• More on Chords...

8/29/2024

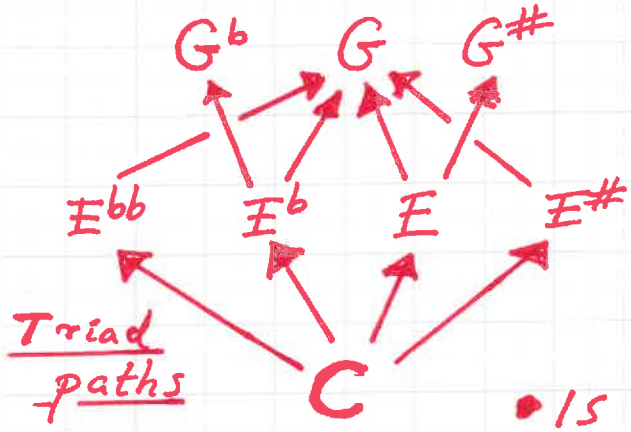


• Common triads (Cmaj key):
CE^bG^b, $CE^{bb}G (= CDG)$, CEG,
CE^bG, $CE^\#G (= CFG)$, $CEG^\#$

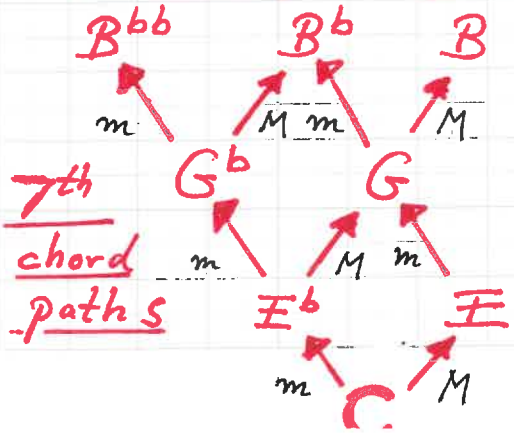
• Notation (left figure):
dim = diminished, aug = augmented,
s2 = sus2, s4 = sus4

• ISSUE: Can, for example, dim, s2 and s4 be included in an "expanded 7th chord set"?

• Can use a graph/network layout to visualize chords. Possible/allowable/used chords can be understood as (directed) paths with 3 nodes (=notes) connected by 2 edges, see left figure.



• IS IT POSSIBLE TO DEFINE A "PHYLOGENETIC DISTANCE" FOR CHORDS (similar to genetic distance for species' genomes) USING SUCH DISCRETE GRAPH/NETWORK (TREE? PATH?) CONCEPTS — to identify smooth progressions, resolutions, modulations etc.?

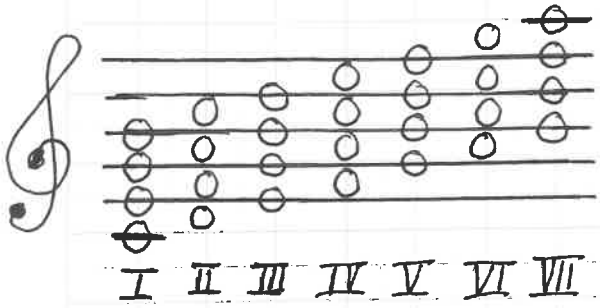


• The left figure shows the six "used" 7th chords in the key of Cmaj as stacks of minor (m) and major (M) 3rds. The six chords correspond to the six "up-paths."

• More on Chords — Focus on 7th Chords

8/29/2024

Example: "Cmaj-inherent" 7th chords



• Notation: m = minor 3rd
M = major 3rd

I	C E G B	M m M
II	D F A C	m M m
III	E G B D	m M m
IV	F A C E	M m M
V	G B D F	M m m
VI	A C E G	m M m
VII	B D F A	m m M

⇒ Each of the seven notes C, D, E, F, G, A and B is in four of these seven "Cmaj-inherent" 7th chords. Thus, one can construct four 7th chords for each of the seven notes, when the note is used as the "melody note" at the top.

B	C E G B	I⁰
	D E G B	III¹
	D F G B	V²
	D F A B	VII³
C	D F A C	II⁰
	E F A C	IV¹
	E G A C	VI²
	E G B C	I³
D	E G B D	III⁰
	F G B D	V¹
	F A B D	VII²
	F A C D	II³
E	F A C E	IV⁰
	G A C E	VI¹
	G B C E	I²
	G B D E	III³
F	G B D F	V⁰
	A B D F	VII¹
	A C D F	II²
	A C E F	IV³
G	A C E G	VI⁰
	B C E G	I¹
	B D E G	III²
	B D F G	V³
A	B D F A	VII⁰
	C D F A	II¹
	C E F A	IV²
	C E G A	VI³

• Notation: $I^0 \hat{=}$ chord I, root position
$III^1 \hat{=}$ chord III, 1st inversion
$V^2 \hat{=}$ chord V, 2nd inversion
$VII^3 \hat{=}$ chord VII, 3rd inversion
⇒ same for all other chords!

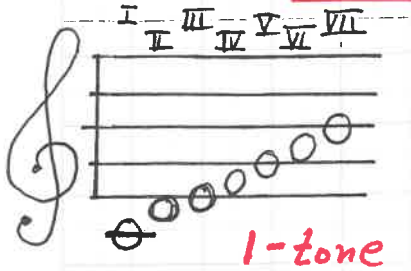
→ The left table shows all possible 4·7 = 28 inversions possible for the "C-maj-inherent" 7th chords — using each Cmaj-note four times as the "top note."
(The same kind of 28 inversions can be compiled for the "C-min-inherent" 7th chords, keeping in mind that chord V has a G♯ in it — not a G.)

