Music theory for guitar nerds

Jean-Hughes Fournier L.

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Contents

- 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

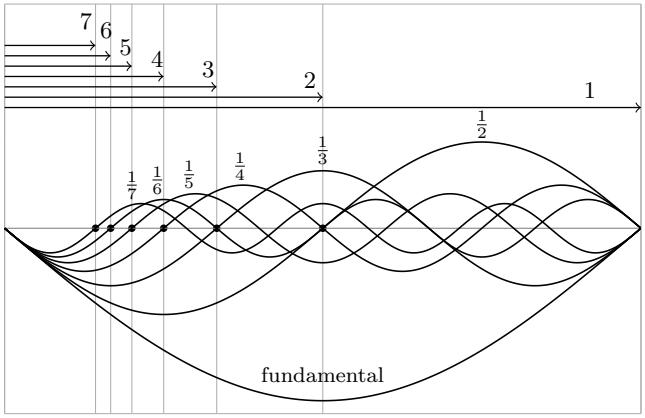

Figure 1: The harmonic series

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

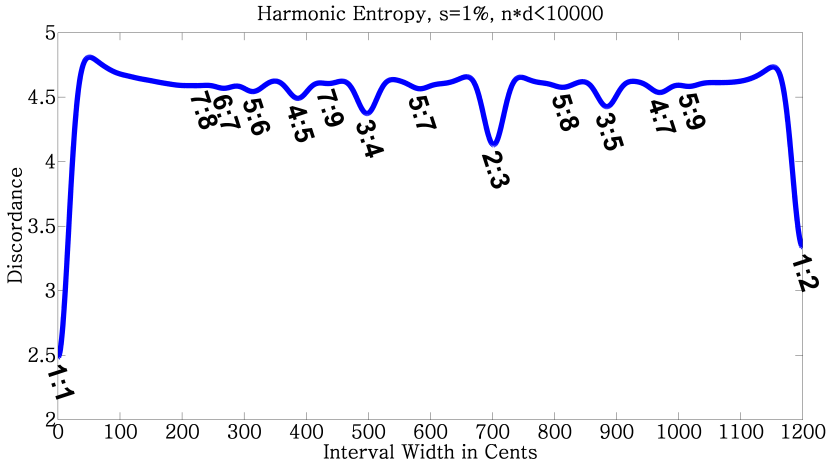

Figure 2: Harmonic entropy

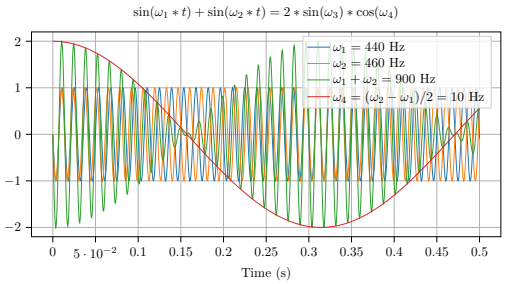

Figure 3: Beat tone

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) (or Aeolian dominant)	1	2	3	4	5	b6	b7	Prog rock
Neapolitan minor	1	b2	b3	4	5	b6	7	
Bizantine scale (double harmonic major) Lydian #2,#6	1	b2	3	4	5	b6	7	Opeth - Bleak
Ultra-Phrygian	1	b2	b3	b4	5	b6	bb7	
Hungarian minor (double harmonic minor) Oriental (Asian)	1	2	b3	#4	5	b6	7	
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

