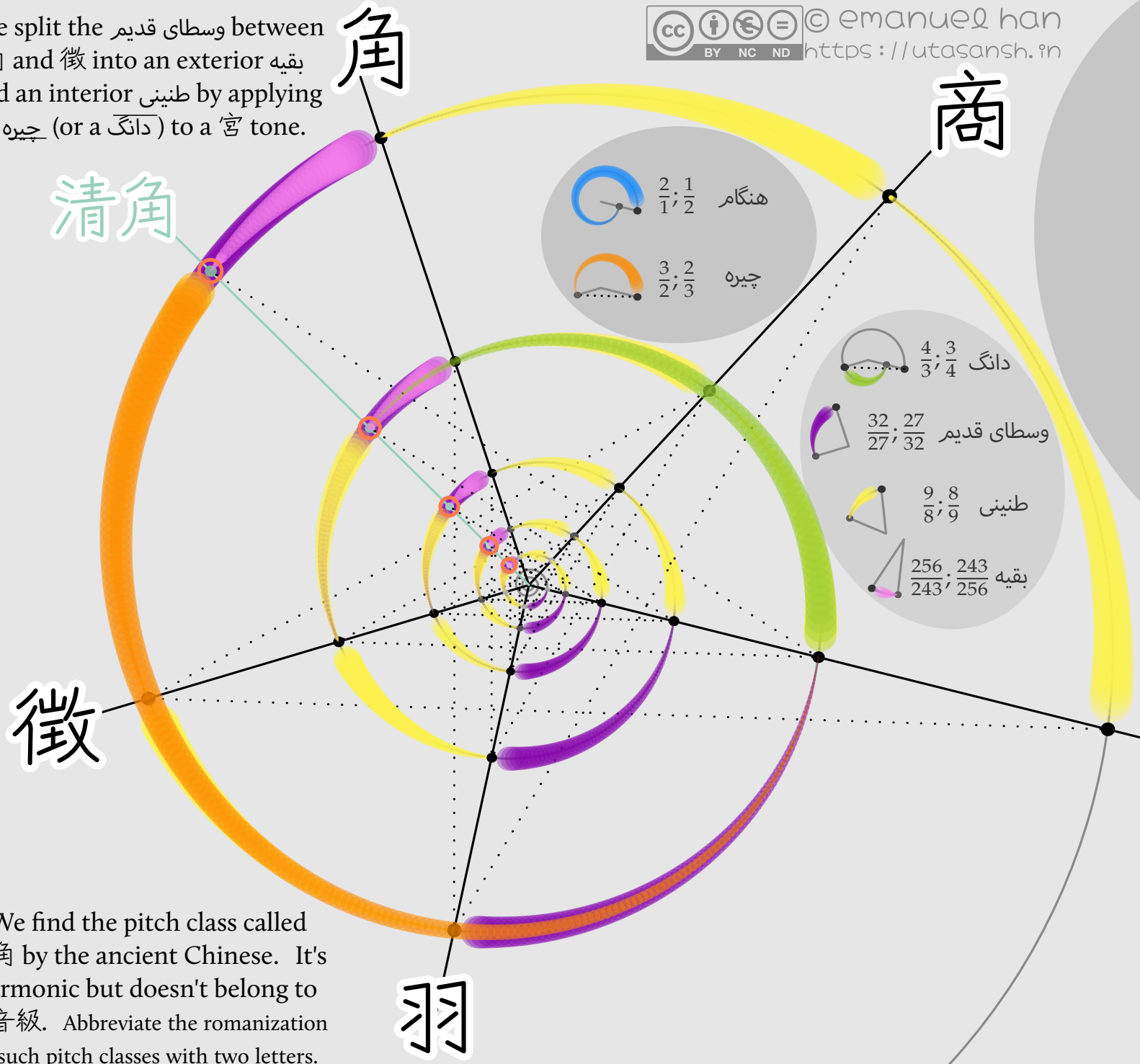
セイガク

청각

“clear (= high) *jué*”

in Western music theory: fa, F

We split the وسطای قدیم between 角 and 徵 into an exterior بقیه and an interior طنینی by applying a چیره (or a دانگ) to a 宮 tone.



We find the pitch class called 清角 by the ancient Chinese. It's harmonic but doesn't belong to 正音級. Abbreviate the romanization of such pitch classes with two letters.

正音級 expanded with 清角 is a six-tone system common in China, of which 茉莉花 江蘇民歌 (*Mòlìhuā Jiāngsū Míngē*) originating from the Jiāngsū region is an example in 宮調.

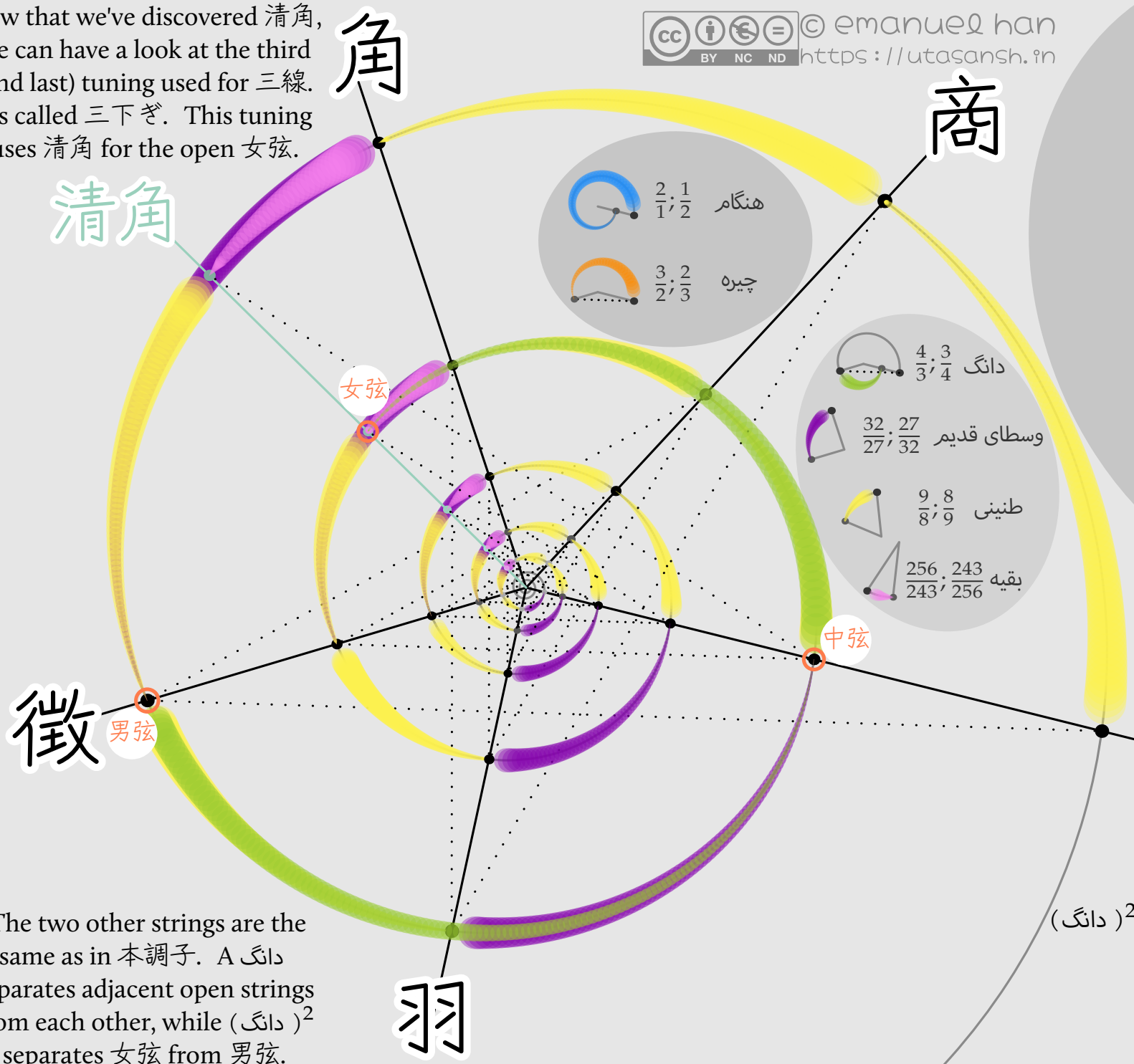
vers. 2025-10-26

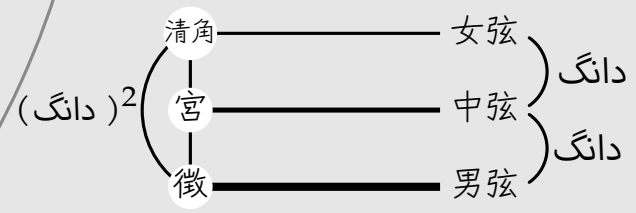
Now that we've discovered 清角, we can have a look at the third (and last) tuning used for 三線. It's called 三下ぎ. This tuning uses 清角 for the open 女弦.

三下ぎ

san sagi

"lowering the third" (string with respect to 本調子)