→ In classical music theory, all these chords are precisely named (REF: RAMEAU).

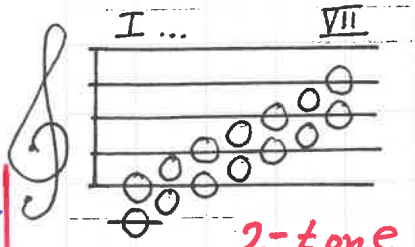
• More on Chords... 8/30/2024

"Summary of 1-tone, 2-tone (3rds), 3-tone (triads) and 4-tone (7ths) chords — and their inversions"

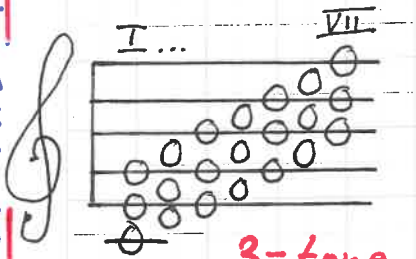
WHEN A CHORD IS RECOGNIZED IN A PIECE, THE PEDAL CAN/SHOULD BE/MUST BE PRESSED FOR THE DURATION OF THE CHORD IN A PIECE PASSAGE.



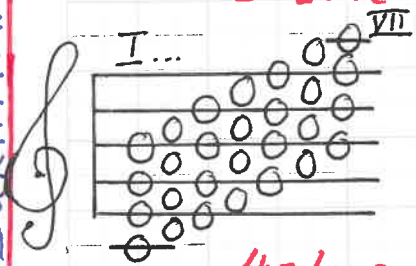
1-tone



2-tone



3-tone



4-tone

• 1-tone/single note: C, D, E, F, G, A, B (= single-note "chords" in Cmaj.):
⇒ only one "inversion" exists: $C^{o}, D^{o}, E^{o}, F^{o}, G^{o}, A^{o}, B^{o}$
(superscript "o" denoting root position)

• 2-note chords (3rds only) in key of Cmaj:
Every note of the Cmaj scale can be played as "melody-note" by using a "key-inherent 3rd" or its (first and only) inversion (3rd or 6th chord), see right figure.

C	I°	C
D	II°	D
E	III°	E
F	IV°	F
G	V°	G
A	VI°	A
B	VII°	B

A C	VI°	C
E C	I¹	
B D	VII°	D
F D	II¹	
C E	I°	E
G E	III¹	
D F	II°	F
A F	IV¹	
E G	III°	G
B G	V¹	
F A	IV°	A
C A	VI¹	
G B	V°	B
D B	VII¹	

• 3-note chords (triads, stacks of two 3rds only) in key of Cmaj.: Every "key-inherent" "melody note" can be represented/played in three ways, using a root position, 1st or 2nd inversion chord ((3rd+3rd)-chord, (3rd+4th)-chord, (4th+3rd)-chord).