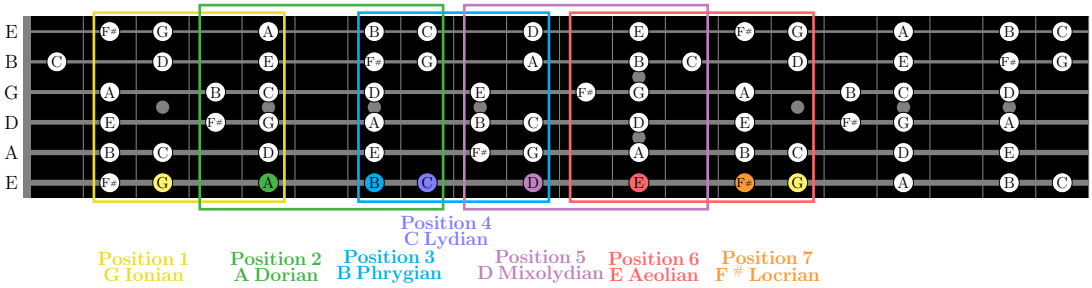

Figure 4: G Major scale on the fretboard

2.2 Pentatonic scale

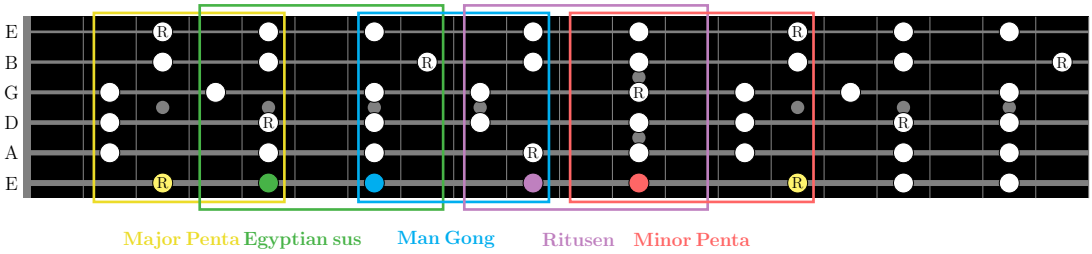

Figure 5: Pattern of pentatonic scales

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: 12 bar blues in C major

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

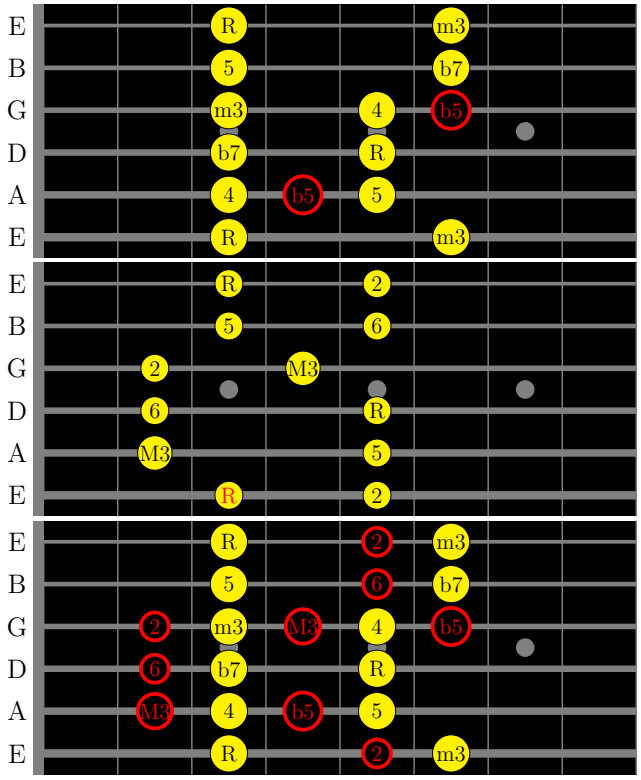

Figure 6: (a) Minor pentatonic scale with blue note (b5). (b) Major pentatonic scale. (c) Blues scale

3 Chords

- 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

Table 6: Construction of chords (notation is relative to the major scale)

# notes	Chords						
triad	-	1	M3	5	-	-	-
	m	1	m3	5	-	-	-
	dim or $^\circ$	1	m3	b5	-	-	-
	aug or $^\#5$	1	m3	$^\#5$	-	-	-
	sus2	1	M2	5	-	-	-
	sus4	1	4	5	-	-	-
tetrad	7	1	M3	5	m7	-	-
	Δ	1	M3	5	M7	-	-
	m^7	1	m3	5	m7	-	-
	m^Δ	1	m3	5	M7	-	-
	m^{7b5} or $\varnothing$	1	m3	b5	m7	-	-
	$^{\circ 7}$	1	m3	b5	b7	-	-
	6	1	M3	5	6	-	-
	m6	1	m3	5	6	-	-
	m6(9)	1	m3	6	M9	-	-
	6(9)	1	M3	6	M9	-	-
	7sus4	1	4	5	m7	-	-
	add2	1	M2	M3	5	-	-
	add9	1	M3	5	M9	-	-
pentad	7(b9)	1	M3	5	m7	m9	-
	Δ^9	1	M3	5	M7	M9	-
	9	1	M3	5	m7	M9	-
	m9	1	m3	5	m7	M9	-
	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

