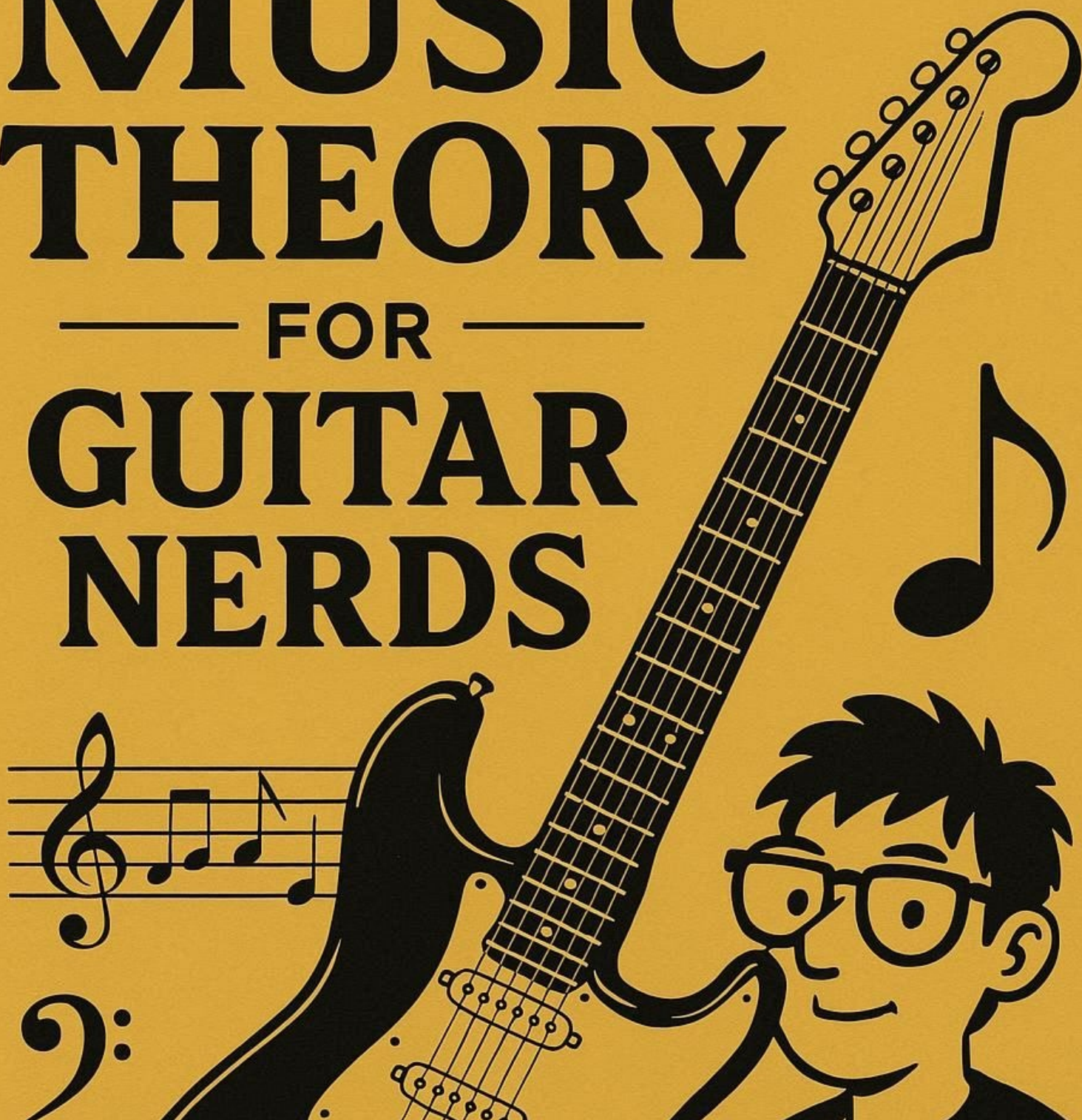


# MUSIC THEORY

— FOR —

# GUITAR NERDS



# Music theory for guitar nerds

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- 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