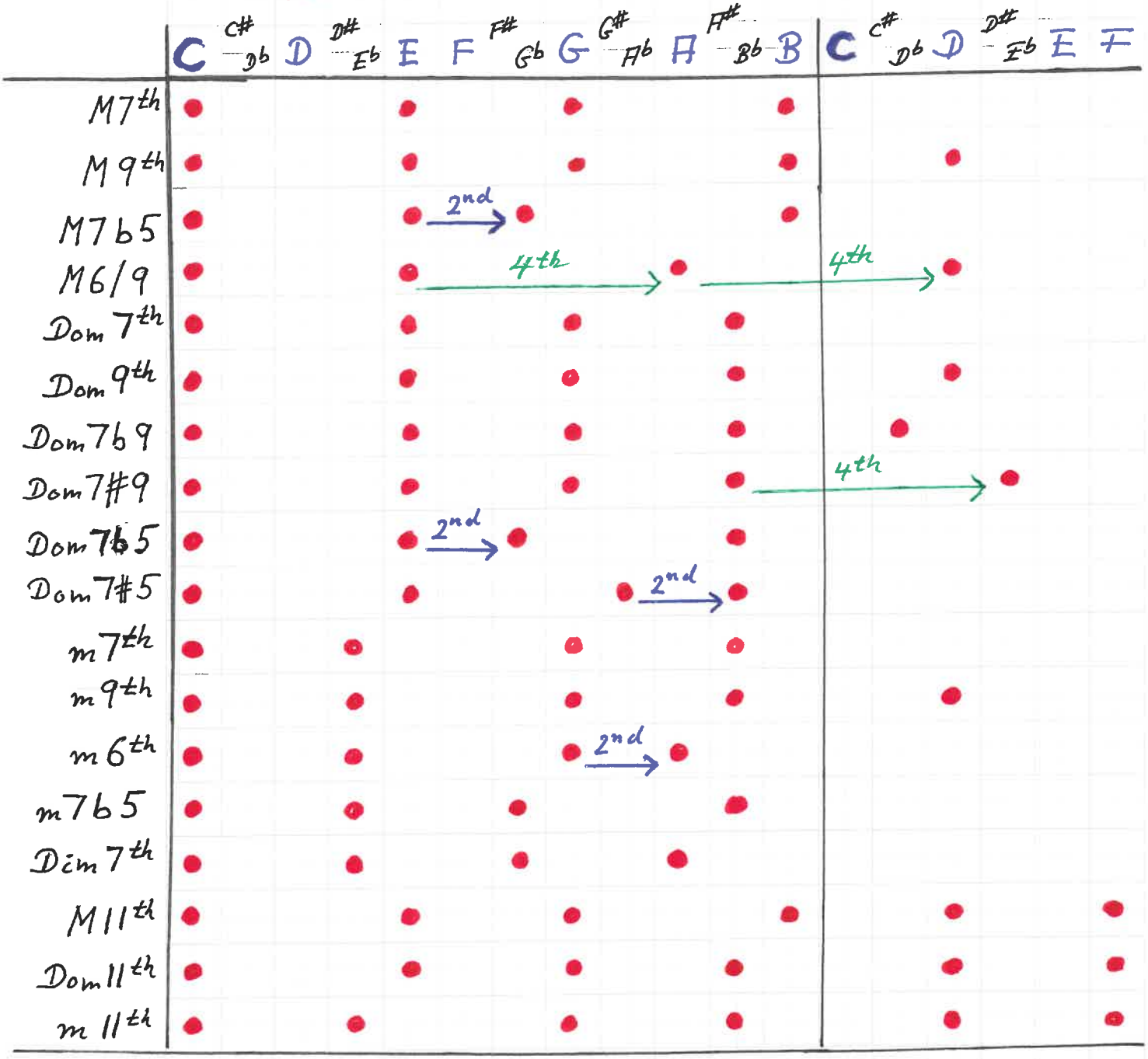
F A C	IV°	C
E G C	I¹	
E A C	VI²₄	

D F A C	II°	C
E G B C	I¹	
E G A C	VI²₄	
E F A C	IV³	

• 4-note chords (7th chords only): Every "key-inherent" "melody note" can be represented/played in four ways, using a root position, 1st, 2nd or 3rd inversion chord ((3rd+3rd+3rd)-chord, (3rd+3rd+2nd)-chord, (3rd+2nd+3rd)-chord, (2nd+3rd+3rd)-chord).

"JAZZ CHORDS"

9/1/2024



M = major

m = minor

Dom = dominant

Dim = diminished

"Construction":

$N1 \xrightarrow{I_1} \ldots \xrightarrow{I_5} N6$

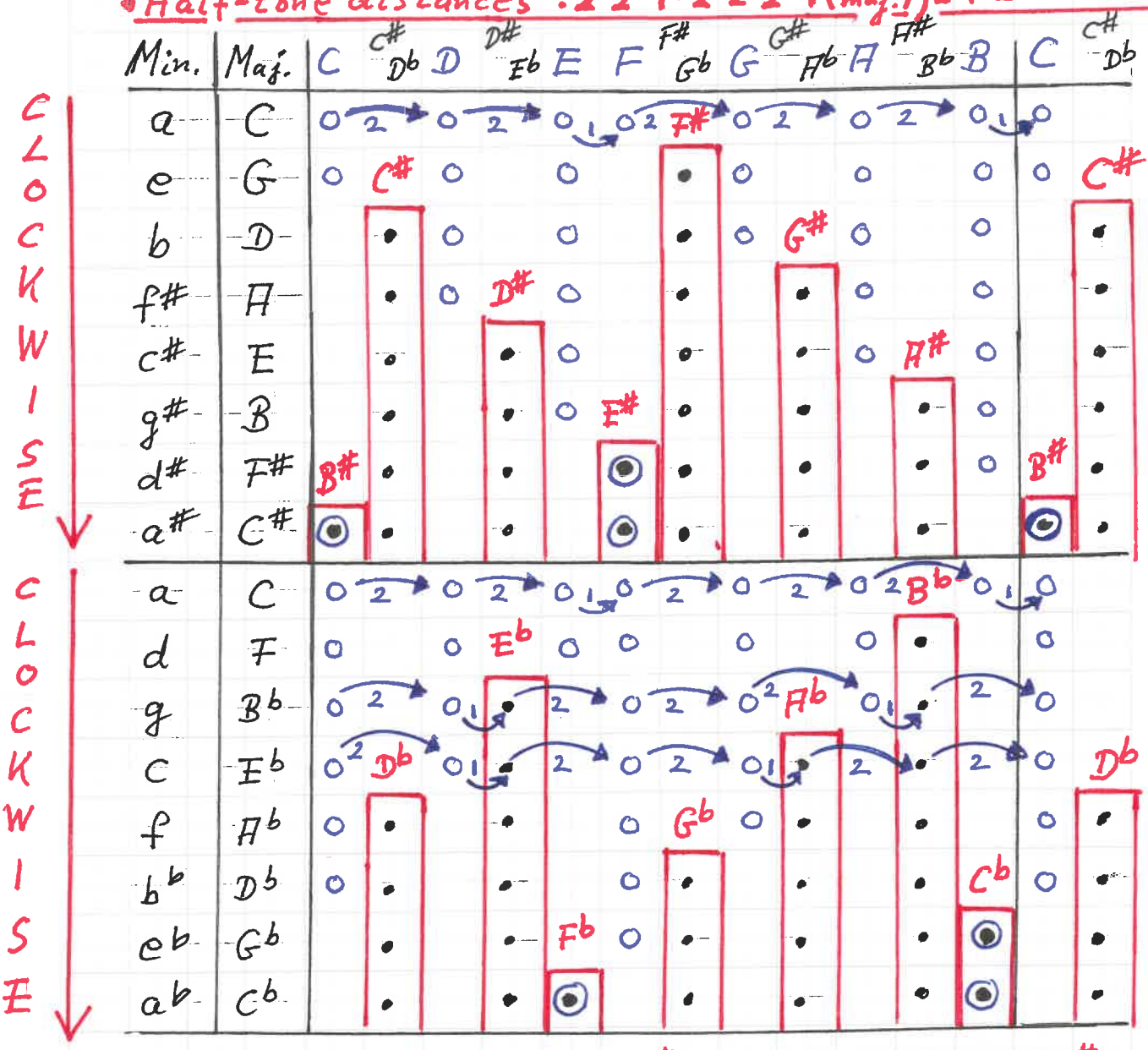
N = note, $I_j \in \{m3^{rd}, M3^{rd}, 2^{nd}, 4^{th}\}$

Most of these "Jazz Chords" (shown only in ROOT position in the key of C) are stacks of minor and major 3rds; only few chords contain a 2nd or 4ths. Often, inversions contain "dense note clusters."