3.2 Harmonizing the major scale

Table 7: Harmonization of scales (relative to major scale)

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

Table 8: Table of modes

Mode name	Ionian	Dorian	Phrygian	Lydian	Mixolydian	Aeolian	Locrian
Diatonic chords	I	ii	iii	IV	V	vi	vii°
Diatonic seventh	Δ7	$^{-}7$	$^{-}7$	Δ7	7	$^{-}7$	∅
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 9: 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

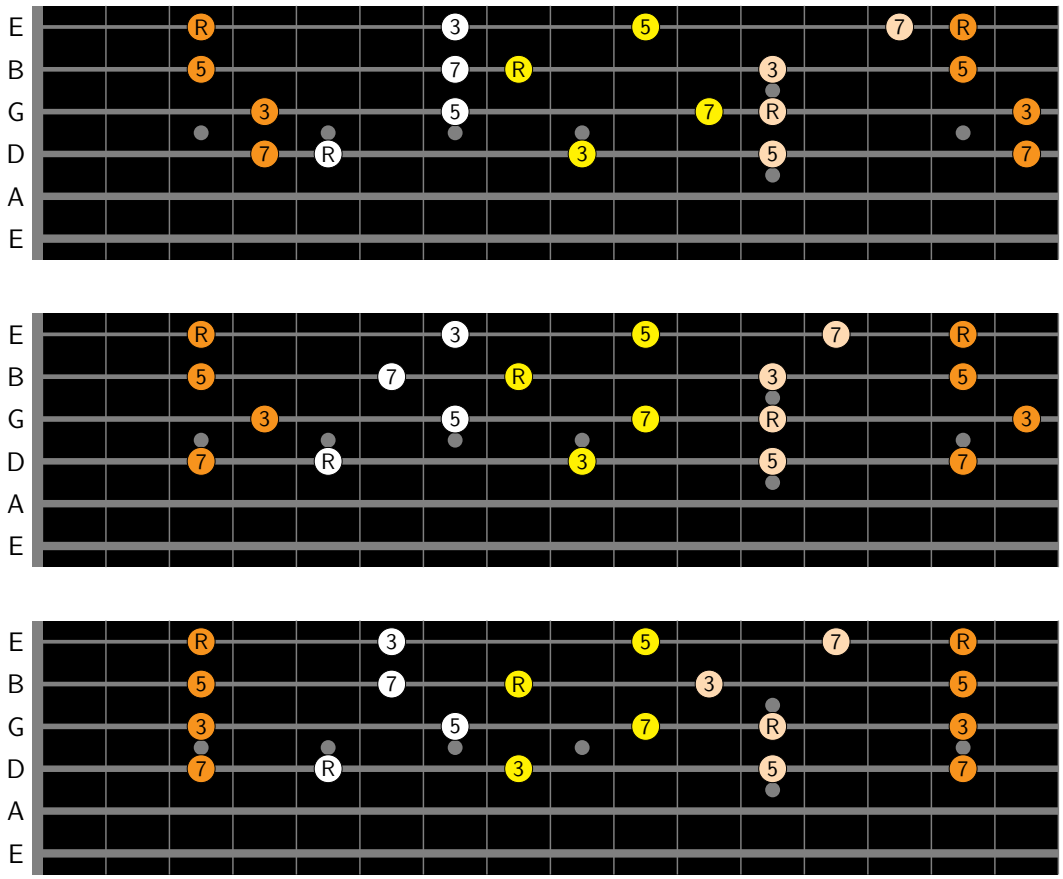

Figure 7: (a) maj7 chords. (b) Dominnt 7 chords. (c) m7 chords

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
- Transistion 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 (Vsub/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

