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Music theory for guitar nerds

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Contents

1	Intervals: where do notes come from?	3
1.1	Harmonic series	3
1.2	Consonance and dissonance	4
2	Scales	5
2.1	Major scale	6
2.2	Pentatonic scale	7
2.3	Blues	8
3	Chords	9
3.1	Formation of chords	10
3.2	Harmonizing the major scale	11
3.3	Chord progression and example	12
3.4	Chord inversions	13
4	Arpeggios	15
5	Modes	16
6	Transposition	17
7	Composition variation (Shred Master Scott)	18

- Gives the recipe not just examples
- If you give a man a fish, you feed him for a day. If you teach a man to fish, you feed him for a lifetime

1 Intervals: where do notes come from?

1.1 Harmonic series

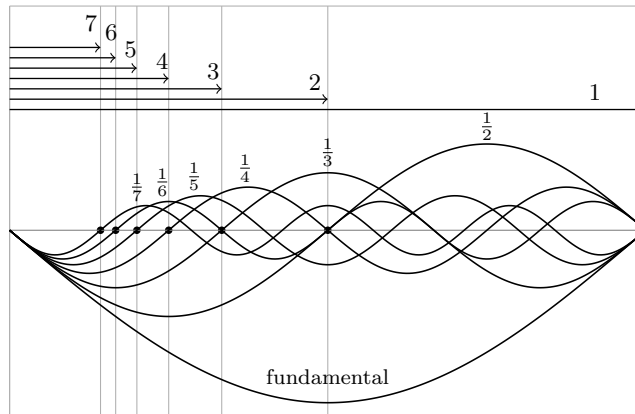


Figure 1: The harmonic series

Table 1: Intervals and

Harmonics					Ratio to fundamental	Intervals	Equal Temperament
1	2	4	8	16	1,2,3,4	unison/octave	1.000
				17	$17/16 = 1.0625$	minor second	1.059
			9	18	$9/8 = 1.125$	major second	1.122
				19	$19/16 = 1.1875$	minor third	1.189
		5	10	20	$5/4 = 1.2500$	major third	1.260
				21	$21/16 = 1.3125$	fourth	1.335
			11	22	$11/8 = 1.375$	tritone	1.414
				23	$23/16 = 1.4375$		
	3	6	12	24	$3/2 = 1.500$	fifth	1.498
				25	$25/16 = 1.5625$	minor sixth	1.587
			13	26	$13/8 = 1.625$		
				27	$27/16 = 1.6875$	major sixth	1.682
		7	14	28	$7/4 = 1.7500$	minor seventh	1.782
				29	$29/16 = 1.8125$		
			15	30	$15/8 = 1.875$	major seventh	1.888
				31	$31/16 = 1.9375$		

Table Source: <https://hellomusictheory.com/learn/intervals/>

Table 2: Intervals chart in relation to C note. Minor (m or “-”), major (M or “maj”), augmented (A or “aug” or “#” or “+”) and diminished (d or “dim” or “b”).

Semitones	Name	Notation	Songs
0	Perfect unison	P1	-
1	Minor second	m2	JAWS theme
2	Major second	M2	Frè-re Jacques
3	Minor third	m3	Iron Man by Black Sabbath
4	Major third	M3	”Oh-When the Saints”
5	Perfect fourth	P4	Here Comes the Bride (Wedding song)
6	Triton	T	”The - Simp- sons”
7	Perfect fifth	P5	”Twinkle - Twinkle Little Star”
8	Minor sixth	m6	The Entertainer
9	Major sixth	M6	Jingle Bells (”Dash-ing through the snow”)
10	Minor seventh	m7	Theme song Star Trek : The Original Series
11	Major seventh	M7	Take On Me (”Take-on ”)
12	Perfect octave	P8	”Some-where over the rainbow”
13	Minor ninth	m9	-
14	Major ninth	M9	-
16	Diminished eleventh	d11	-
17	Perfect eleventh	P11	-
18	Augmented eleventh	A11	-
20	Minor thirteenth	m13	-
21	Major thirteenth	M13	-