On the Circle of Fifths — and the "Appearance" of '#' and 'b'

9/2/2024

- Half-tone "distances": 2-2-1-2-2-2-1 (maj.), 2-1-2-2-1-2-2 (min.)



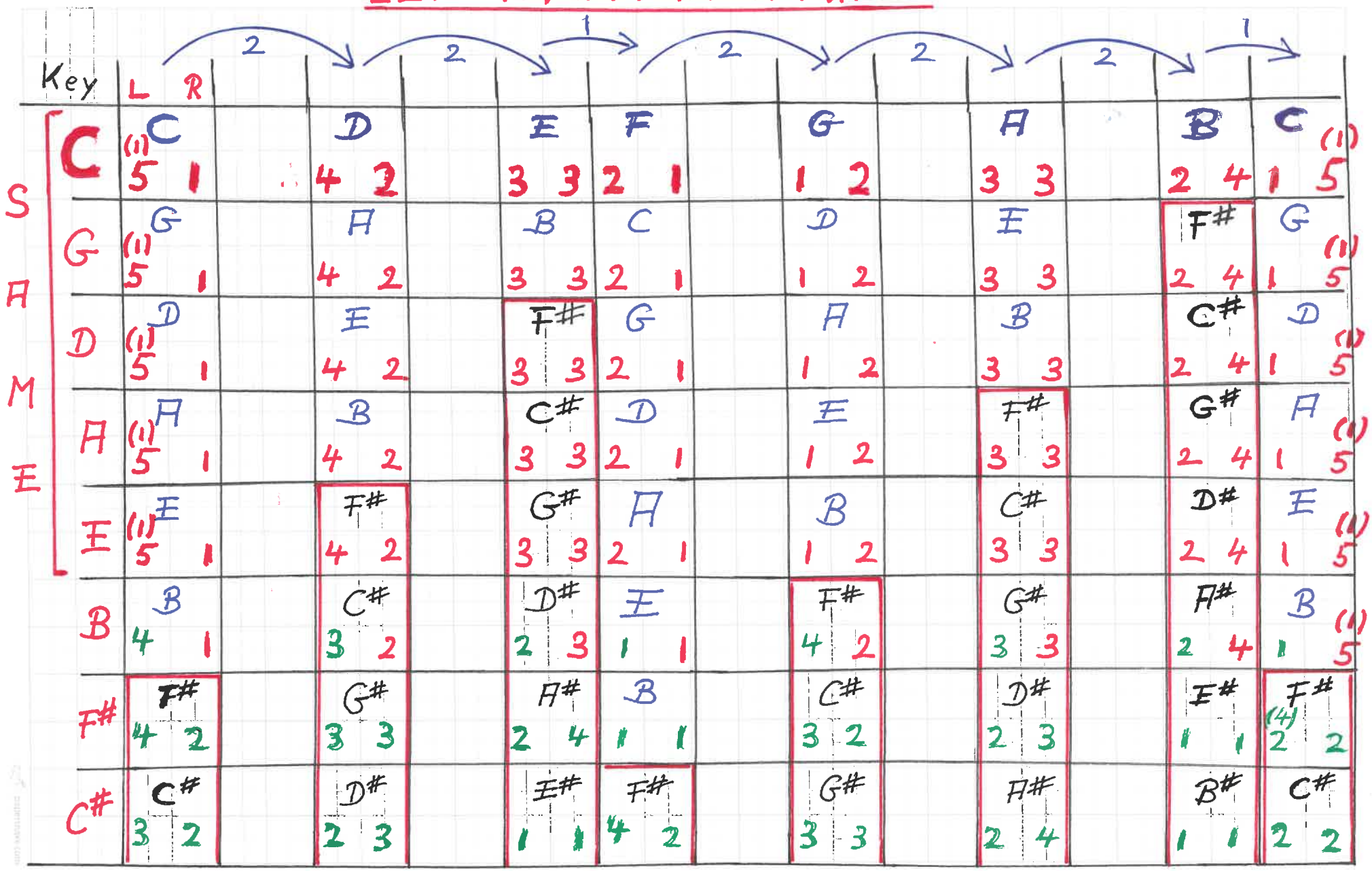
- Maj. scales – "clockwise": C, G, D, A, E, B, F#, C#
  – "counter-clockwise": C, F, Bb, Eb, Ab, Db, Gb, Cb
- Min. scales – "clockwise": a, e, b, f#, c#, g#, d#, a#
  – "counter-clockwise": a, d, g, c, f, bb, eb, ab

- Order of introduction of '#': F#, C#, G#, D#, A#, E# (≙F), B# (≙C)
- Order of introduction of 'b': Bb, Eb, Ab, Db, Gb, Cb (≙B), Fb (≙E)