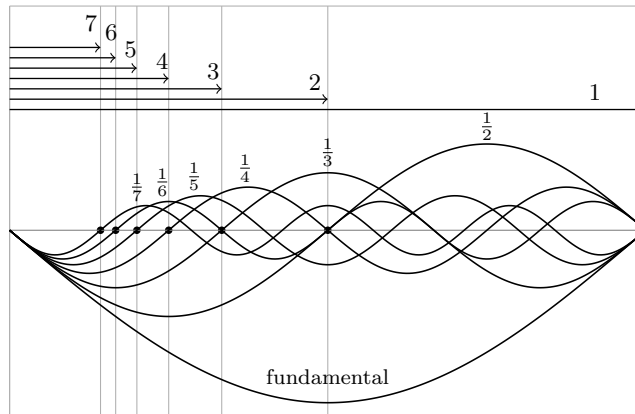


Figure 1: The harmonic series

### 1.2 Intervals definition

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

### 1.3 Consonance and dissonance

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	$31/16 = 1.9375$		

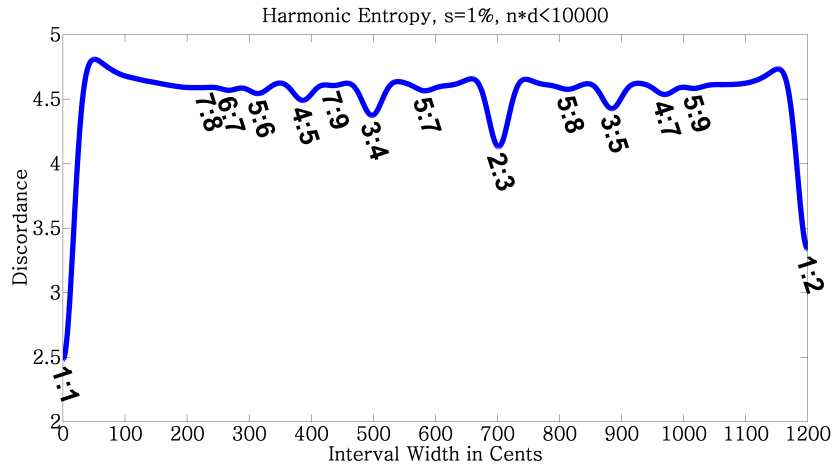


Figure 2: Harmonic entropy

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 for scales	Songs
0	Perfect unison	R	-
1	Minor second	b2	JAWS theme
2	Major second	2	<b>Frère</b> Jacques
3	Minor third	b3	Iron Man by Black Sabbath
4	Major third	3	” <b>Oh-When</b> the Saints”
5	Perfect fourth	4	Here Comes the Bride (Wedding song)
6	Triton	b5,#4	” <b>The - Simp</b> -sons”
7	Perfect fifth	5	” <b>Twinkle - Twinkle</b> Little Star”
8	Minor sixth	b6,#5	The Entertainer
9	Major sixth	6, bb7	Jingle Bells (” <b>Dash-ing</b> through the snow”)
10	Minor seventh	b7	Theme song Star Trek : The Original Series
11	Major seventh	7	Take On Me (”Take-on”)
12	Perfect octave	8	” <b>Some-where</b> over the rainbow”
13	Minor ninth	b9	
14	Major ninth	9	
15	Augmented ninth	#9	
16	Diminished eleventh	b11	
17	Perfect eleventh	11	
18	Augmented eleventh	#11	
20	Minor thirteenth	b13	
21	Major thirteenth	13	

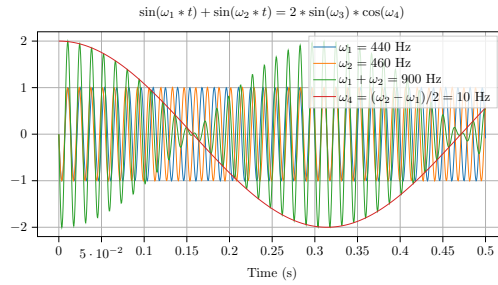


Figure 3: Beat tone

## 2 Scales

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

Scale name	Formula							Comment
Major	1	2	3	4	5	6	7	
Natural minor	1	2	b3	4	5	b6	b7	
Harmonic minor	1	2	b3	4	5	b6	<span style="border: 1px solid black;">7</span>	
Melodic minor	1	2	b3	4	5	<span style="border: 1px solid black;">6</span>	7	
Pentatonic Major	1	2	3	-	5	6	-	
Pentatonic minor	1	-	b3	4	5	-	b7	
Ionian (Major)	1	2	3	4	5	6	7	
Dorian	1	2	b3	4	5	<span style="border: 1px solid black;">6</span>	b7	Mad world, So What
Phrygian	1	<span style="border: 1px solid black;">b2</span>	b3	4	5	b6	b7	Symphony of destruction
Lydian	1	2	3	<span style="border: 1px solid black;">#4</span>	5	6	7	Legend of Zelda
Mixolydian	1	2	3	4	5	6	<span style="border: 1px solid black;">b7</span>	Clock by Coldplay
Aeolian (natural minor)	1	2	b3	4	5	b6	b7	Smell Like Teen Spirit
Locrian	1	b2	b3	4	<span style="border: 1px solid black;">b5</span>	b6	b7	Rush-YYZ intro
Ionian b6	1	2	3	4	5	b6	7	
Dorian #4 (4 <sup>th</sup> Harm. min)	1	2	b3	#4	5	6	b7	Klezmer music (Jewish)
Phrygian dominant (5th Harm. min)	1	b2	3	4	5	b6	b7	Flamenco, <i>Come out and play</i>
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 fretboard positions