1.2 Consonance and dissonance

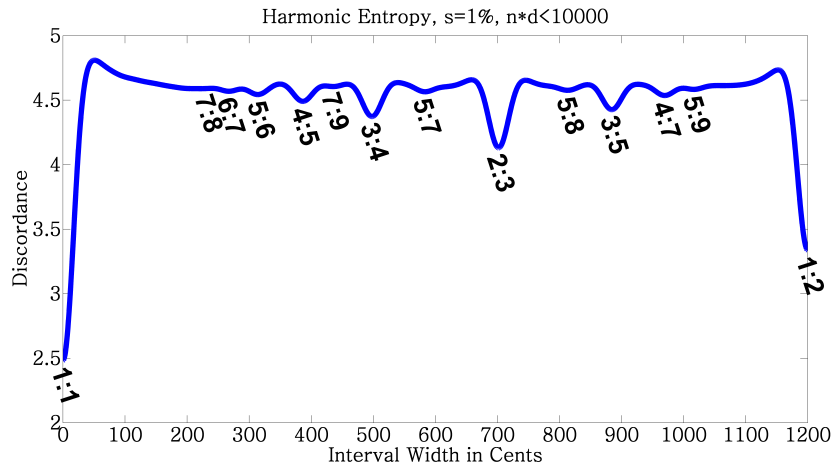


Figure 2: Harmonic entropy

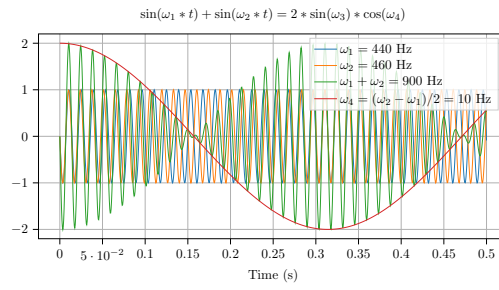


Figure 3: Beat tone

2 Scales

Table 3: Scales formula (relative to the major scale)

Scale name	Formula							Comment
Major	1	2	3	4	5	6	7	
Pentatonic Major	1	2	3	-	5	6	-	
Natural minor	1	2	b3	4	5	b6	b7	
Pentatonic minor	1	-	b3	4	5	-	b7	
Harmonic minor	1	2	b3	4	5	b6	7	
Melodic minor	1	2	b3	4	5	6	7	
Ionian (Major)	1	2	3	4	5	6	7	
Dorian	1	2	b3	4	5	6	b7	Mad world, So What
Phrygian	1	b2	b3	4	5	b6	b7	Symphony of destruction
Lydian	1	2	3	#4	5	6	7	Legend of Zelda
Mixolydian	1	2	3	4	5	6	b7	Clock by Coldplay
Aeolian (natural minor)	1	2	b3	4	5	b6	b7	Smell Like Teen Spirit
Locrian	1	b2	b3	4	b5	b6	b7	Rush-YYZ intro
Ionian b6	1	2	3	4	5	b6	7	
Dorian #4 (4 th Harm. min)	1	2	b3	#4	5	6	b7	
Phrygian dominant (5th Harm. min)	1	b2	3	4	5	b6	b7	Flamenco, egyptian
Lydian dominant (4th Melo. min)	1	2	3	#4	5	6	b7	Prog futuristic, Simpsons theme
Mixolydian b6 (5th Melo. min)	1	2	3	4	5	b6	b7	Prog rock
(or Aeolian dominant)								
Neapolitan minor	1	b2	b3	4	5	b6	7	
Bizantine scale (double harmonic major)	1	b2	3	4	5	b6	7	Opeth - Bleak
Lydian #2,#6								
Ultra-Phrygian	1	b2	b3	b4	5	b6	bb7	
Hungarian minor (double harmonic minor)	1	2	b3	#4	5	b6	7	
Oriental (Asian)								
Ionian Aug#2	1	#2	3	4	#5	6	7	
Locrian bb3,bb7	1	b2	bb3	4	b5	b6	bb7	

2.1 Major scale

Modes ranked by brightness: Super-locrian, locrian, phrygian, aeolian, dorian, mixolydian, major, lydian, lydian augmented