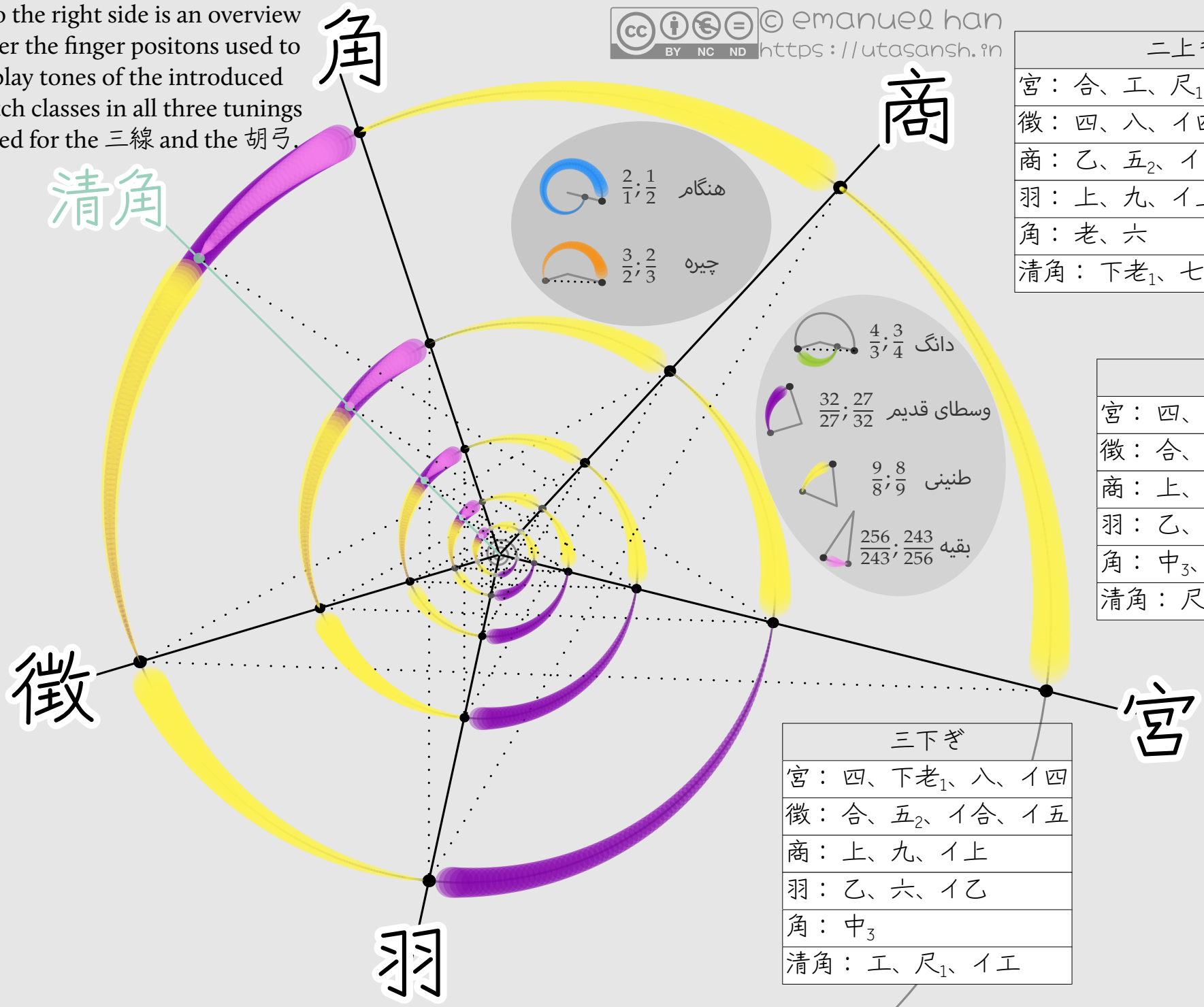




The two other strings are the same as in 本調子. A دانگ separates adjacent open strings from each other, while $(\text{دانگ})^2$ separates 女弦 from 男弦.

vers. 2025-10-26

To the right side is an overview over the finger positons used to play tones of the introduced pitch classes in all three tunings used for the 三線 and the 胡弓.



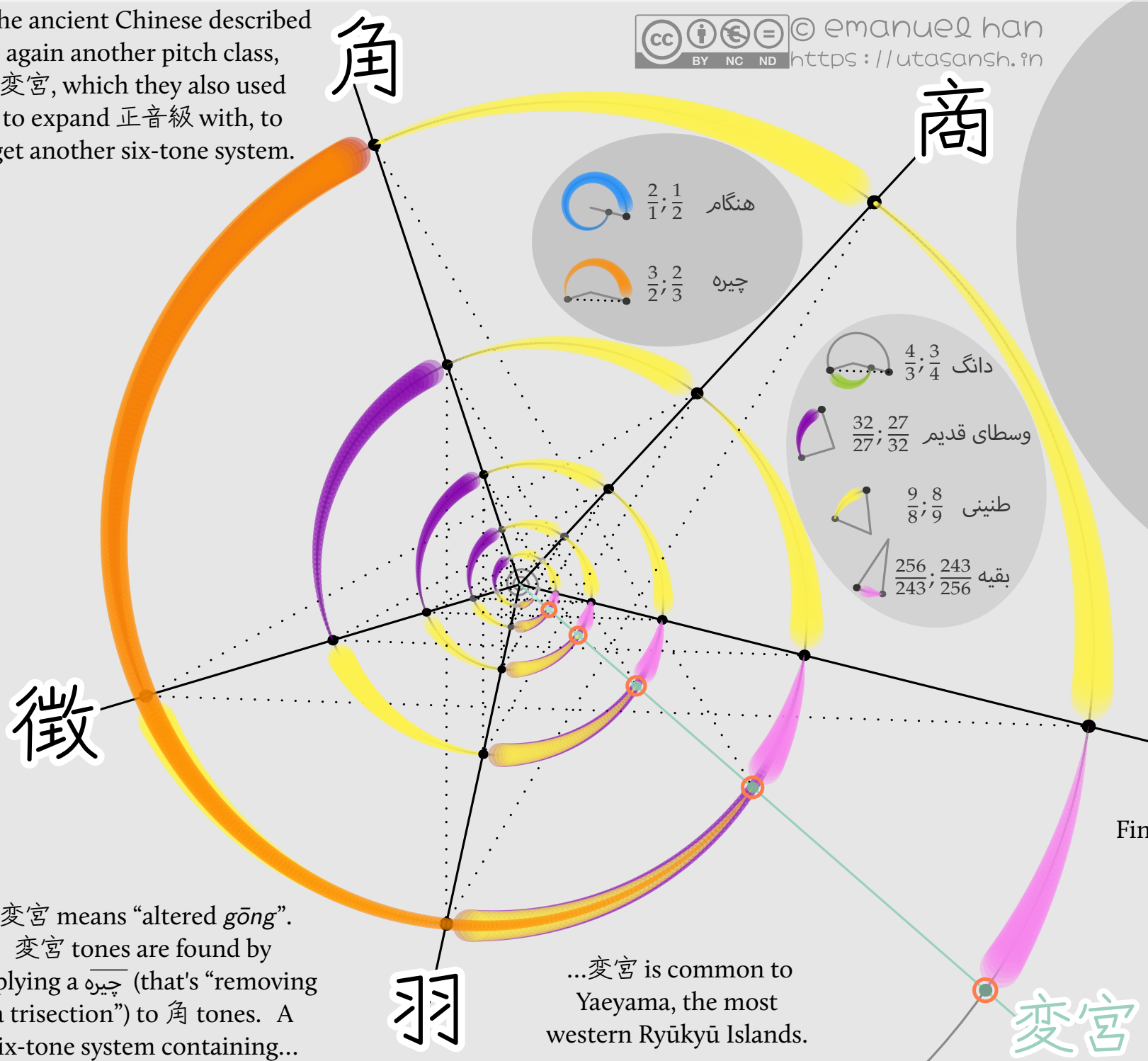
二上ぎ
宮： 合、工、尺$_1$、イ合、イ工
徴： 四、八、イ四
商： 乙、五$_2$、イ乙、イ五
羽： 上、九、イ上
角： 老、六
清角： 下老$_1$、七$_1$

本調子
宮： 四、下老$_1$、七$_1$、イ四
徴： 合、工、イ合、イ工
商： 上、八、イ上
羽： 乙、五$_2$、イ乙、イ五
角： 中$_3$、九
清角： 尺$_1$

三下ぎ
宮： 四、下老$_1$、八、イ四
徴： 合、五$_2$、イ合、イ五
商： 上、九、イ上
羽： 乙、六、イ乙
角： 中$_3$
清角： 工、尺$_1$、イ工

vers. 2025-10-26

The ancient Chinese described again another pitch class, 変宮, which they also used to expand 正音級 with, to get another six-tone system.



BG

変宮

biàn gōng

ヘンキュウ

변궁

in Western music theory: si, B

"altered *gōng*"

An example song from there is 鳩間節 (*hatoma bushi*), which is in 宮調.

Finger positions for 変宮 are:

二上ぎ	本調子
変宮： 中$_3$	変宮： 老、六

三下ぎ
変宮： 老、七$_4$

変宮 means "altered *gōng*". 変宮 tones are found by applying a $\overline{\text{چیره}}$ (that's "removing a trisection") to 角 tones. A six-tone system containing...

...変宮 is common to Yaeyama, the most western Ryūkyū Islands.

vers. 2025-10-26

If we expand 正音級 with both 清角 and 変宮, we get a seven-tone system. This seven-tone system is called 清樂 by the ancient Chinese.

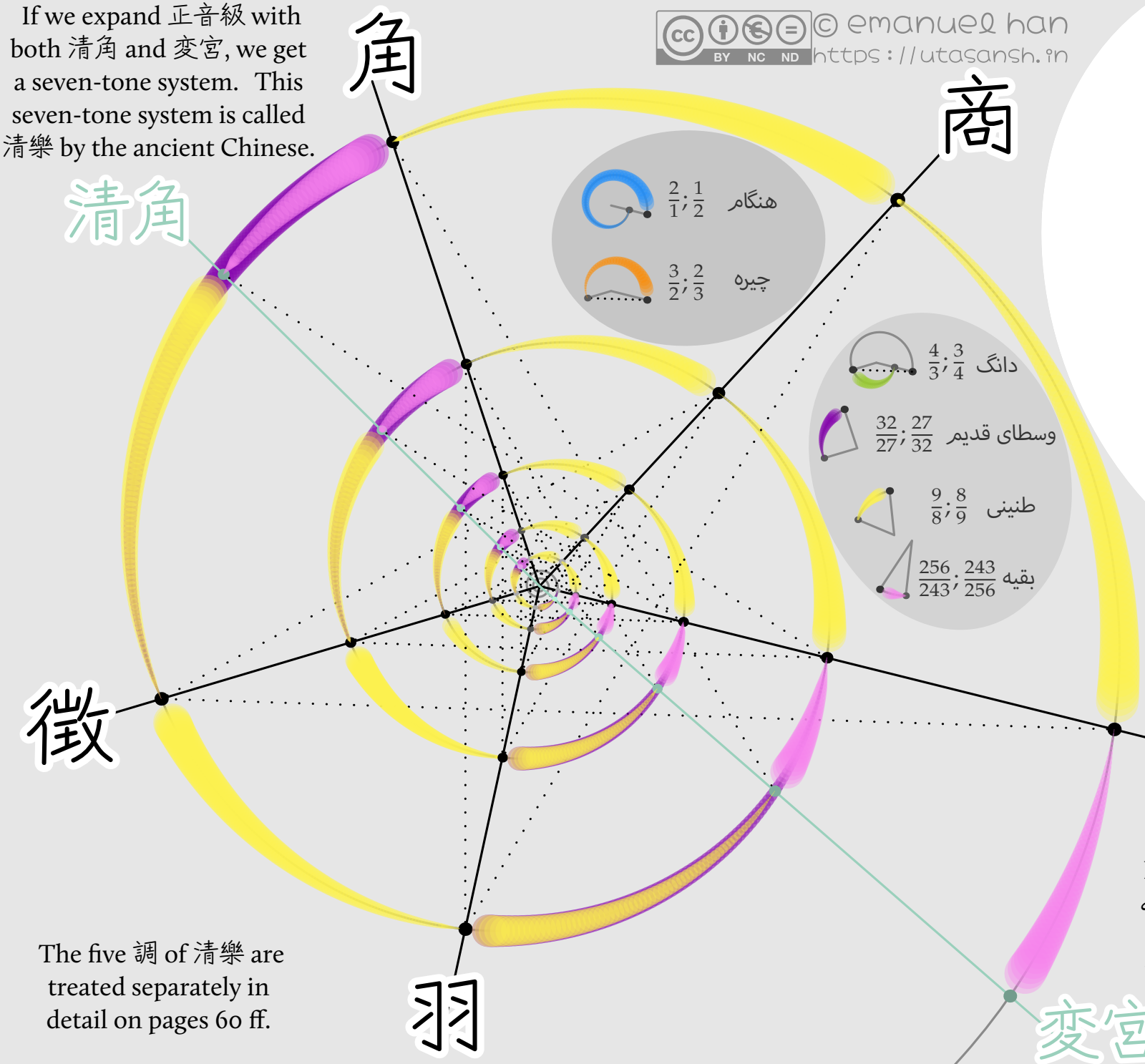
清樂

qīng yuè

セイガク

청악

"clear music"



There, some example Ryūkyūan songs and Persian مایه are mentioned (which use 清樂 expanded again with non-harmonic pitch classes).