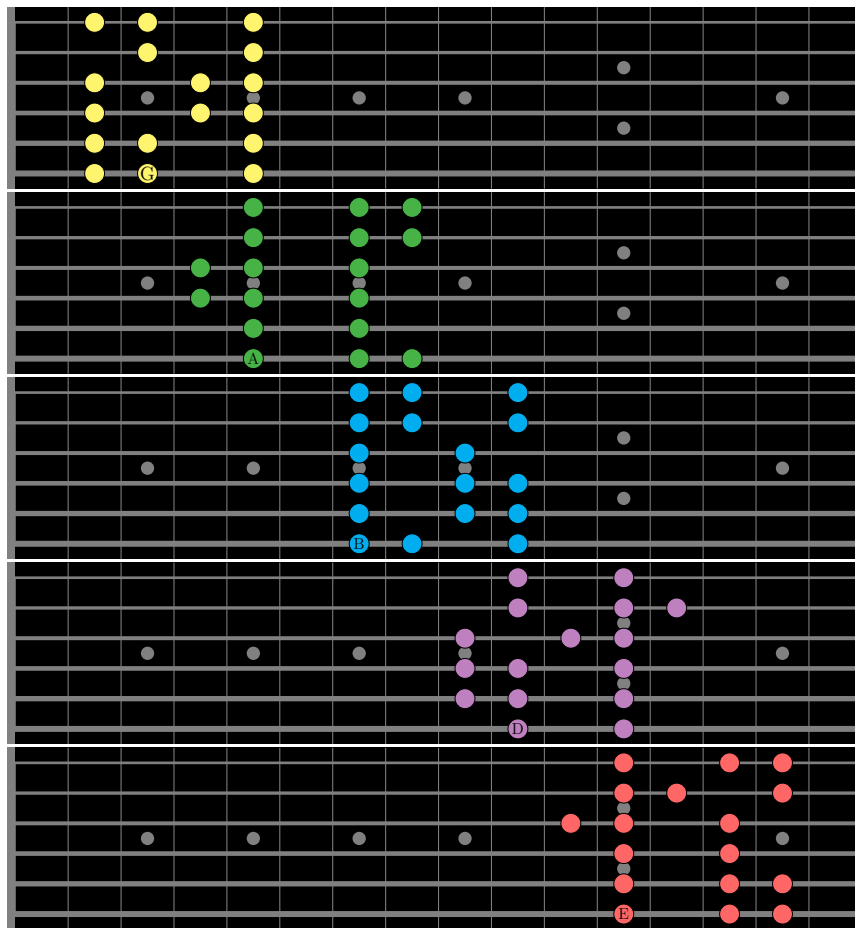


Figure 4: G Major scale on the fretboard position 1, 2, 3, 4 and 5.