- Major scales and the modes (and all modes)
- Pentatonic scale (Major, Egyptian, Man Gong, Ritusen)
- Minor scale (natural, harmonic, melodic)
- Phrygian dominant (hijaz) (I-bII-iiidim-iv-vdim-bVI+-bvii) Ex: Come out and Play The Offsprings

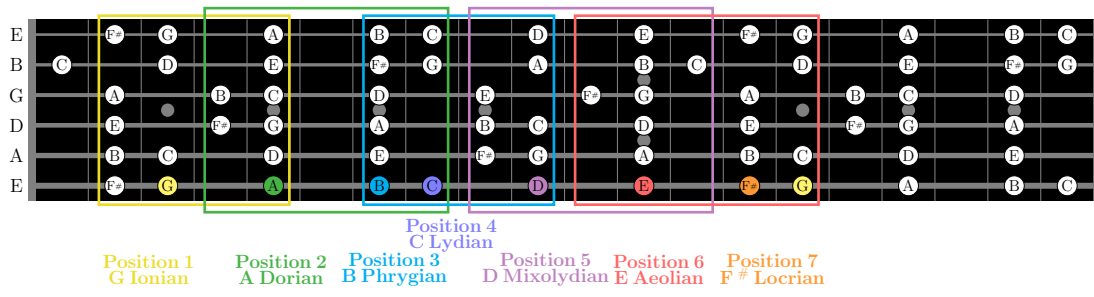


Figure 4: G Major scale on the fretboard

2.2 Pentatonic scale

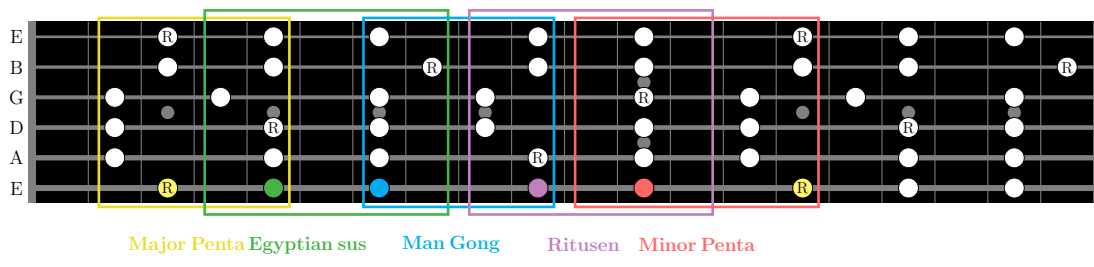


Figure 5: Pattern of pentatonic scales

2.3 Blues

Table 4: Blues scales (relative to the major scale)

Scale name	Formula							
Blues Major	1	2	b3	3	-	5	6	-
Blues minor	1	-	b3	4	b5	5	-	b7

Table 5: Basic 12 bar major blues

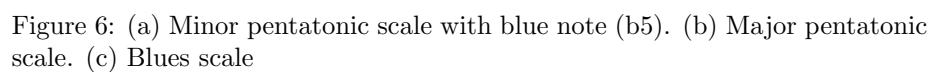
I7	I7	I7	I7
IV7	IV7	I7	I7
V7	IV7	I7	I7

Table 6: Basic 12 bar minor blues

i7	i7	i7	i7
iv7	iv7	i7	i7
v7 or V7	iv7	i7	V7

Table 7: Basic 12 bar major blues with a *quick change* and *turnaround*

I7	IV7	I7	I7
IV7	IV7	I7	I7
V7	IV7	I7 - vi7	ii7 - V7



- Tonic: I, iii, vi
- Pre-dominant: IV, ii
- Dominant: V, vii°
- “Sus” chords: chord without third
- “sus9” will often replace the dominant 7th chord