• FINGERING — MAJOR SCALES (#),

9/3/2024

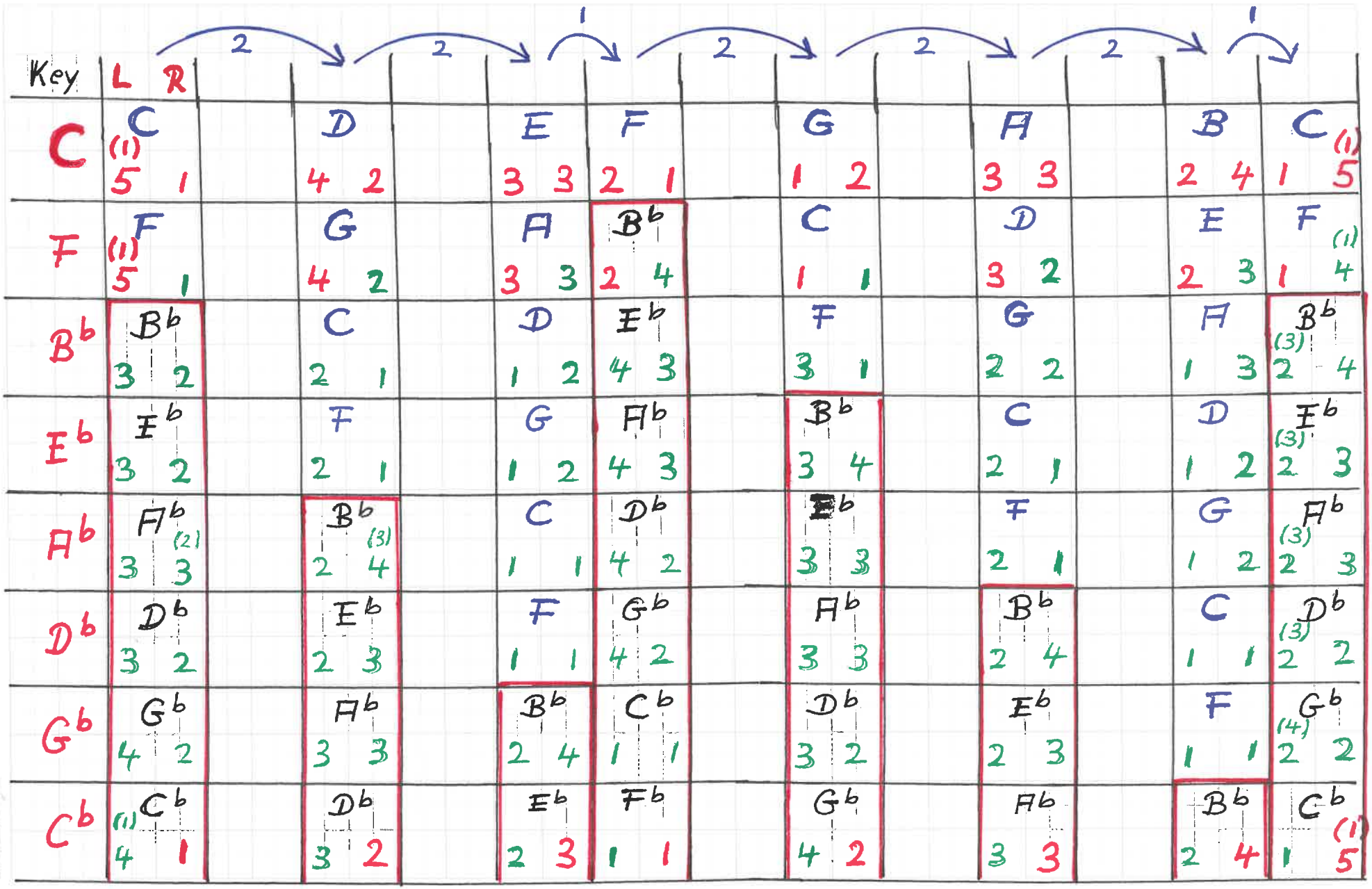
LEFT (L) & RIGHT (R) HAND



(..)(..) — when continuing (another octave)

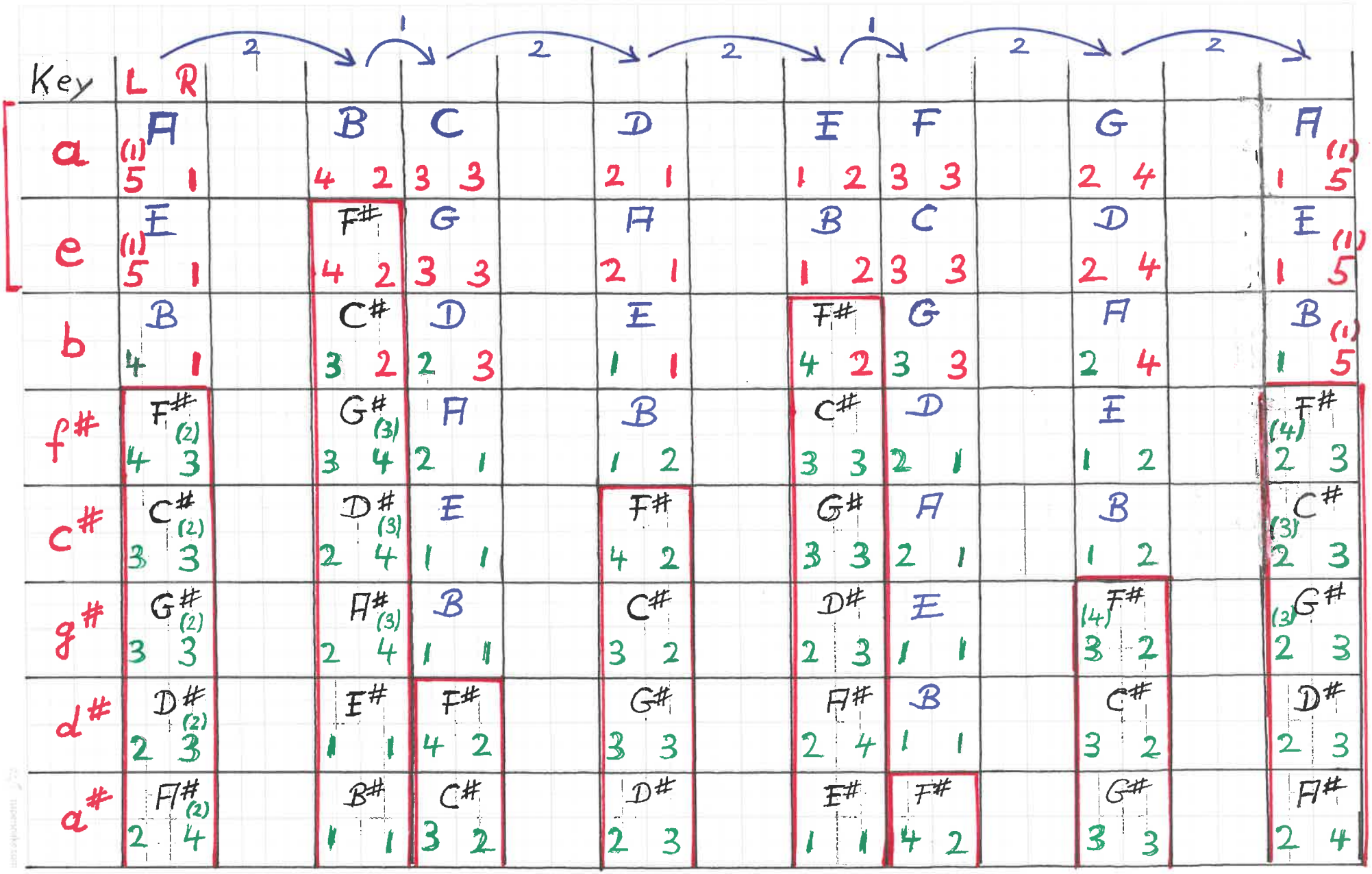
FINGERING — MAJOR SCALES (b), LEFT (L) & RIGHT (R) HAND