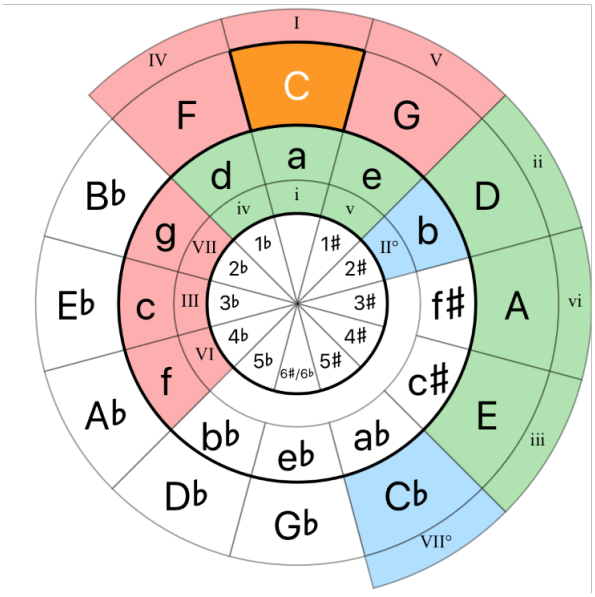

Figure 8

4 Arpeggios

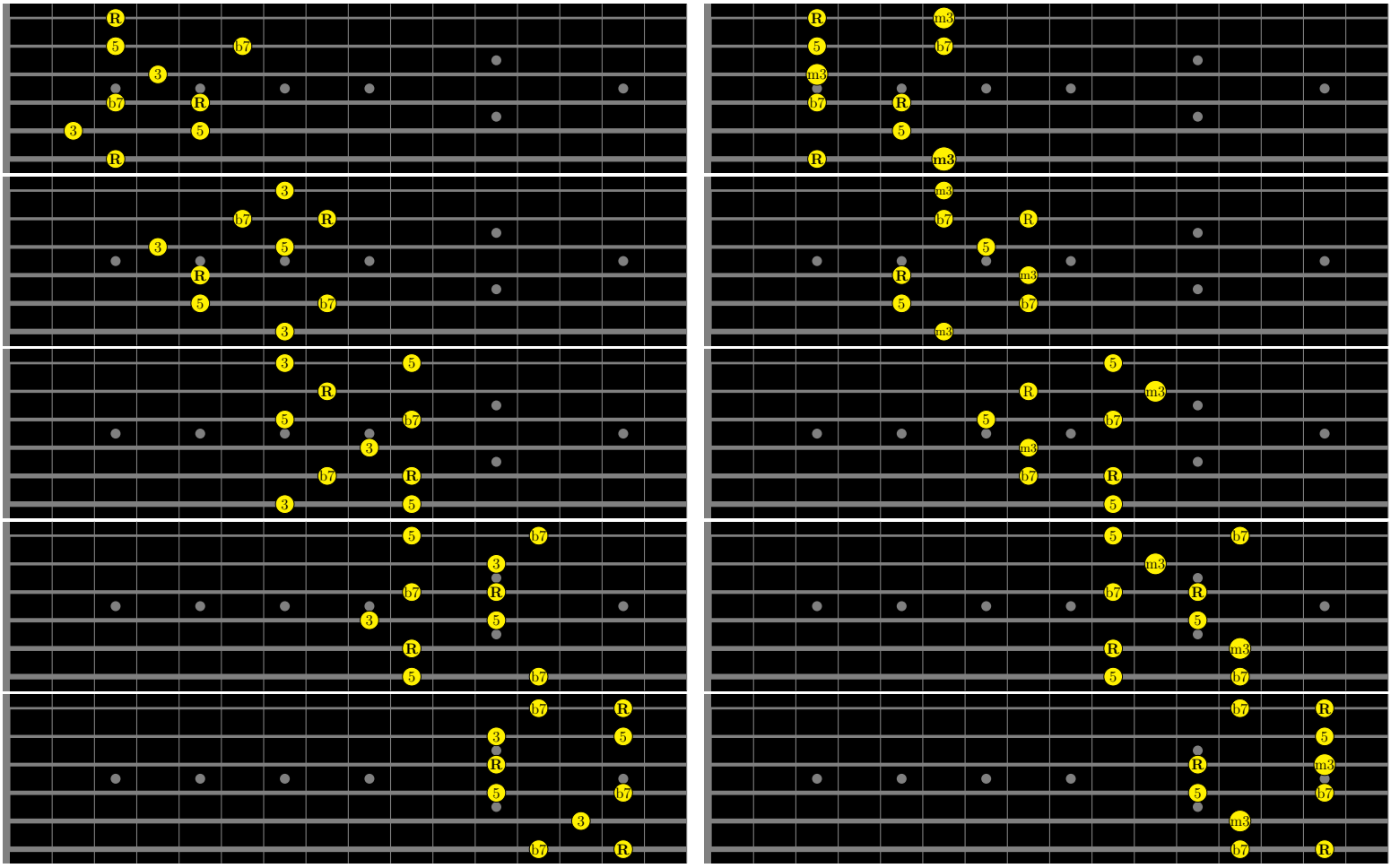

Table 10: (left) dom7 arpeggio. (right) m7 arpeggio

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)