3.1 Formation of chords

arydshln

Table 8: Construction of chords (notation is relative to the major scale)

	chord	symbol						name
triad			1	M3	5			major
	m		1	m3	5			minor
	dim	◦	1	m3	b5			diminished
	aug	+	1	M3	#5			augmented
	sus2		1	M2	5			suspended 2nd
	sus4		1	4	5			suspended 4th
tetrad	7		1	M3	5	m7		dominant 7th
	maj7	Δ, M7	1	M3	5	M7		major 7th
	m7	−7	1	m3	5	m7		minor 7th
	m7b5	∅	1	m3	b5	m7		half-diminished
	dim7	◦7	1	m3	b5	b7		fully-diminished
	mM7	mΔ	1	m3	5	M7		minor major 7th
	maj7(#5)	+Δ	1	M3	#5	M7		augmented major 7th
	7(#5)	+7	1	M3	#5	m7		augmented 7th
	6		1	M3	5	M6		
	m6		1	m3	5	M6		
	b6		1	M3	5	m6		
	m(b6)		1	m3	5	m6		
	m6/9		1	m3	6	M9		
	6/9		1	M3	6	M9		
	add9		1	M3	5	M9		
	m(add9)		1	m3	5	M9		
	7sus4		1	4	5	m7		
	add2		1	M2	M3	5		
pentad	9		1	M3	5	m7	M9	Dominant 9th
	maj9	Δ9	1	M3	5	M7	M9	major 9th
	7b9		1	M3	5	m7	m9	
	m9		1	m3	5	m7	M9	minor 9th
	mM9		1	m3	5	M7	M9	minor major 9th
	sus9		1	4	5	m7	M9	
	11		1	5	m7	M9	11	
hexad	7(13)		1	M3	5	m7	M9	M13
	7(b9,13)		1	M3	5	m7	m9	M13

- Accords: 7, m7, maj7, m7b5 (root sur corde E, A, D)

3.2 Harmonizing the major scale

Table 9: Harmonization of scales (relative to major scale)

	1	2	3	4	5	6	7
Major	I $^{\Delta}$	ii $^{-7}$	iii $^{-7}$	IV $^{\Delta}$	V 7	vi $^{-7}$	vii $^{\emptyset}$
Natural minor	i $^{-7}$	ii $^{\emptyset}$	bIII $^{\Delta}$	iv $^{-7}$	v $^{-7}$	bVI $^{\Delta}$	bVII 7
Harmonic minor	i $^{\Delta}$	ii $^{\emptyset}$	bIII $^{\Delta, \text{aug}}$	iv $^{-7}$	V 7	bVI $^{\Delta}$	vii $^{\circ 7}$
Melodic minor	i $^{\Delta}$	ii $^{-7}$	bIII $^{\Delta, \text{aug}}$	IV 7	V 7	vi $^{\emptyset}$	vii $^{\emptyset}$
Dorian	i $^{-7}$	ii $^{-7}$	bIII $^{\Delta, \text{aug}}$	IV 7	v $^{-7}$	vi $^{\emptyset}$	bVII $^{\Delta}$

Table 10: Table of modes

Mode name	Ionian	Dorian	Phrygian	Lydian	Mixolydian	Aeolian	Locrian
Diatonic chords	I	ii	iii	IV	V	vi	vii $^{\circ}$
Diatonic seventh	$\Delta 7$	-7	-7	$\Delta 7$	7	-7	\emptyset
Alternative naming	maj7	m7	m7	maj7	7	m7	m7b5
#####	F $^{\#}$	G $^{\#}$	A $^{\#}$	B	C $^{\#}$	D $^{\#}$	E $^{\#}$
#####	B	C $^{\#}$	D $^{\#}$	E	F $^{\#}$	G $^{\#}$	A $^{\#}$
####	E	F $^{\#}$	G $^{\#}$	A	B	C $^{\#}$	D $^{\#}$
###	A	B	C $^{\#}$	D	E	F $^{\#}$	G $^{\#}$
##	D	E	F $^{\#}$	G	A	B	C $^{\#}$
#	G	A	B	C	D	E	F $^{\#}$
-	C	D	E	F	G	A	B
b	F	G	A	B b	C	D	E
bb	B b	C	D	E b	F	G	A
bbb	E b	F	G	A b	B b	C	D
bbbb	A b	B b	C	D b	E b	F	G
bbbbb	D b	E b	F	G b	A b	B b	C
bbbbbb	G b	A b	B b	C b	D b	E b	F