## 2.2 Pentatonic scale on the fretboard

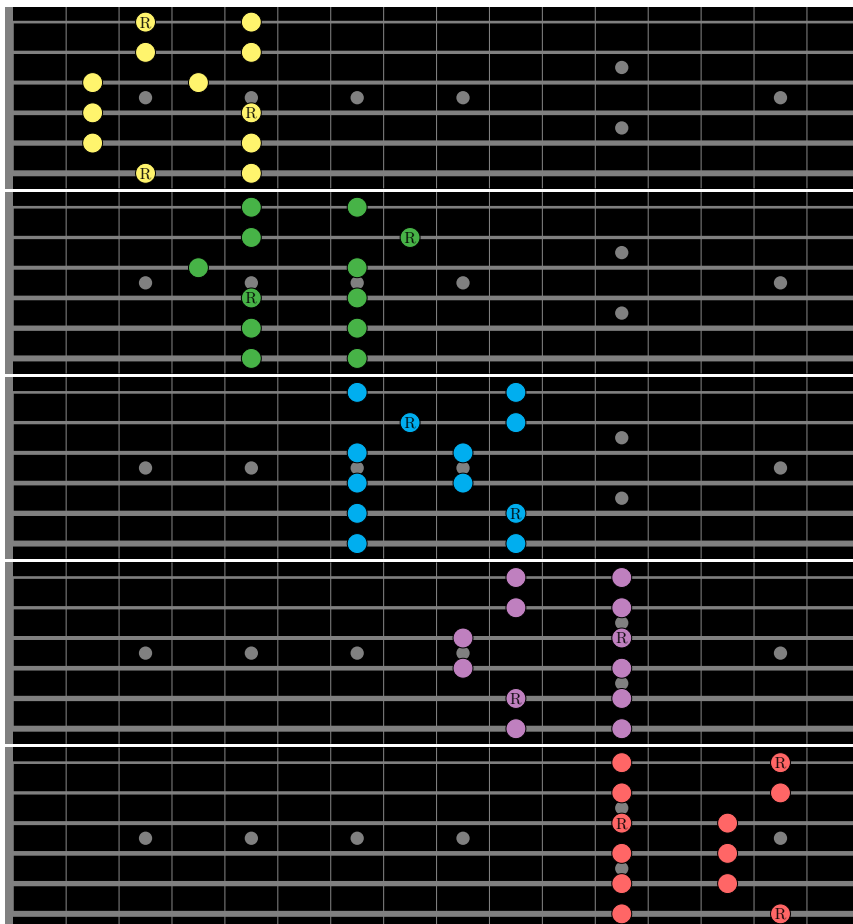


Figure 5: Pattern of pentatonic scales

## 2.3 Minor melodic scale

## 2.4 Minor harmonic scale

## 2.5 Diminished scale

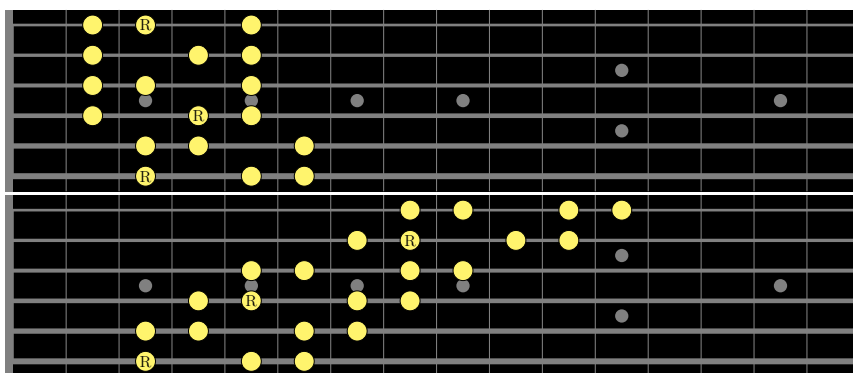


Figure 6: G diminished scales with two fingering.

### 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

arydshln

Table 4: Construction of chords (notation is relative to the major scale)

chord		symbol					name	
triad	m		1	3	5	major		
	dim	◦	1	b3	5	minor		
			1	b3	b5	diminished		
	aug	+	1	3	#5	augmented		
sus2			1	2	5	suspended 2nd		
sus4			1	4	5	suspended 4th		
tetrad	7		1	3	5	b7	dominant 7th	
	maj7	Δ, M7	1	3	5	7	major 7th	
	m7	-7	1	b3	5	b7	minor 7th	
	m7b5	∅	1	b3	b5	b7	half-diminished	
	dim7	◦7	1	b3	b5	b7	fully-diminished	
	mM7	mΔ	1	b3	5	7	minor major 7th	
	maj7(#5)	+Δ	1	3	#5	7	augmented major 7th	
	7(#5)	+7	1	3	#5	b7	augmented 7th	
6			1	3	5	6		
m6			1	b3	5	6		
b6			1	3	5	b6		
m(b6)			1	b3	5	b6		
m6/9			1	b3	6	9		
6/9			1	3	6	9		
add9			1	3	5	9		
m(add9)			1	b3	5	9		
7sus4			1	4	5	b7		
add2			1	2	3	5		
pentad	9		1	3	5	b7	9	Dominant 9th
	maj9	Δ9	1	3	5	7	9	major 9th
	7b9		1	3	5	b7	b9	
	m9		1	b3	5	b7	9	minor 9th
	mM9		1	b3	5	7	9	minor major 9th
sus9			1	4	5	b7	9	
11			1	5	b7	9	11	
hexad	7(13)		1	3	5	b7	9	13
	7(b9,13)		1	3	5	b7	b9	13

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

### 3.2 Diatonic chords

Table 5: 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 $^{\Delta}$	IV $^7$	v $^{-7}$	vi $^{\emptyset}$	bVII $^{\Delta}$

Table 6: 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 $\sharp$	G $\sharp$	A $\sharp$	B	C $\sharp$	D $\sharp$	E $\sharp$
#####	B	C $\sharp$	D $\sharp$	E	F $\sharp$	G $\sharp$	A $\sharp$
####	E	F $\sharp$	G $\sharp$	A	B	C $\sharp$	D $\sharp$
###	A	B	C $\sharp$	D	E	F $\sharp$	G $\sharp$
##	D	E	F $\sharp$	G	A	B	C $\sharp$
#	G	A	B	C	D	E	F $\sharp$
-	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>A</b>	<b>B</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 Extended chords

<https://music.stackexchange.com/questions/108060/extended-chord-types-for-all-major-scale-degrees>