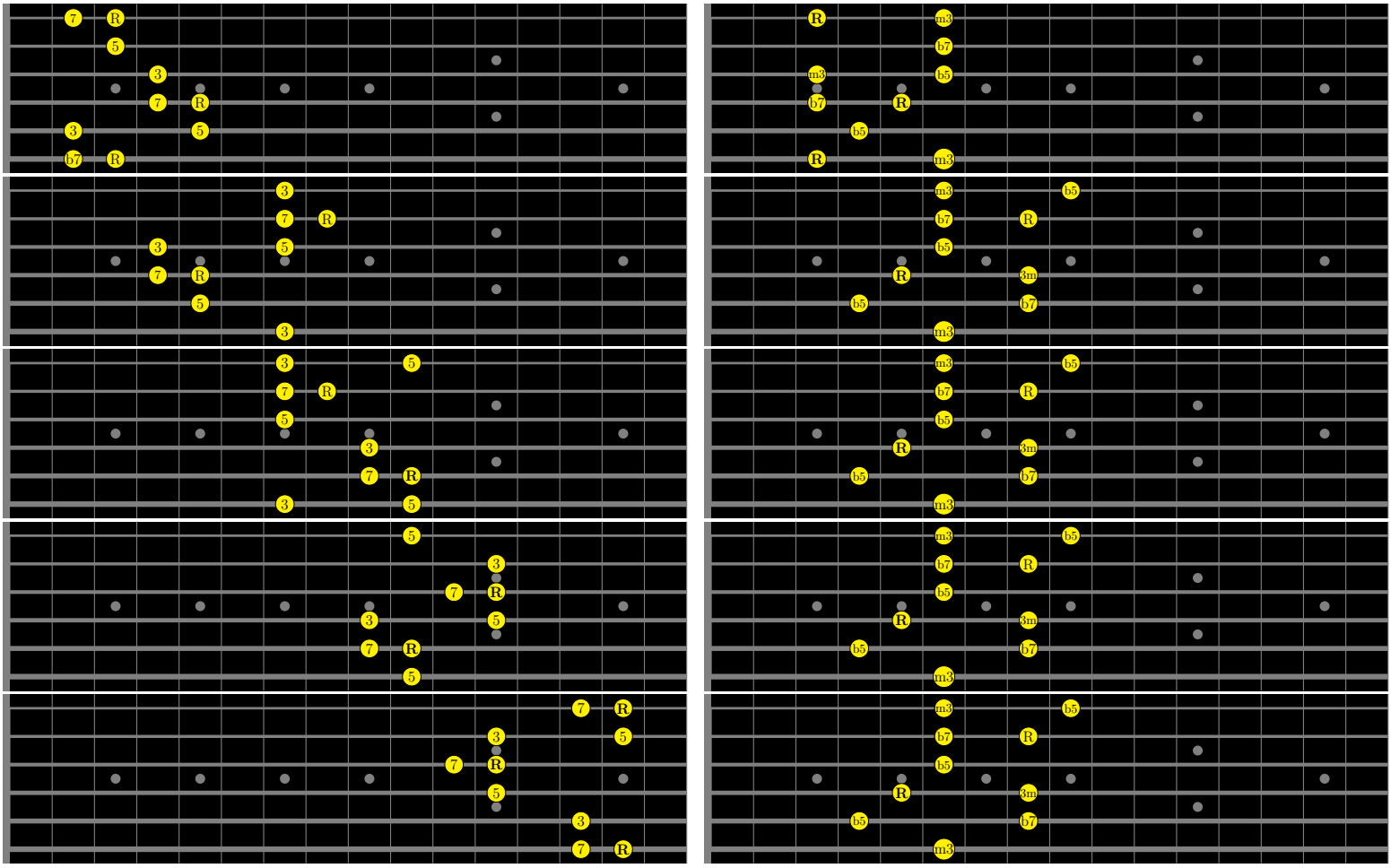

Table 11: (left) maj7 arpeggio. (right) m7b5 arpeggio

6 Transposition

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

7 Composition variation (Shred Master Scott)

- Pedal tone
- Inversion
- Voice leading