3.3 Chord progression and example

Table 11: Famous chord progressions

Name	Progression	Example
Pop major (punk)	$I - V - vi - IV$	Dammit, Let it be, Country Road
Anatol (turnaround)	$I^\Delta - vi^7 - ii^7 - V^7$	Blue Moon
50s progression	$I - vi - IV - V$	Every Breath You Take, Crocodile Rock
Ragtime	$I - VI^7 - II^7 - V^7$	I want to be like you (Disney)
Jazz (ii-V-I)	$ii^7 - V^7 - I^\Delta$	Autumn leaves
Blues/Rock (Major)	$I^7 - IV^7 - V^7 - I^7$	Johnny B. Goode
Mixo vamp (mixo)	$I - bVII - IV - I$	Hey Jude, Sweet home Alabama
Japanese “Royal road”	$IV^\Delta - V^7 - iii^7 - vi^7 - (ii^7 - V^7 - I^\Delta)$	Shogo theme, anime
“Storyteller”	$I - IV - vi - V$	
Creep chord	$I - III - IV - iv$	Creep, Space Oddity
Pop minor	$i - bVI - bIII - bVII$	Save Tonight, Africa Toto
Aeolian vamp	$i - bVII - bVI - bVII$	Stairway to Heaven, All Iron Maiden
Minor progression 01	$i - i - bVI - V$	Sweet Dreams
Minor progression 02	$i - bVI - bIII - bVII$	
Minor progression 03	$i - bVI - iv - bVII$	Final countdown
Minor progression 04	$i - bIII - bVII - iv$	Boulevard of Broken Dreams
Andalusian (phrygian)	$i - bVII - bVI - V^7$	Happy Together The Turtles
Blues/Rock (minor)	$i^7 - iv^7 - V^7 - i^7$	Minor swing
Anime	$bVI - bVII - i$	
Neapolitan	$i - bII^6 - V - i$	Classic

3.4 Chord inversions

- Accords: 7, m7, maj7, m7b5 (root: E, A, D)