The five 調 of 清樂 are treated separately in detail on pages 60 ff.

vers. 2025-10-26

BZ

変徴

biàn zhǐ

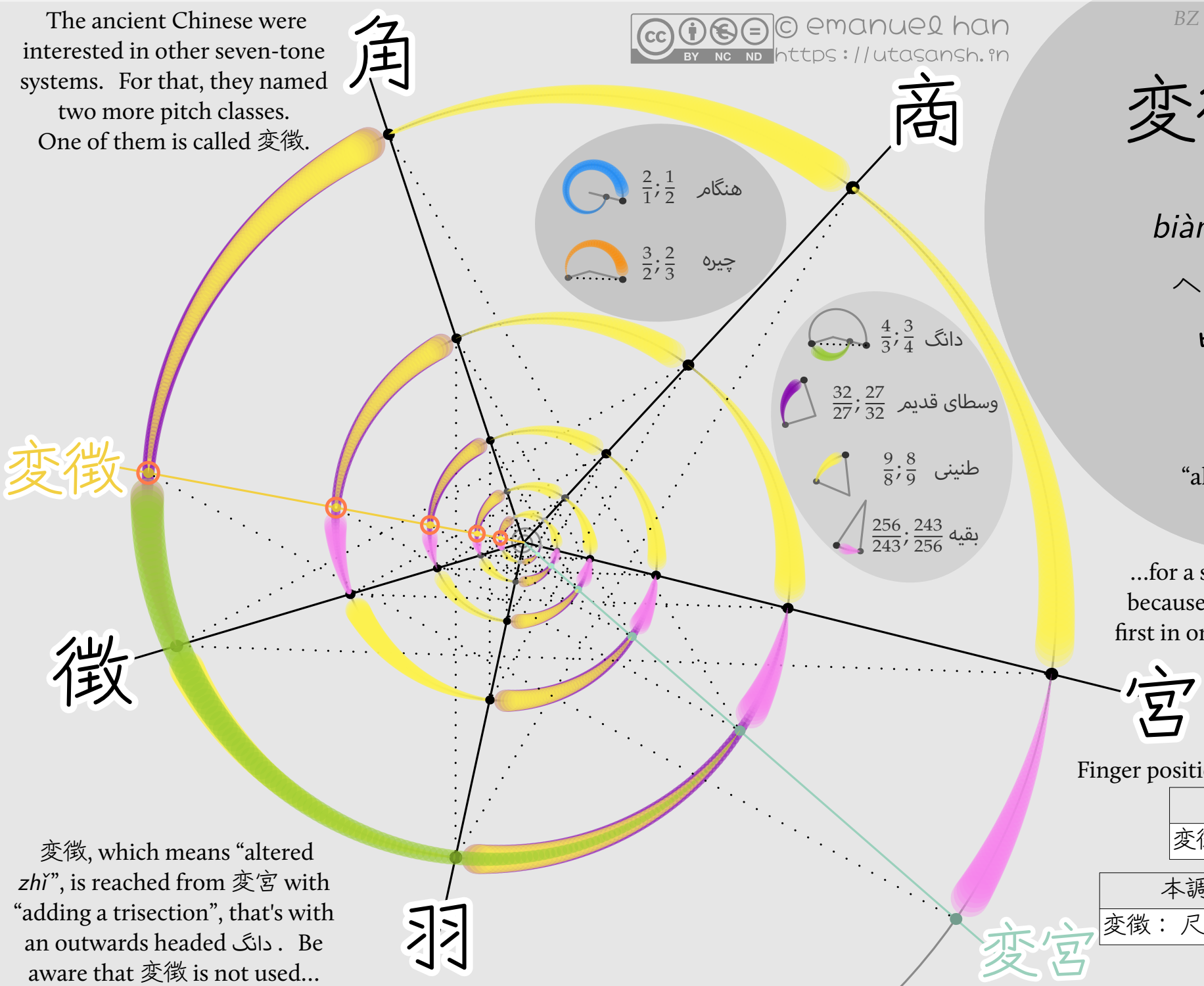
ヘンチ

변치

“altered *zhǐ*”

in Western music theory: fa dies, F#

The ancient Chinese were interested in other seven-tone systems. For that, they named two more pitch classes. One of them is called 変徴.



...for a six-tone system, because 変宮 is needed first in order to find 変徴.

Finger positions for 変宮 are:

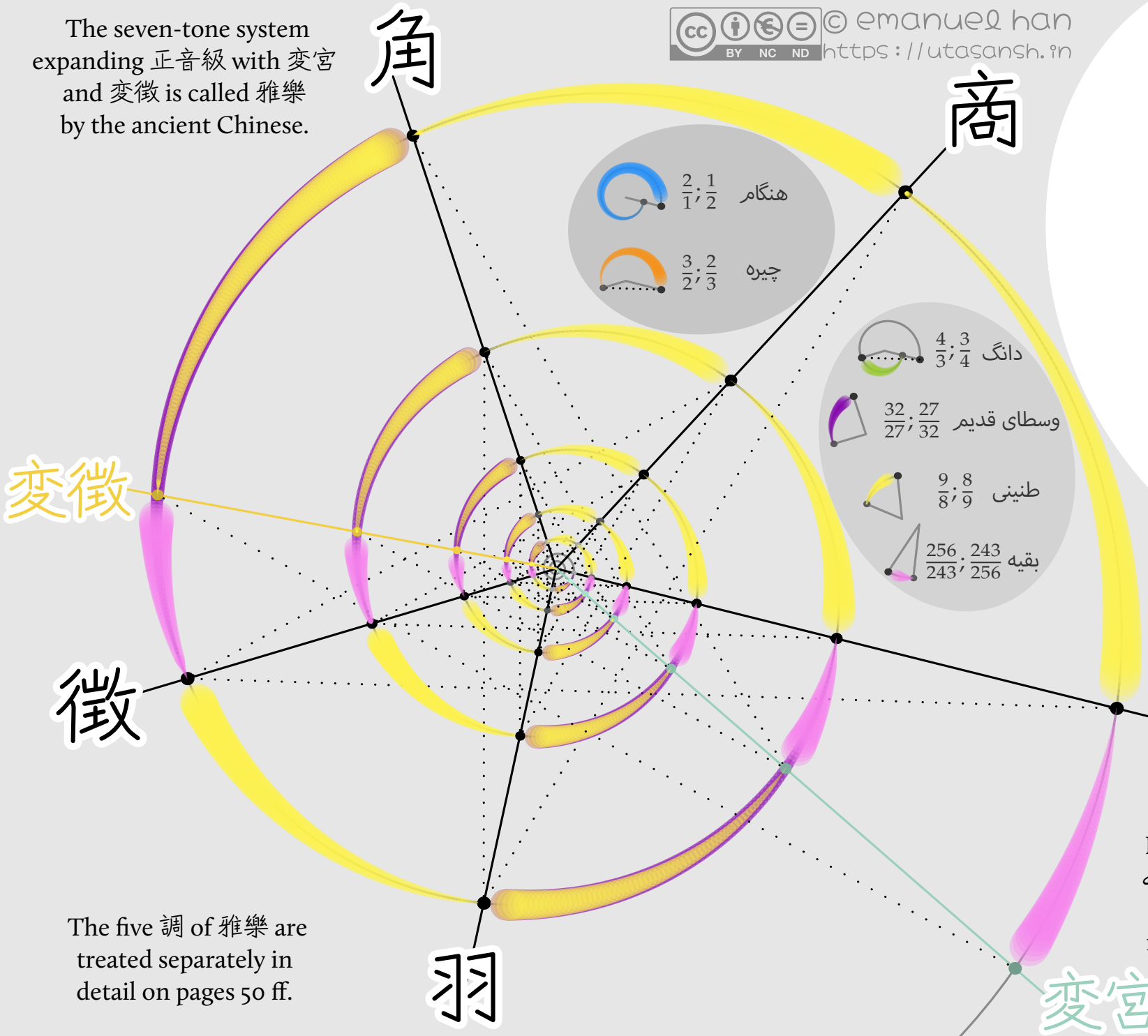
二上ぎ
変徴： 口上$_4$、七$_4$

本調子	三下ぎ
変徴： 尺$_4$、イ尺$_2$	変徴： 尺$_4$

変徴, which means “altered *zhǐ*”, is reached from 変宮 with “adding a trisection”, that's with an outwards headed دانگ . Be aware that 変徴 is not used...

vers. 2025-10-26

The seven-tone system expanding 正音級 with 変宮 and 変徴 is called 雅樂 by the ancient Chinese.