9/4/2024



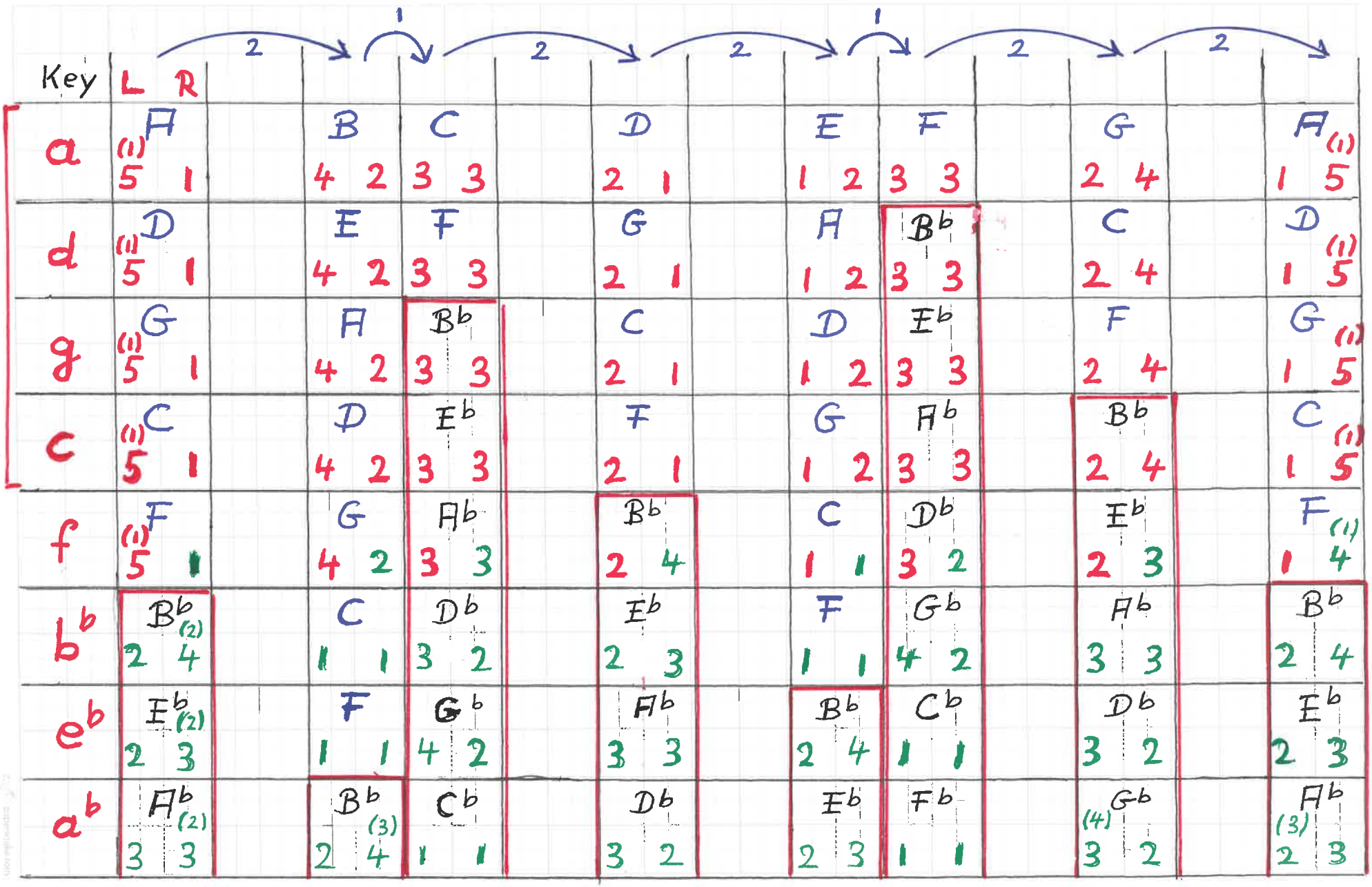
• FINGERING — MINOR SCALES (#), LEFT (L) & RIGHT (R) HAND