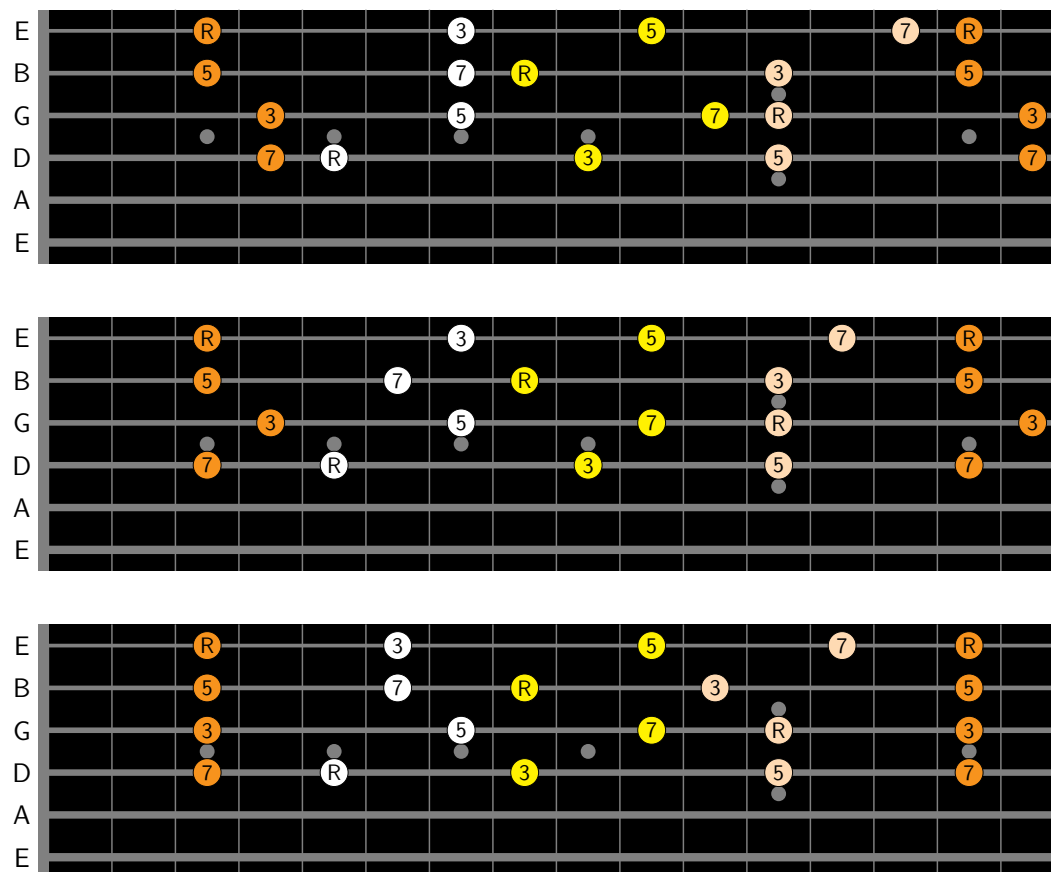


Figure 7: (a) maj7 chords. (b) Dominant 7 chords. (c) m7 chords

Concepts:

- Borrowed chord: chord that is not built from the scale of the tonic. Examples:
 - “Picardy third”: a progression with an ending major triad instead of an expected minor triad to create an impression of resolution.
 - Use the bVII
- Transition Chords:
 - Secondary dominant chord (tonicization) (V/x): using the fifth of a

chord (even if it's not a diatonic chord) in order to feel a "resolution" on this chord.

- Tritone substitution ($V_{\text{sub}/x}$ or $bV7/V$): Approach any target chord with a diminished 7 chord a semitone above.
- Backdoor [ii V]. Approach the tonic with $iv7 - bVII7 - I$.
- Modulation (Rick Beato):
 - * Diatonic common chord ("close" keys have many chords in common that can be used to modulate from a key to another. Common chords are called pivot chords)
 - * Chromatic pivot chord
 - * Enharmonic dominant
 - * Deceptive
 - * Enharmonic Dim7
 - * Dim7 to Dom7 (lower the root of the dim7 chord to create a dominant chord that leads to a new tonic)
 - * Chromatic Mediant
 - * Common tone (Pivot note)
 - * Direct or Linear (Abrupt change of key without preparation to "lift" the song)
 - * Chain Modulation ()
 - * Parallel modulation (Modulation of the mode but keep the same root ex: C to Cm)
- Substitution tritonique
- Substitution diatonique