雅樂

yǎ yuè

ガガク

아악

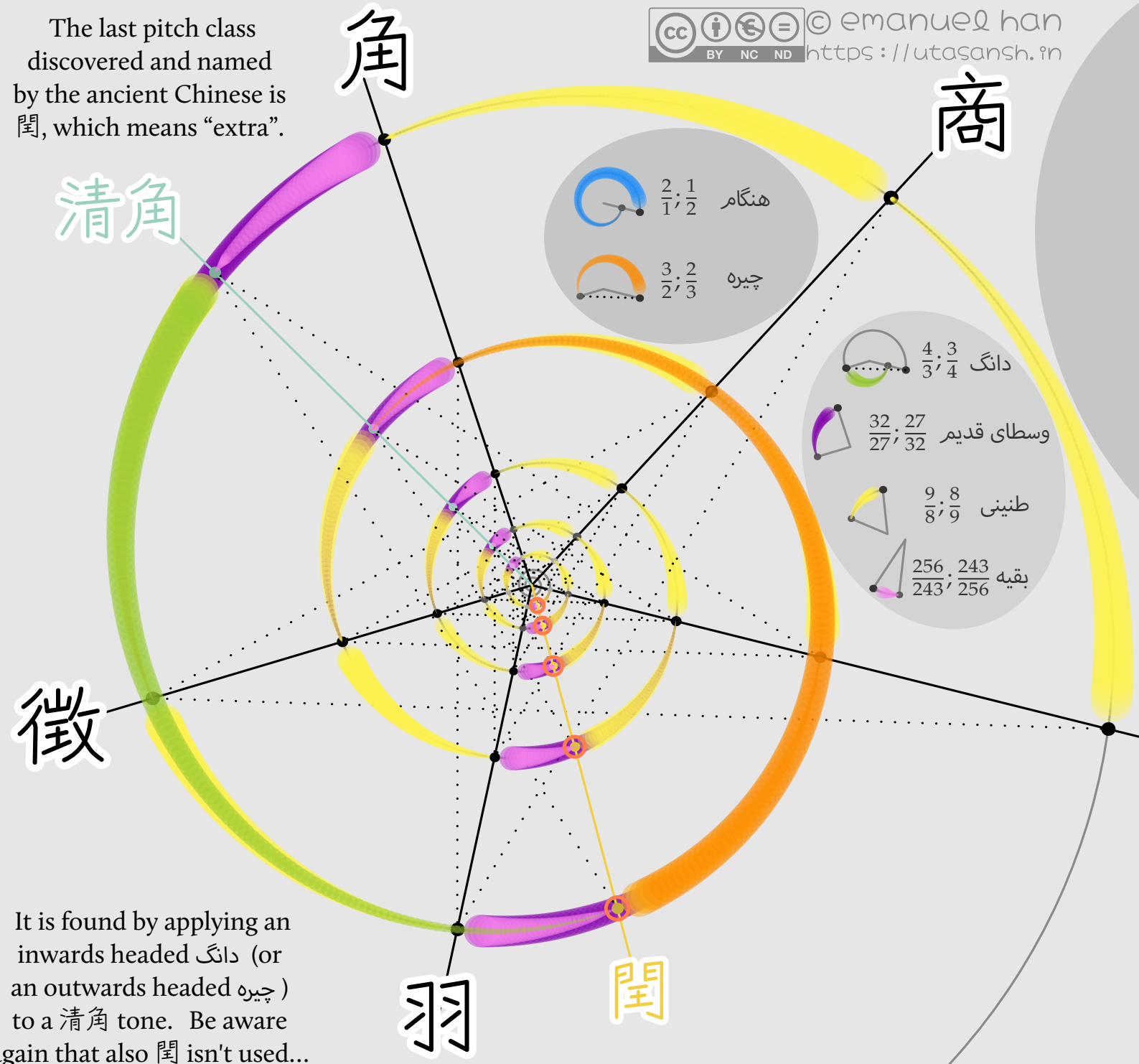
"elegant music"

The five 調 of 雅樂 are treated separately in detail on pages 50 ff.

There, again some example Ryūkyūan songs and Persian مایه are mentioned (which use 雅樂 expanded again with non-harmonic pitch classes).

vers. 2025-10-26

The last pitch class discovered and named by the ancient Chinese is 閏, which means “extra”.



RU

閏

rùn

ジュン

윤

in Western music theory: la dies, A#

“extra”

...for a six-tone system, because 清角 is needed first in order to find 閏.

閏 is not used in Ryūkyūan music. Of the finger positions used on the Ryūkyū Islands, it could be played with two though:

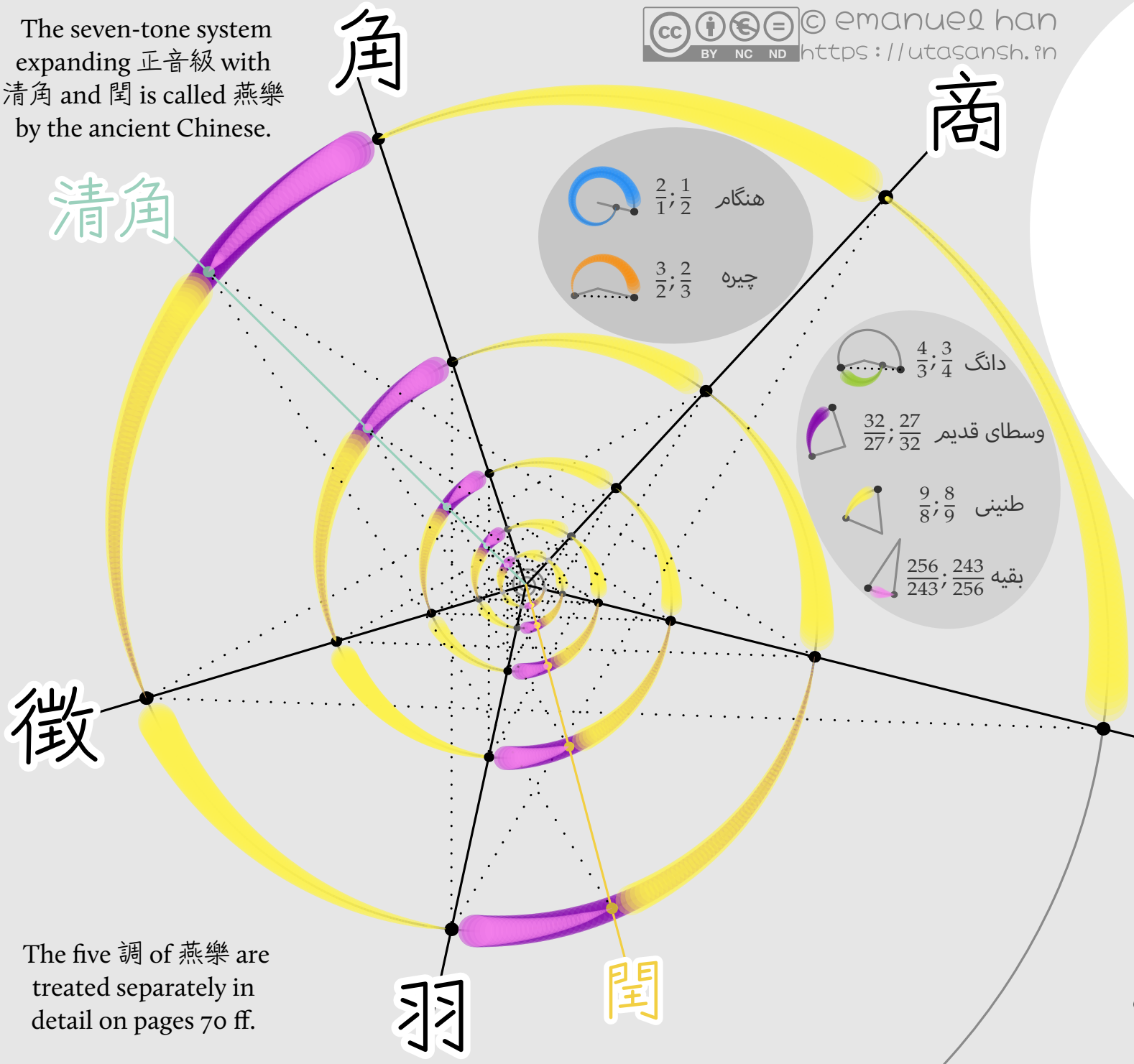
二上ぎ
閏： 中$_1$

三下ぎ
閏： 七$_1$

It is found by applying an inwards headed دانگ (or an outwards headed چیره) to a 清角 tone. Be aware again that also 閏 isn't used...

vers. 2025-10-26

The seven-tone system expanding 正音級 with 清角 and 閏 is called 燕樂 by the ancient Chinese.



燕樂

yàn yuè

エンガク

연악

"joyful music"

The five 調 of 燕樂 are treated separately in detail on pages 70 ff.

Since 燕樂 is not used in Ryūkyūan music, only some Persian مایه (which use 燕樂 expanded again with non-harmonic pitch classes) are mentioned there.