### 3.4 Chord inversions

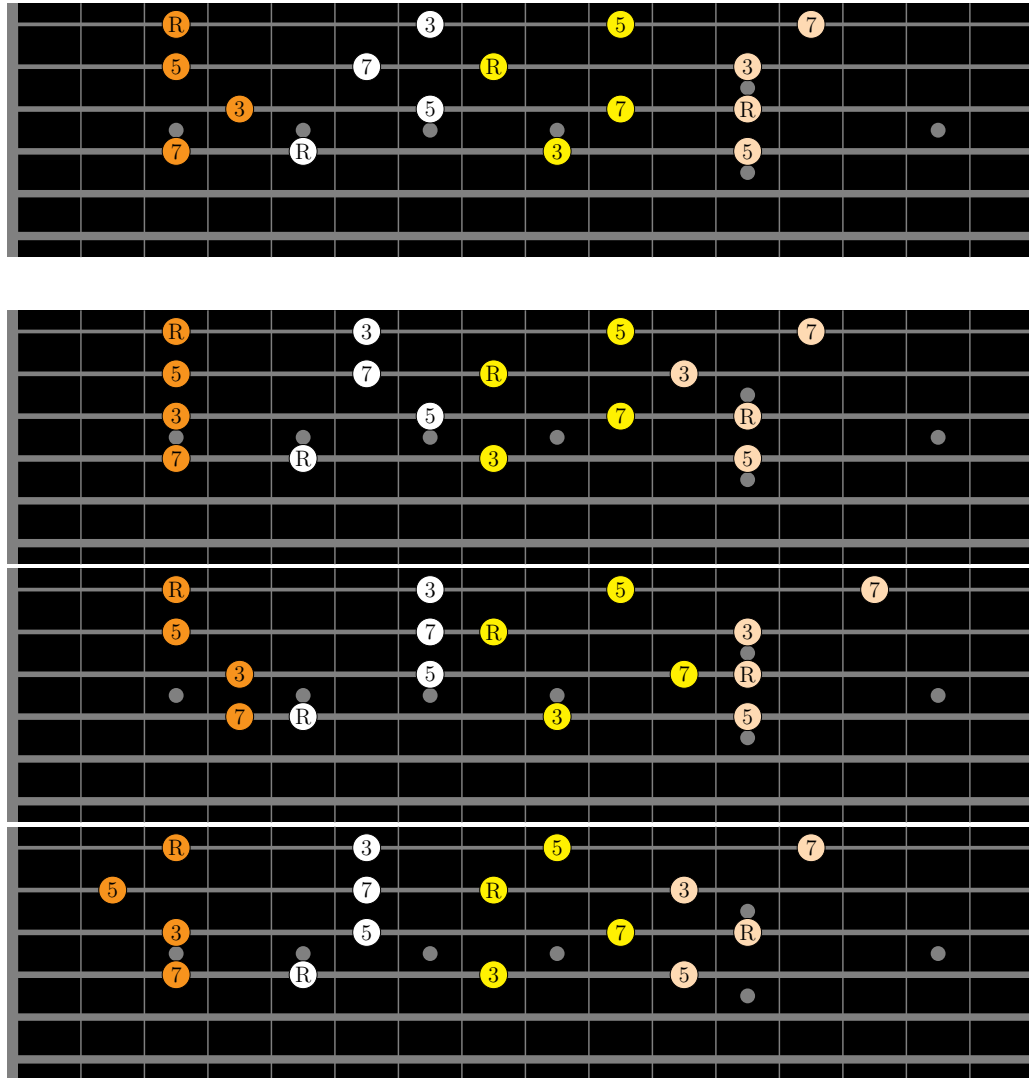


Figure 7: Chord inversion on the D string. (a) dom7 chords. (b) m7 chords. (c) maj7 chords. (d) m7b5 chords

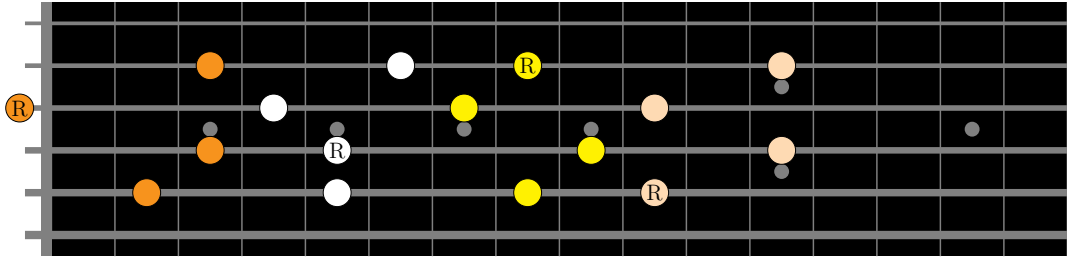


Figure 8: Chord inversion on the A string. (a) dom7 chords. (b) m7 chords. (c) maj7 chords. (d) m7b5 chords

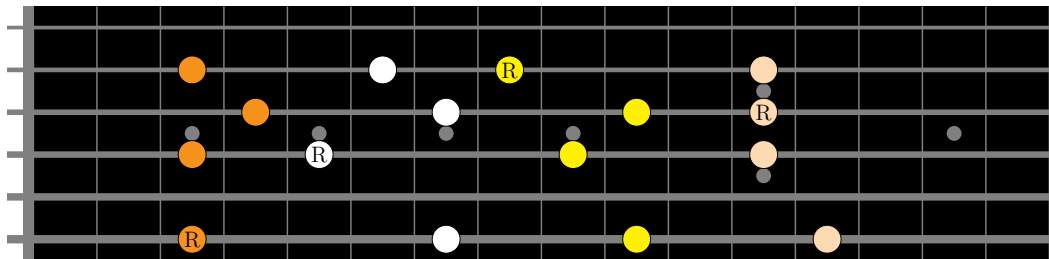


Figure 9: Chord inversion on the E string. (a) dom7 chords. (b) m7 chords. (c) maj7 chords. (d) m7b5 chords