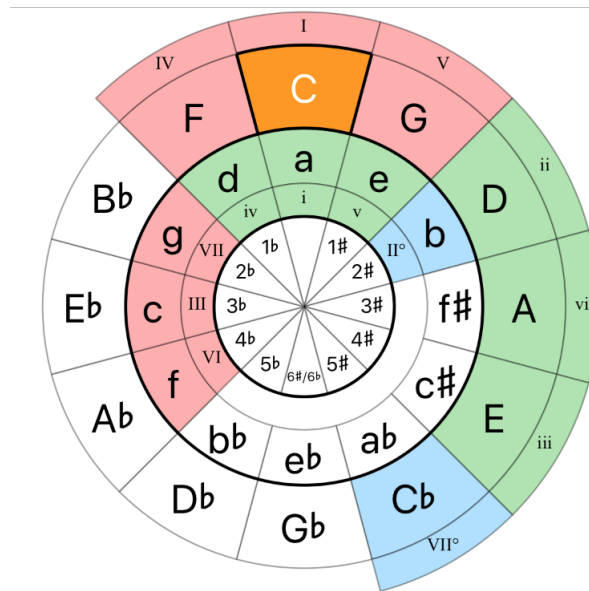


Figure 8

4 Arpeggios

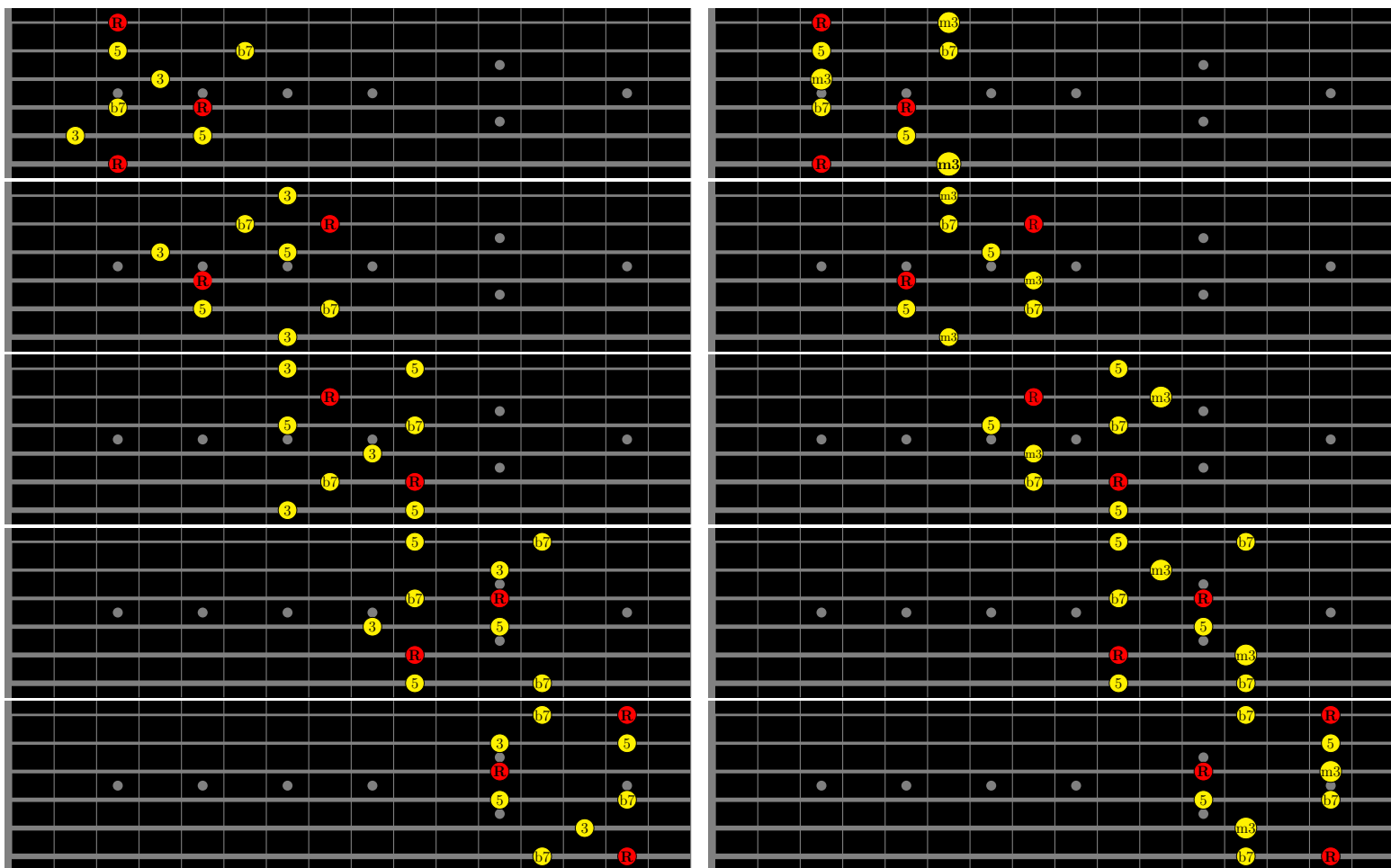


Table 12: (left) dom7 arpeggio. (right) m7 arpeggio

5 Modes

- Ionian (Joy), dorian(Jazz), phrygian(flamenco,doom), lydian (floaty,mystery) (ex: E.T., Jurassic Park, Back to the Future), mixo(blues)(ex: AC/DC), aeolian(sad)(ex: Losing my Religion), locrian(tension)(ex:Bjork Army of Me)