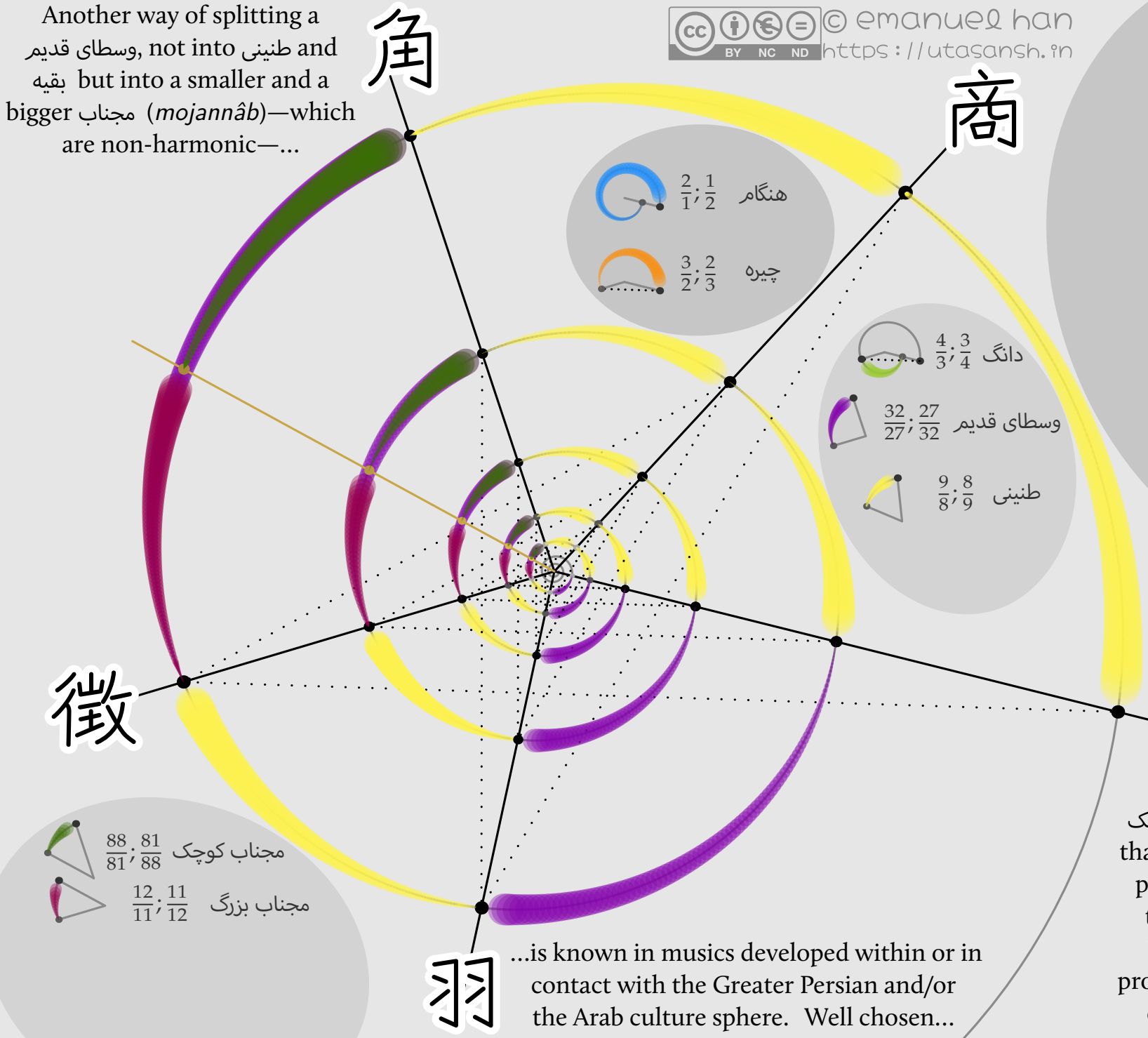
vers. 2025-10-26

مجناب کوچک؛ مجناب بزرگ

mojannâb kuchak; mojannâb bozorg

mojannâb: “to turn aside, shun, hit sideways” (*borrowed from arabic*);
kuchak: “small”;
bozorg: “big”

Another way of splitting a وسطای قدیم, not into طنینی and بقیه but into a smaller and a bigger مجناب (*mojannâb*)—which are non-harmonic—...

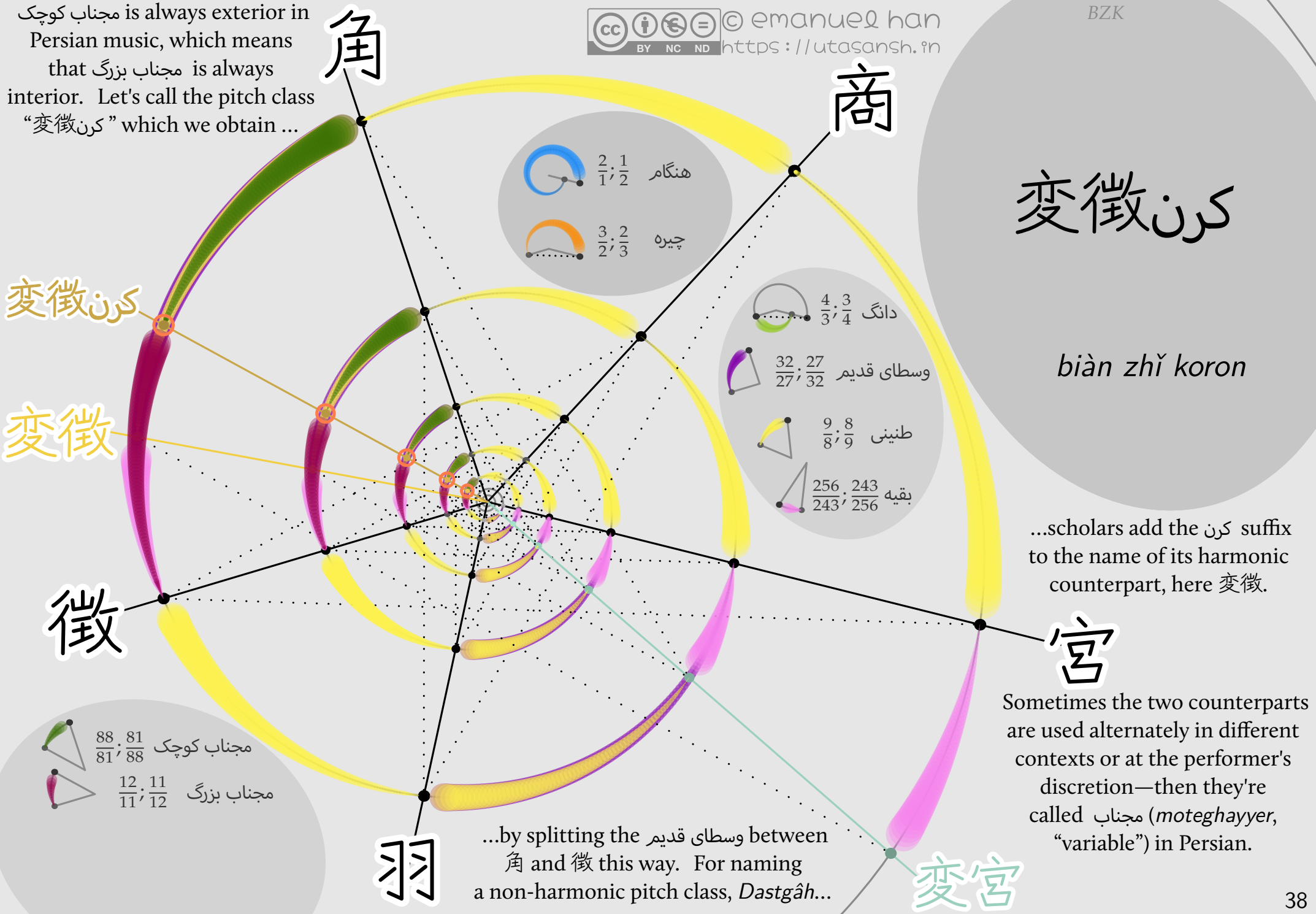


...non-harmonic intervals add character to a song or مایه—like spices in cooking.

...is known in musics developed within or in contact with the Greater Persian and/or the Arab culture sphere. Well chosen...

مجناب کوچک is slightly smaller than مجناب بزرگ. This interval pair is learned through oral tradition, just like spoken language. To the left are proposed rational numbers for calculating tuning tables.

مجاب کوچک is always exterior in Persian music, which means that مجاب بزرگ is always interior. Let's call the pitch class "変徴کرن" which we obtain ...



変徴کرن

biàn zhǐ koron

...scholars add the کرن suffix to the name of its harmonic counterpart, here 変徴.

Sometimes the two counterparts are used alternately in different contexts or at the performer's discretion—then they're called مجاب (*moteghayyer*, "variable") in Persian.

...by splitting the وسطای قدیم between 角 and 徴 this way. For naming a non-harmonic pitch class, *Dastgâh*...

vers. 2025-10-26

The وسطای قدیم between 羽 and 宮 can be split the same way. Let's call the obtained pitch class "変宮コルン".

変宮コルン

biàn gōng koron

変宮コルン tones can be reached with a دانگ (or a چیره) from a 変徴コルン tone.

変宮コルン again is an alternative to its harmonic variant, which is 変宮. Let's abbreviate the romanization of non-harmonic pitch classes with three capital letters.

角 商 変徴コルン 徴 宮 羽 変宮コルン 変宮

هنگام $\frac{2}{1};\frac{1}{2}$

چیره $\frac{3}{2};\frac{2}{3}$

دانگ $\frac{4}{3};\frac{3}{4}$

وسطای قدیم $\frac{32}{27};\frac{27}{32}$

طنینی $\frac{9}{8};\frac{8}{9}$

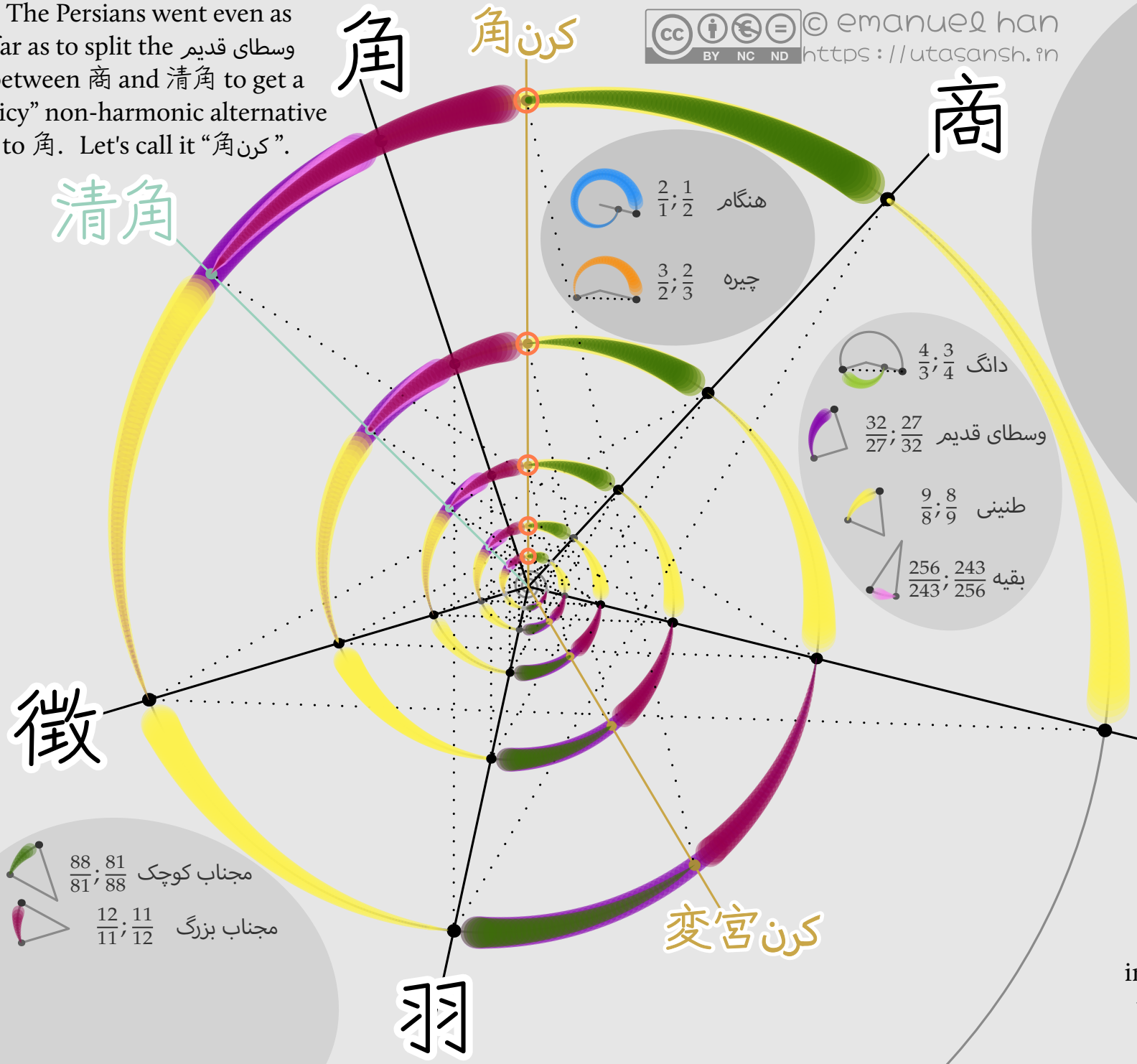
بقیه $\frac{256}{243};\frac{243}{256}$

مجناب کوچک $\frac{88}{81};\frac{81}{88}$

مجناب بزرگ $\frac{12}{11};\frac{11}{12}$

vers. 2025-10-26

The Persians went even as far as to split the وسطای قدیم between 商 and 清角 to get a "spicy" non-harmonic alternative to 角. Let's call it "角کرن".