9/5/2024



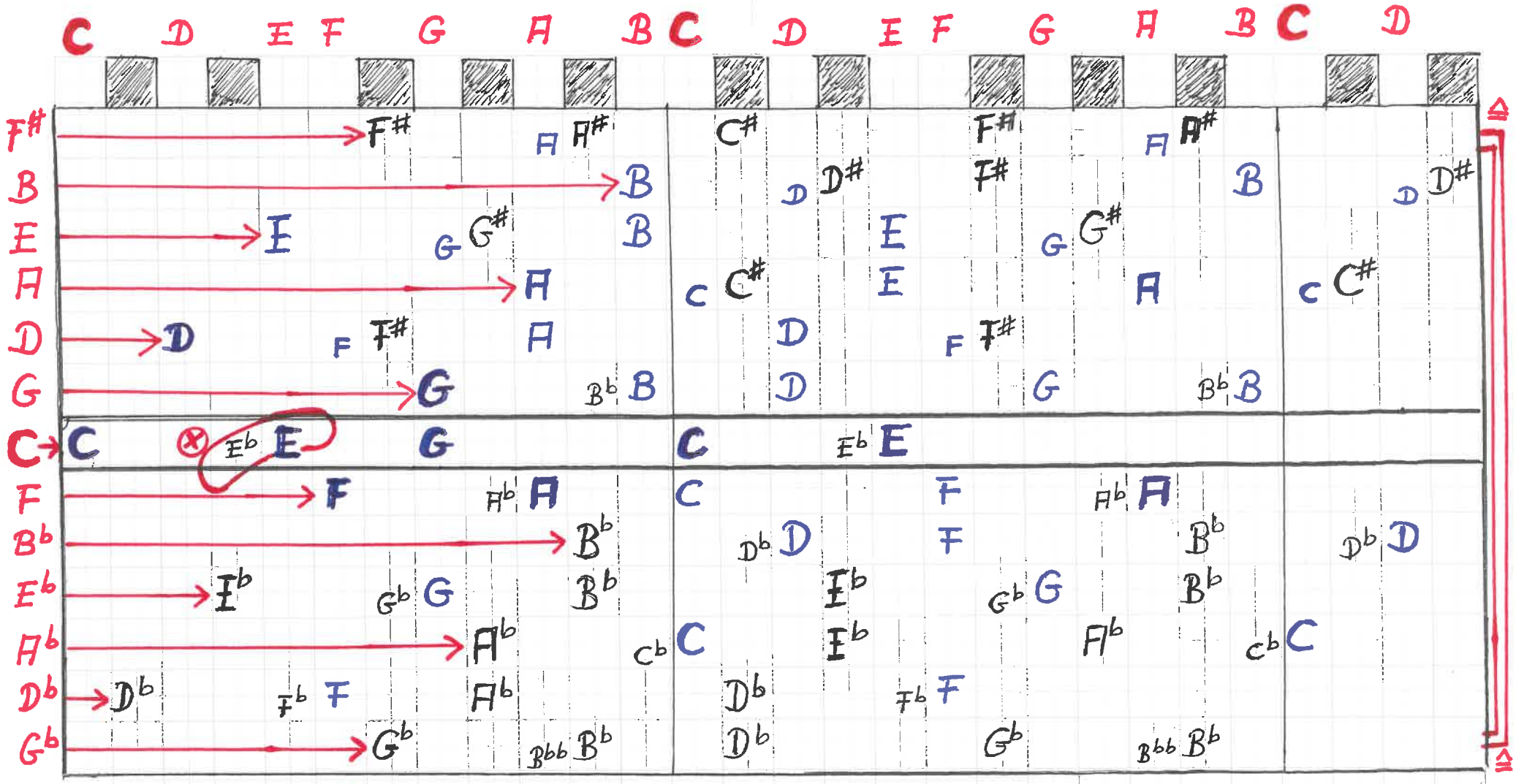
FINGERING — MINOR SCALES (b), LEFT (L) & RIGHT (R) HAND

9/5/2024



• MAJOR & MINOR TRIADS WITH INVERSIONS ⊛

9/6/2024



	L	R
0th	5, 3, 1	1, 3, 5
1st	5, 3, 1	1, 2, 5
2nd	5, 2, 1	1, 3, 5

FINGERING

The left table shows the standard fingerings for all major and minor triads and all inversions.

⊗ E♭ E "NOTE PAIR" for minor & major keys

An "octave chord," e.g. C-E-G-C, uses the standard fingerings 5-4-2-1 (L) and 1-2-3-5 (R).