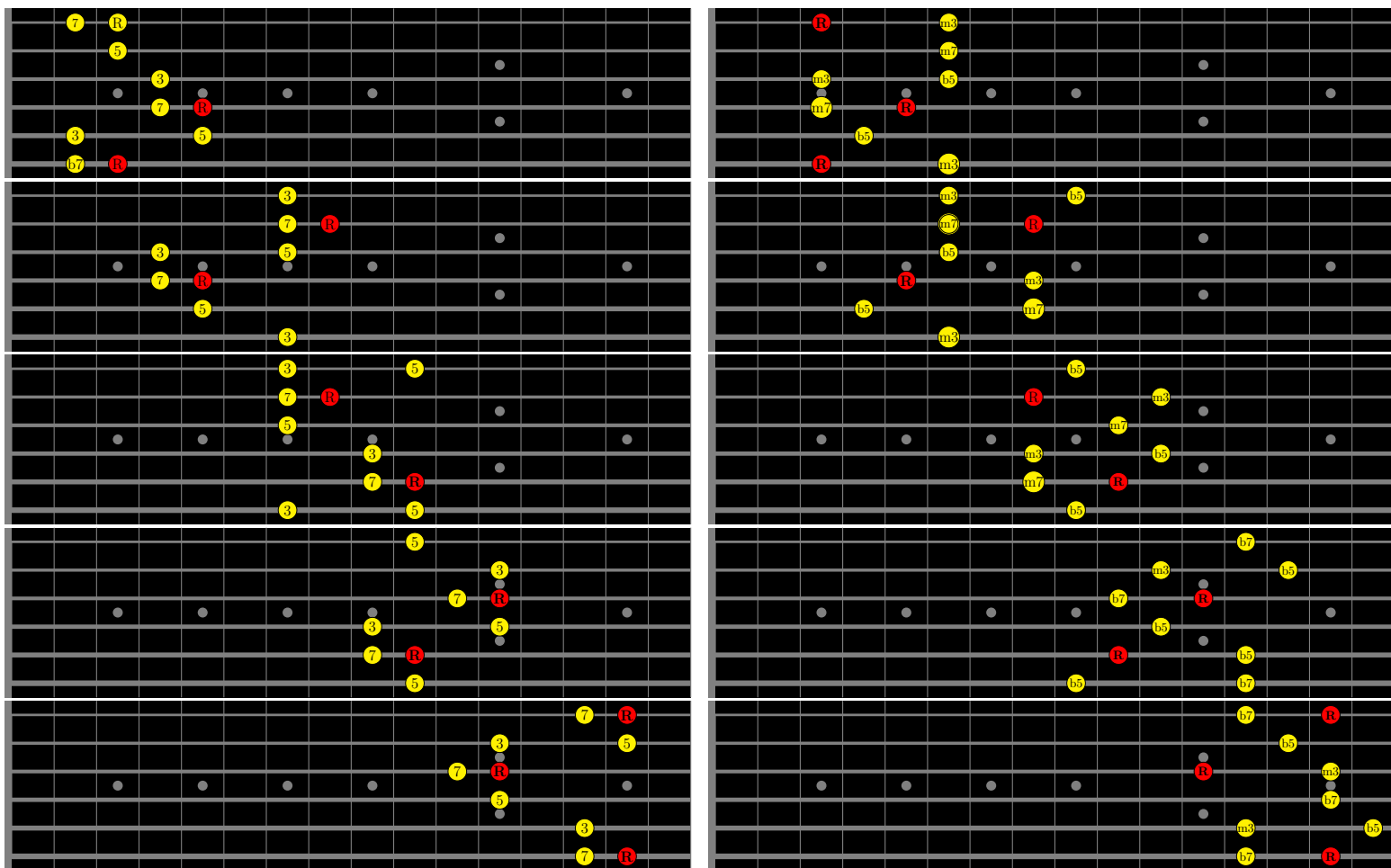


Table 13: (left) maj7 arpeggio. (right) m7b5 arpeggio

6 Transposition

<https://www.youtube.com/watch?v=Vxac3hHrxg8>

7 Composition variation (Shred Master Scott)

- Pedal tone
- Inversion
- Voice leading