角کرن

jué koron

角کرن tones can be reached with a چیره or a دانگ from a 変宮کرن tone.

Be aware that tones of non-harmonic pitch classes are never played or sung simultaneously with—or immediately before or after—a tone of its harmonic variant.

vers. 2025-10-26

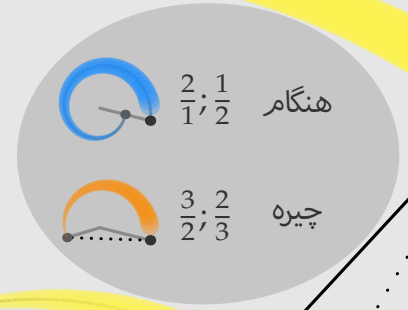
kk; uk

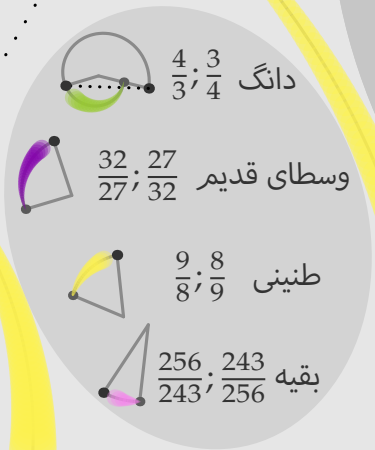
小傾ち
大傾ち

kuu katanchi;
ufu katanchi

katanchi: “slope; inclination”;
kuu: “small”;
ufu: “big”
(all in uchinaaguchi)

Ryūkyūan music also knows a non-harmonic interval pair to split وسطای قدیم into. Let's call these two intervals 傾ち. 小傾ち is smaller than...





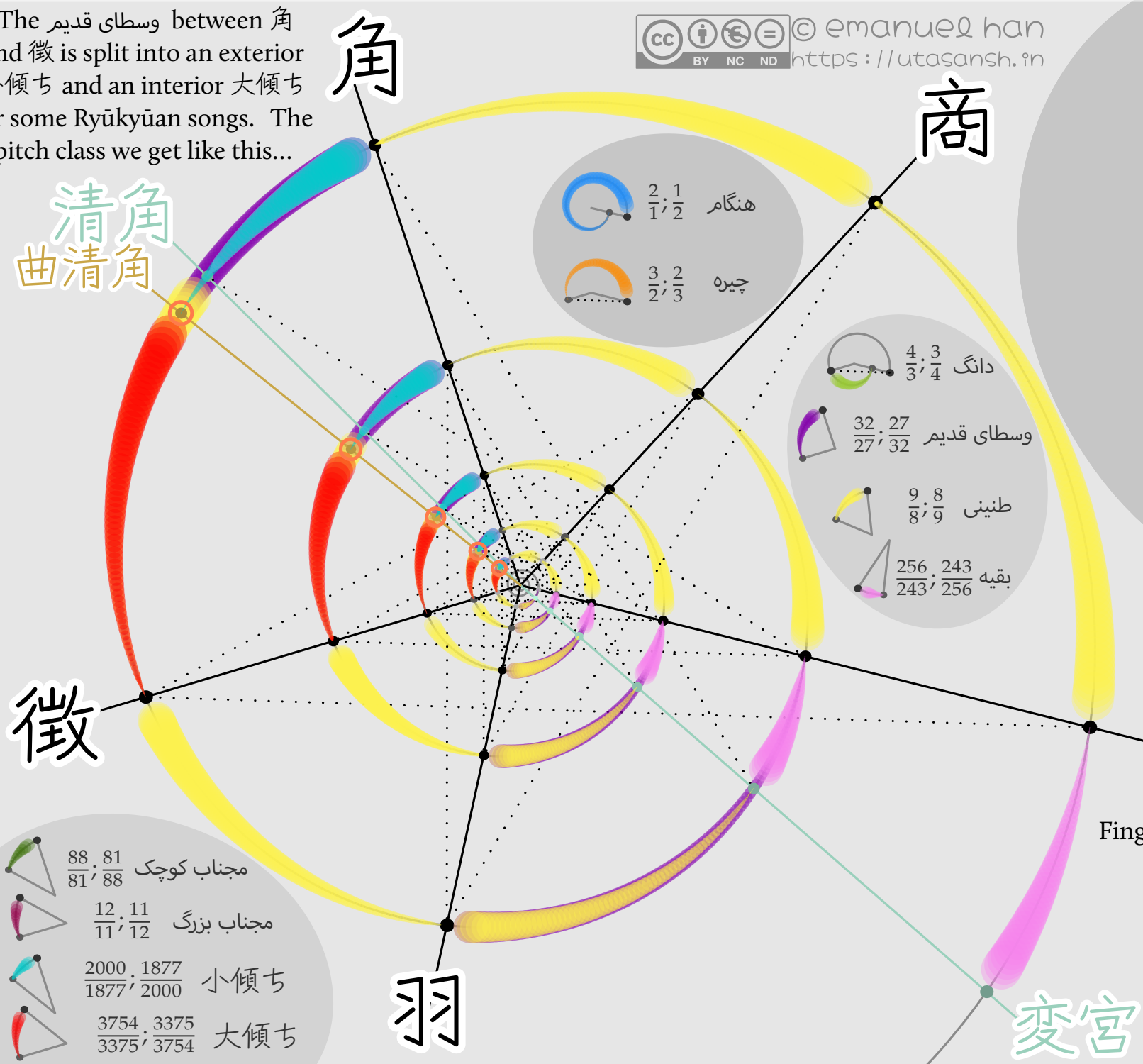
...مجناب کوچک , but bigger than بقیه. 大傾ち is bigger than مجناب بزرگ, but smaller than طنینی .

傾ち are like مجناب not defined by nature, but passed on from master to pupil and trained by hearing. They are around the values proposed on the left.

vers. 2025-10-26

MQJ

The وسطای قدیم between 角 and 徵 is split into an exterior 小傾ち and an interior 大傾ち for some Ryūkyūan songs. The pitch class we get like this...



曲清角

magai qīng jué

magai: “bended” *(in uchinaaguchi)*

...is used as a variant to its harmonic alternative 清角. Let's call it “曲清角”.

Finger positions for 曲清角 are:

二上ぎ
曲清角： 下老$_2$、七$_2$

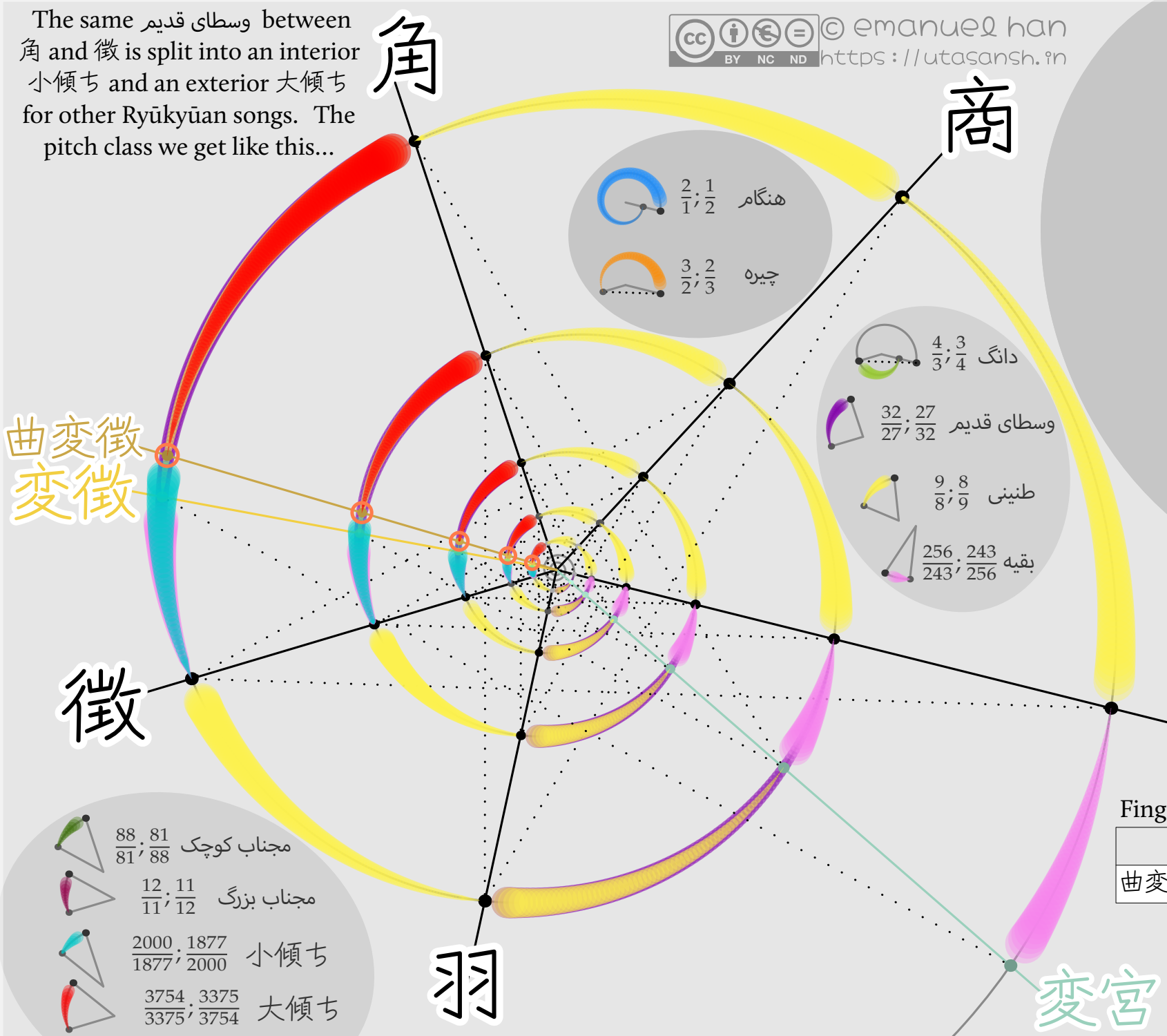
本調子
曲清角： 尺$_2$

三下ぎ
曲清角： 尺$_2$

vers. 2025-10-26

MBZ

The same وسطای قدیم between 角 and 徴 is split into an interior 小傾ち and an exterior 大傾ち for other Ryūkyūan songs. The pitch class we get like this...