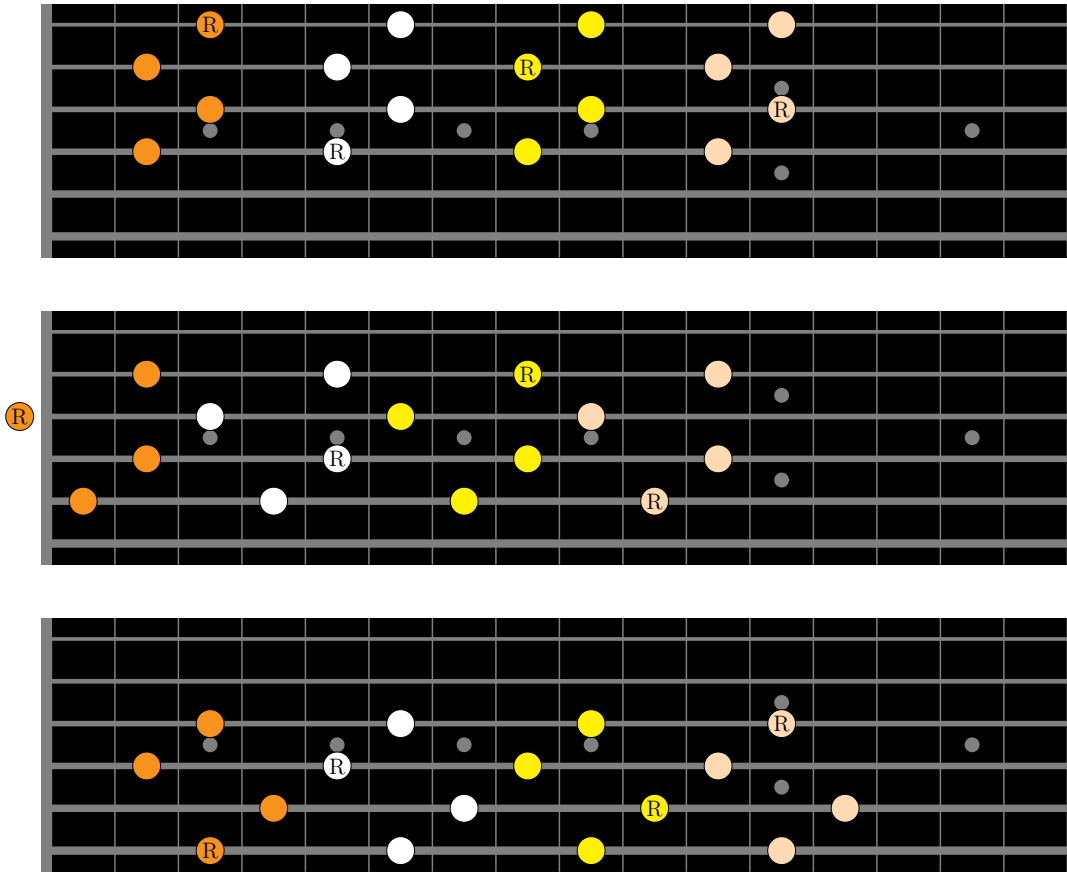


Figure 10:  $G^{\circ 7}$  inversion ( $G^{\circ 7}$ ,  $Bb^{\circ 7}$ ,  $Db^{\circ 7}$ ,  $E^{\circ 7}$  )



## 4 Harmony

### 4.1 Chord progression and example

Table 7: 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

### 4.2 Chord substitution

#### 4.2.1 Tritone substitution

Table 8: Tritone substitution: Substitute V7 chord by a 7 chord a tritone above tonic.

$ii^7$	$V^7$	$I^\Delta$	%
$ii^7$	$bII^7$	$I^\Delta$	%

#### 4.2.2 Backdoor II-V

#### 4.2.3 Secondary dominant

Table 9: Backdoor II-V: modal interchange

ii <sup>7</sup>	V <sup>7</sup>	I <sup>Δ7</sup>	%
iv <sup>7</sup>	bVII <sup>7</sup>	I <sup>Δ7</sup>	%

Table 10: Secondary dominant

%	ii <sup>7</sup>	V <sup>7</sup>	I <sup>Δ7</sup>
VI <sup>7</sup>	ii <sup>7</sup>	V <sup>7</sup>	I <sup>Δ7</sup>