⊛ Here: C-E-G-C-E (0th, 1st, 2nd inversions)

9/7/2024

• DIATONIC TRIADS — MINOR KEYS

(Key-inherent triads and their "implied inversions")

Key	i	ii°	III	iv	v	VI	VII
a#	A#C#E#	B#D#F#	C#E#G#	D#F#A#	E#G#B#	F#A#C#	G#B#D#
d#	D#F#A#	E#G#B	F#A#C#	G#B D#	A#C#E#	B D#F#	C#E#G#
g#	G#B D#	A#C#E	B D#F#	C#EG#	D#F#A#	EG#B	F#A#C#
c#	C#EG#	D#F#A	EG#B	F#AC#	G#B D#	AC#E	B D#F#
f#	F#AC#	G#B D	AC#E	B DF#	C#EG#	DF#A	EG#B
b	B DF#	C#EG	DF#A	EGB	F#AC#	GB D	AC#E
e	EGB	F#AC	GB D	ACE	B DF#	CEG	DF#A
a	ACE	B DF	CEG	DFA	EGB	FAC	GB D
d	DFA	EGB♭	FAC	GB♭D	ACE	B♭DF	CEG
g	GB♭D	ACE♭	B♭DF	CE♭G	DFA	E♭GB♭	FAC
c	CE♭G	DFA♭	E♭GB♭	FA♭C	GB♭D	A♭CE♭	B♭DF
f	FA♭C	GB♭D♭	A♭CE♭	B♭D♭F	CE♭G	D♭FA♭	E♭GB♭
b♭	B♭D♭F	CE♭G♭	D♭FA♭	E♭G♭B♭	FA♭C	G♭B♭D♭	A♭CE♭
e♭	E♭G♭B♭	FA♭C♭	G♭B♭D♭	A♭C♭E♭	B♭D♭F	C♭E♭G♭	D♭FA♭
a♭	A♭C♭E♭	B♭D♭F♭	C♭E♭G♭	D♭F♭A♭	E♭G♭B♭	F♭A♭C♭	G♭B♭D♭

EQUIVALENT!

\# : i, ii°, III, iv, v, VI, VII

♭ : i, ii°, III, iv, v, VI, VII

This table concerns the NATURAL MINOR scales. Regarding the HARMONIC and MELODIC MINOR scales, the 6th and 7th scale degrees (notes) must be raised by a halftone (#). This affects all triads (ii°–VII), except i.

III, VI, VII — major chords / triads

i, iv, v — minor chords / triads

ii° — diminished (minor) chord / triad

⇒ Triad types: M 3rd m 3rd, m 3rd M 3rd / m 3rd m 3rd !

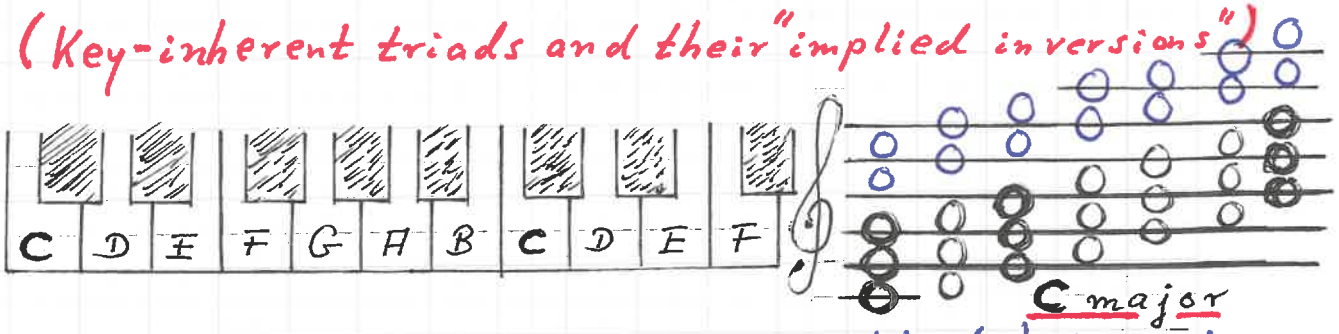
• Note. The keys of the minor keys used for the above table are keys of the NATURAL MINORS. Thus, the seven triads for the key of a-minor, for example, are the same triads shown for C-major — with different numbering.

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9/7/2024

• DIATONIC TRIADS — MAJOR KEYS

(Key-inherent triads and their "implied inversions")



blue 'o': inversions

Key	I	ii	iii	IV	V	vi	vii°
C#	C#E#G#	D#F#A#	E#G#B#	F#A#C#	G#B#D#	A#C#E#	B#D#F#
F#	F#A#C#	G#B#D#	A#C#E#	B#D#F#	C#E#G#	D#F#A#	E#G#B#
B	BD#F#	C#EG#	D#F#A#	EG#B	F#A#C#	G#BD#	A#C#E
E	EG#B	F#AC#	G#BD#	AC#E	BD#F#	C#EG#	D#F#A
A	AC#E	BDF#	C#EG#	DF#A	EG#B	F#AC#	G#BD
D	DF#A	EGB	F#AC#	GBD	AC#E	BDF#	C#EG
G	GBD	ACE	BDF#	CEG	DF#A	EGB	F#AC
C	CEG	DFA	EGB	FAC	GBD	ACE	BDF
F	FAC	GBbD	ACE	BbDF	CEG	DFA	EGBb
Bb	BbDF	CEbG	DFA	EbGBb	FAC	GBbD	ACEb
Eb	EbGBb	FAbC	GBbD	AbCEb	BbDF	CEbG	DFAb
Ab	AbCEb	BbDbF	CEbG	DbFAb	EbGBb	FAbC	GBbDb
Db	DbFAb	EbGbBb	FAbC	GbBbDb	AbCEb	BbDbF	CEbGb
Gb	GbBbDb	AbCbEb	BbDbF	CbEbGb	DbFAb	EbGbBb	FAbCb
Cb	CbEbGb	DbFbAb	EbGbBb	FbAbCb	GbBbDb	AbCbEb	BbDbFb

= EQUIVALENT!

I, IV, V — major chords / triads

ii, iii, vi — minor chords / triads

vii° — diminished (minor) chord / triad

⇒ Triad types: M3rd m3rd, m3rd M3rd, m3rd m3rd !

⇒ Three "shapes" only!