曲変徴

magai biàn zhǐ

...is used as a variant to its harmonic alternative 変徴. Let's call it “曲変徴”.

Finger positions for 曲変徴 are:

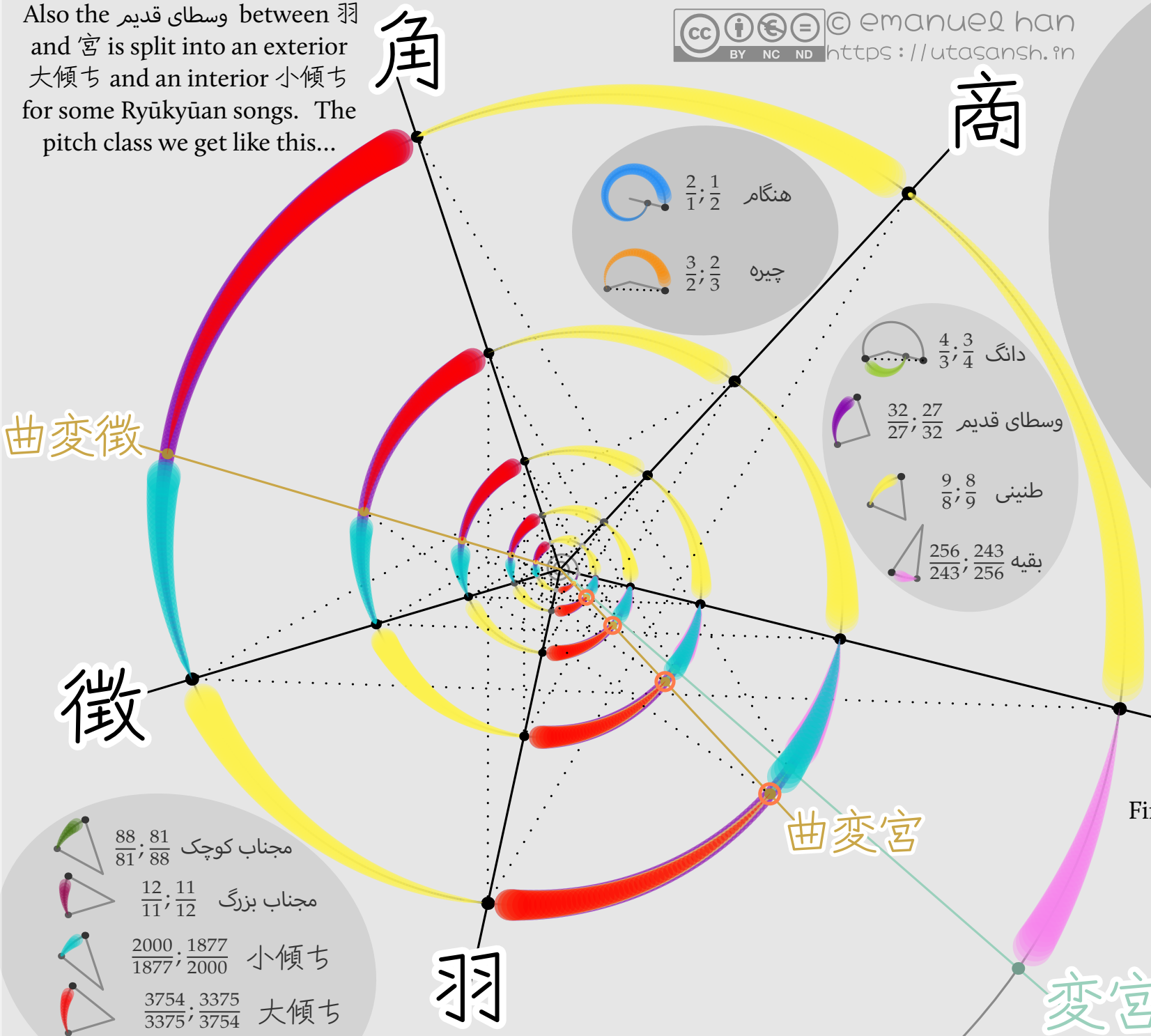
本調子	三下ぎ
曲変徴：尺$_3$、イ尺$_1$	曲変徴： 尺$_3$

二上ぎ
曲変徴： ロ上$_3$、七$_3$

vers. 2025-10-26

MBG

Also the وسطای قدیم between 羽 and 宮 is split into an exterior 大傾ち and an interior 小傾ち for some Ryūkyūan songs. The pitch class we get like this...



曲变宮

magai biàn gōng

...is used as a variant to its harmonic alternative 变宮. Let's call it "曲变宮".

Finger positions for 曲变宮 are:

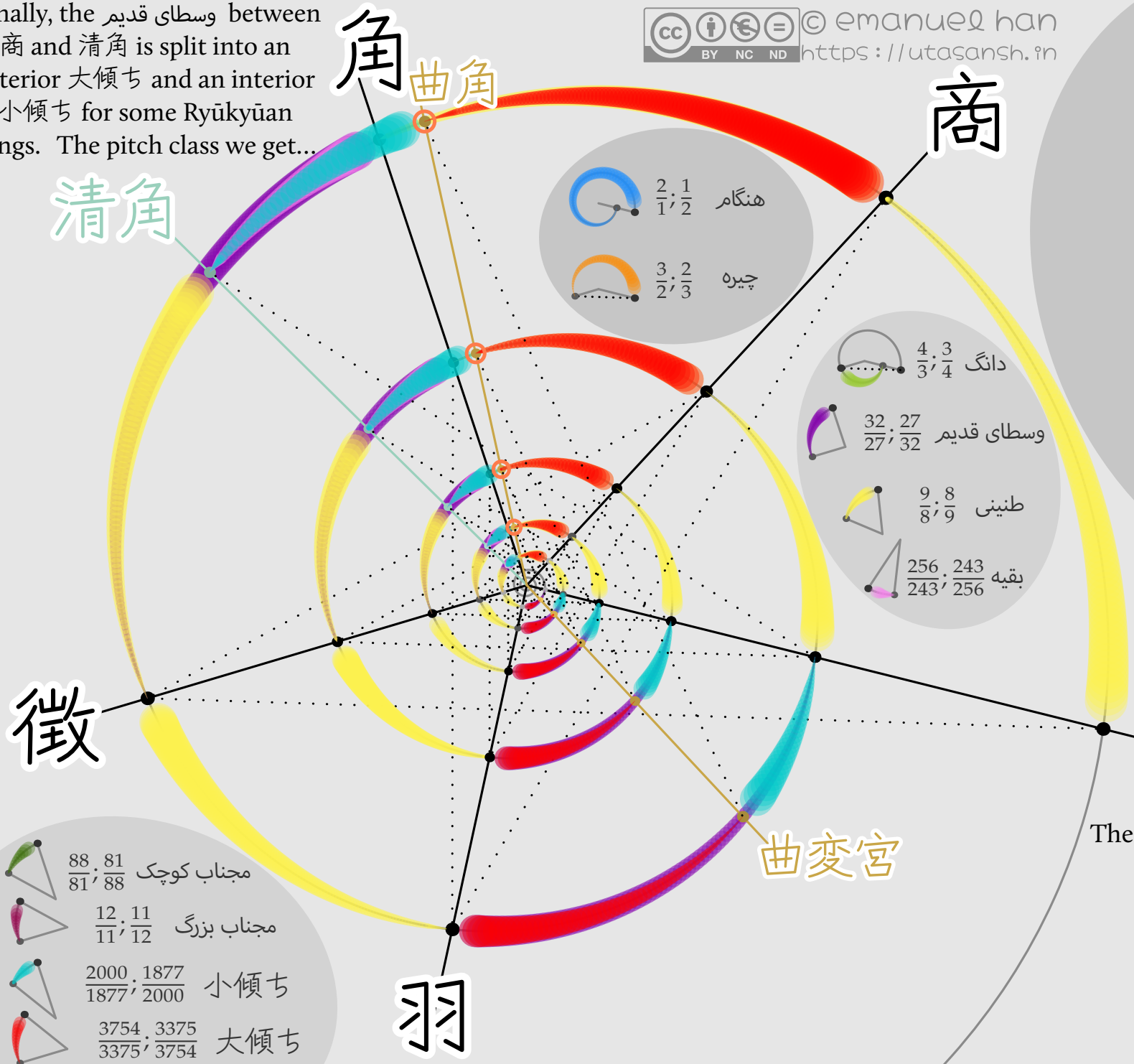
二上ぎ
曲变宮： 中$_2$

三下ぎ
曲变宮： 口上$_3$

vers. 2025-10-26

MJU

Finally, the وسطای قدیم between 商 and 清角 is split into an exterior 大傾ち and an interior 小傾ち for some Ryūkyūan songs. The pitch class we get...



曲角

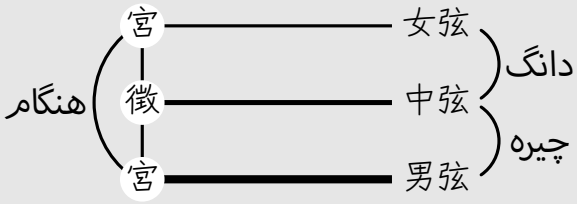
magai jué

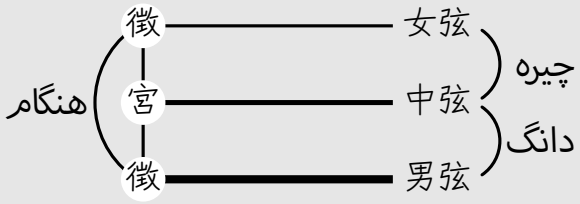
...like this is used as a variant to its harmonic alternative 角. Let's call it "曲角".