Table 11: Dominant to diminished 7: Replace dominant chord by a diminished 7 chord half step above the root or major third above. Dominant G7 replace by Bdim7 or Ddim7 or Fdim or Abdim7

ii <sup>7</sup>	V <sup>7</sup>	I <sup>Δ7</sup>	%
ii <sup>7</sup>	bIV <sup>o</sup>	I <sup>Δ7</sup>	%

#### 4.2.4 Dominant to diminished 7

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.
- Transistion Chords:
  - 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)

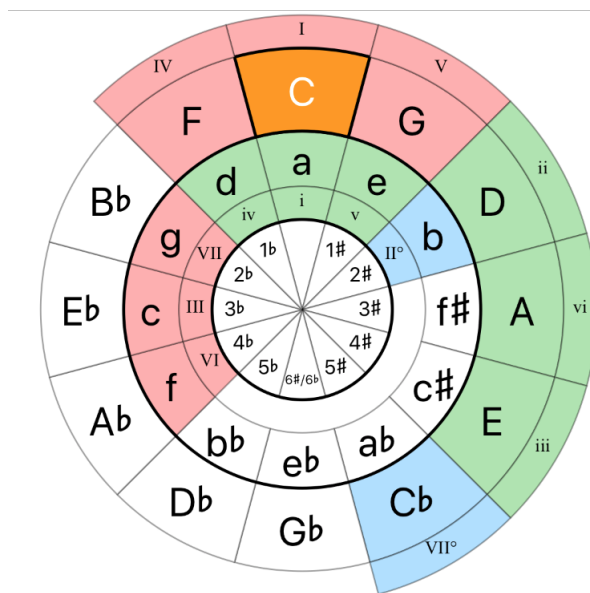


Figure 11