The only finger position for 曲角 is:

本調子
曲角：中$_2$

vers. 2025-10-26





二上ぎ
宮： 合、工、尺$_1$、イ合、イ工
徴： 四、八、イ四
商： 乙、五$_2$、イ乙、イ五
羽： 上、九、イ上
角： 老、六
清角： 下老$_1$、七$_1$
変宮： 中$_3$
変徴： 口上$_4$、七$_4$
閏： 中$_1$
曲清角： 下老$_2$、七$_2$
曲変徴： 口上$_3$、七$_3$
曲変宮： 中$_2$
曲角：×

Lower 中弦 or
raise 女弦 and 男弦

Raise 中弦 or
lower 女弦 and 男弦

本調子
宮： 四、下老$_1$、七$_1$、イ四
徴： 合、工、イ合、イ工
商： 上、八、イ上
羽： 乙、五$_2$、イ乙、イ五
角： 中$_3$、九
清角： 尺$_1$
変宮： 老、六
変徴： 尺$_4$、イ尺$_2$
閏： ×
曲清角： 尺$_2$
曲変徴：尺$_3$、イ尺$_1$
曲変宮： ×
曲角：中$_2$

Switching between ちんだみ requires raising or lowering one or two strings by a طنینی . Be aware that for playing Japanese style songs, a different mapping of the pitch classes onto 本調子 is done in order to have the tonic 角 on an open string (here 中弦). See p. 55 (雅樂角調) for details.

宮： 五$_1$
徴： 中$_1$
角： 四、七$_2$
変宮： 合、工、イ合、イ工
変徴： 上、八
Japanese style on 本調子

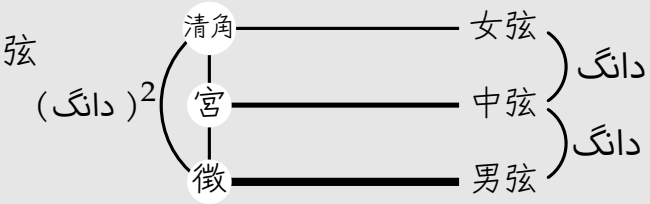
Raise 男弦 or
lower 女弦 and 中弦

Lower 男弦 or
raise 女弦 and 中弦

三下ぎ
宮： 四、下老$_1$、八、イ四
徴： 合、五$_2$、イ合、イ五
商： 上、九、イ上
羽： 乙、六、イ乙
角： 中$_3$
清角： 工、尺$_1$、イ工
変宮： 老、七$_4$
変徴： 尺$_4$
閏： 七$_1$
曲清角： 尺$_2$
曲変徴：尺$_3$、イ尺$_1$
曲変宮： 口上$_3$
曲角：×

Lower 女弦 or
raise 中弦 and 男弦*

Raise 女弦 or
lower 中弦 and 男弦



* That's why 三下ぎ is also called 一、二上ぎ (*ichi ni agi*).

vers. 2025-10-26

	small					big					combined
	name			value	cent	name			value	cent	name
harmonic	دانگ	*dâng*	*d*	$\frac{4}{3}; \frac{3}{4}$	498.05	چیره	*chireh*	*c*	$\frac{3}{2}; \frac{2}{3}$	701.96	هنگام
	طنینی	*tanini*	*t*	$\frac{9}{8}; \frac{8}{9}$	203.91	وسطای قدیم	*vostâ-ye qadim*	*v*	$\frac{32}{27}; \frac{27}{32}$	294.14	دانگ
	بقیه	*baqiyeh*	*b*	$\frac{256}{243}; \frac{243}{256}$	90.23	طنینی	*tanini*	*t*	$\frac{9}{8}; \frac{8}{9}$	203.91	وسطای قدیم
non-harmonic	مجناب کوچک	*mojannâb kuchak*	*mk*	$\frac{88}{81}; \frac{81}{88}$	143.50	مجناب بزرگ	*mojannâb bozorg*	*mb*	$\frac{12}{11}; \frac{11}{12}$	150.64	وسطای قدیم
	(*Central Javan exterior interval between 角 and 徴*)			$\frac{76}{71}; \frac{71}{76}$	117.82	(*Central Javan interior interval between 角 and 徴*)			$\frac{568}{513}; \frac{513}{568}$	176.32	وسطای قدیم
	(*Central Javan interior interval between 羽 and 宮*)			$\frac{63}{59}; \frac{59}{63}$	113.56	(*Central Javan exterior interval between 羽 and 宮*)			$\frac{1888}{1701}; \frac{1701}{1888}$	180.57	وسطای قدیم
	小傾ち	*kuu katanchi*	*kk*	$\frac{2000}{1877}; \frac{1877}{2000}$	109.89	大傾ち	*ufu katanchi*	*uk*	$\frac{3754}{3375}; \frac{3375}{3754}$	184.25	وسطای قدیم

The values for non-harmonic intervals might differ slightly from region to region, form master to master or even from song to song. They probably won't be a rational number. But since rational numbers are convenient for calculating tuning tables, one is proposed here also for each non-harmonic interval type. When singing or when playing acoustic instruments, we use our hearing to play the intervals correctly and don't need these numbers at all.

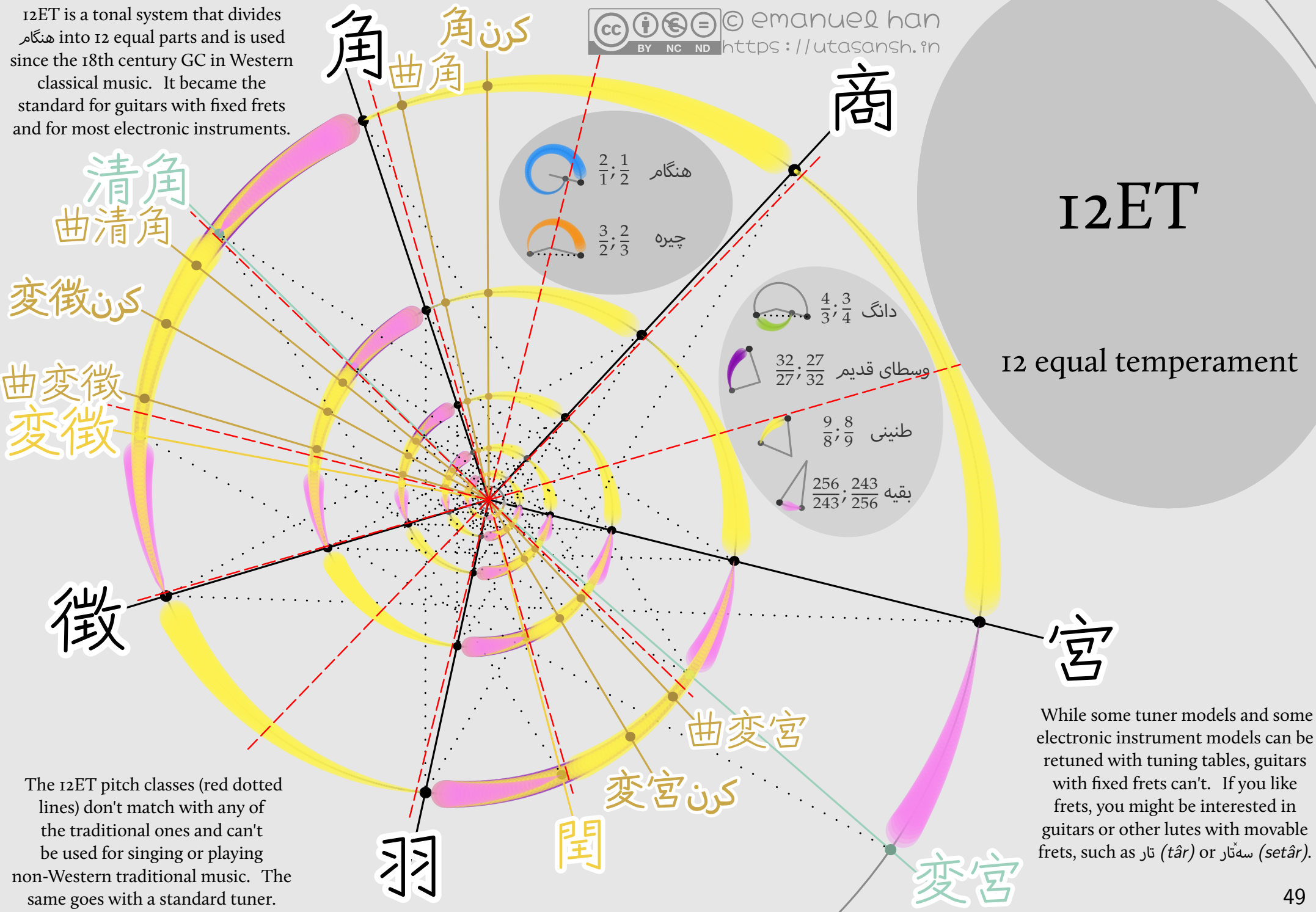
It is highly possible that the non-harmonic intervals changed over time and geographic dislocation, just as the ربابة *(rebâb)*, coming from Persia and being spread to Malacca, Java and Siam—and from these regions to Ryūkyū, where it became the 胡弓 *(kuuchoo)*—, took different shapes over time. A similarity of the non-harmonic intervals from Ryūkyū (小傾ち／大傾ち) to the ones from Central Java might be heard (or observed in numbers when looking at cents).

List overview over all mentioned traditional pitch classes (to be included here)

12ET is a tonal system that divides هنگام into 12 equal parts and is used since the 18th century GC in Western classical music. It became the standard for guitars with fixed frets and for most electronic instruments.

12ET

12 equal temperament



The 12ET pitch classes (red dotted lines) don't match with any of the traditional ones and can't be used for singing or playing non-Western traditional music. The same goes with a standard tuner.

While some tuner models and some electronic instrument models can be retuned with tuning tables, guitars with fixed frets can't. If you like frets, you might be interested in guitars or other lutes with movable frets, such as تار *(târ)* or سه‌تار *(setâr)*.

vers. 2025-10-26

Releases of “Tuner?—No thanks, I can do without!” by Emanuel Han

2025-10-26 First publication. Big parts still need to be written.

To do:

- List overview over all mentioned traditional pitch classes (p. 48)
- Detail pages for each 調 of 清樂, 雅樂 and 燕樂 (p. 50 ff)
- Adding QR codes to audio samples
- Translation of the whole document to Japanese