- Substitution tritonique
- Substitution diatonique

## 5 Arpeggios

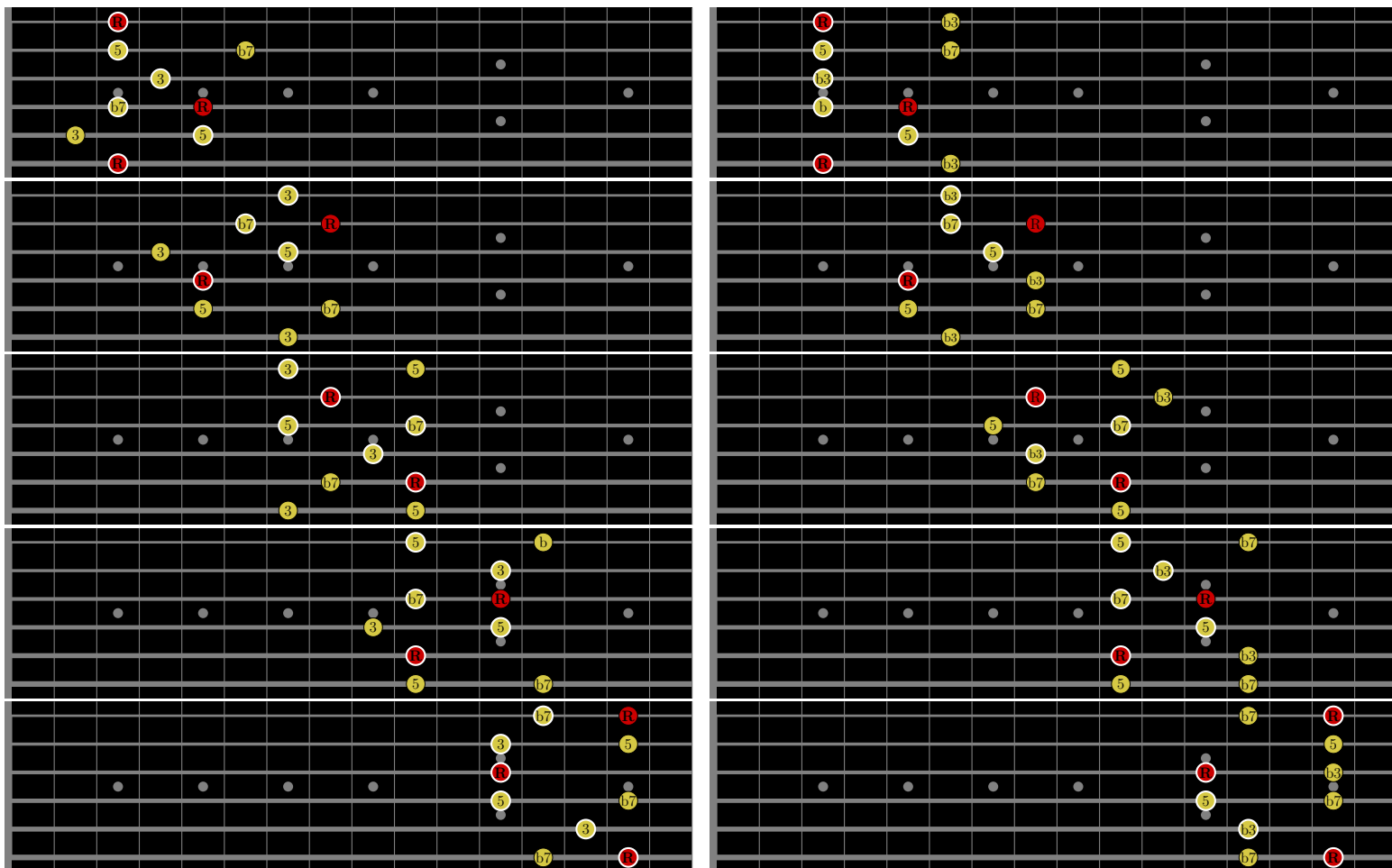


Figure 12: (left) dom7 arpeggio. (right) m7 arpeggio. E-shape position, D-shape position, C-shape position, A-shape position, G-shape position (CAGED system)

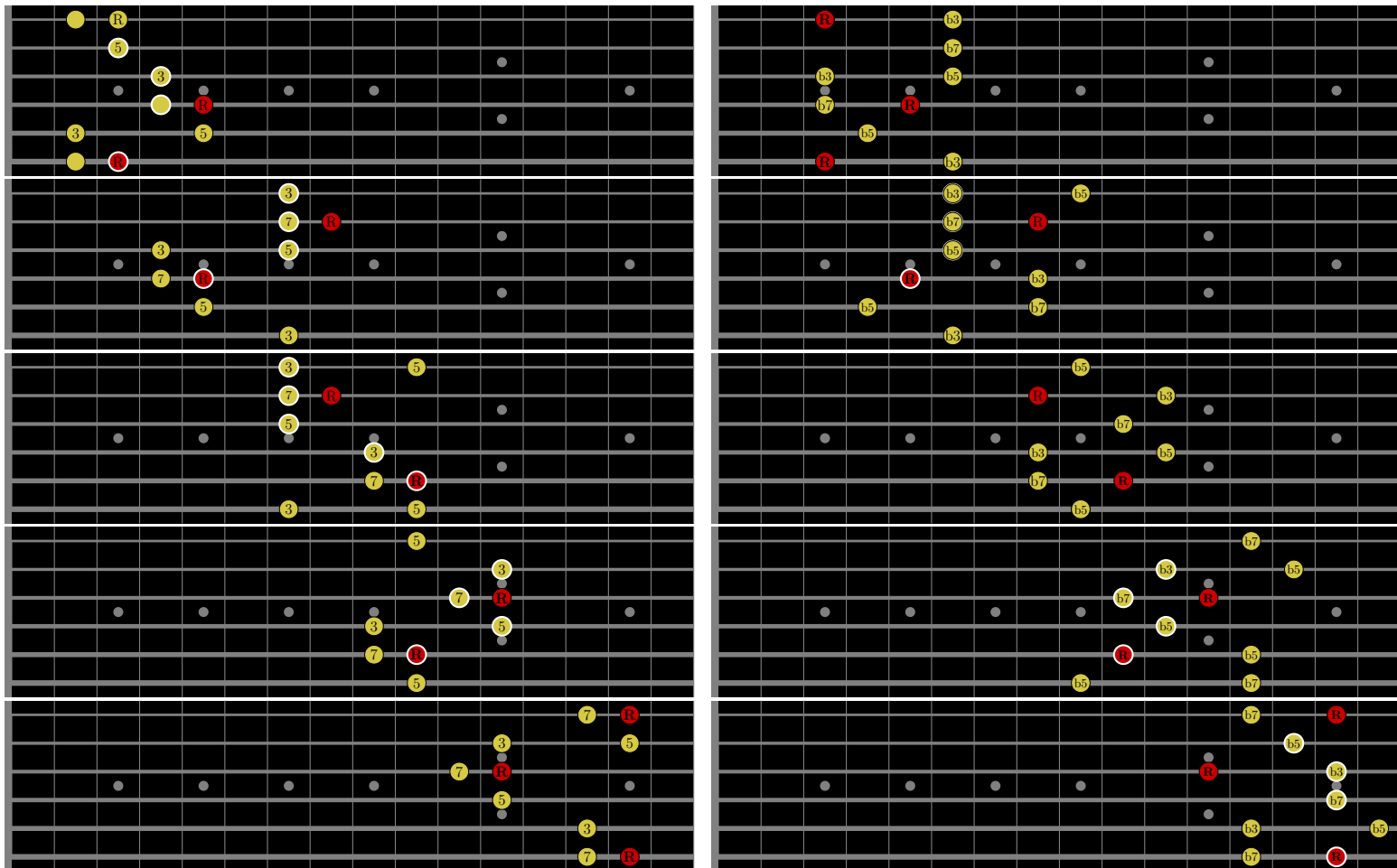


Figure 13: (left) maj7 arpeggio (EDCAG). (right) m7b5 arpeggio

## 6 Blues

### 6.1 Blues scales

Table 12: Blues scales (relative to the major scale)

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

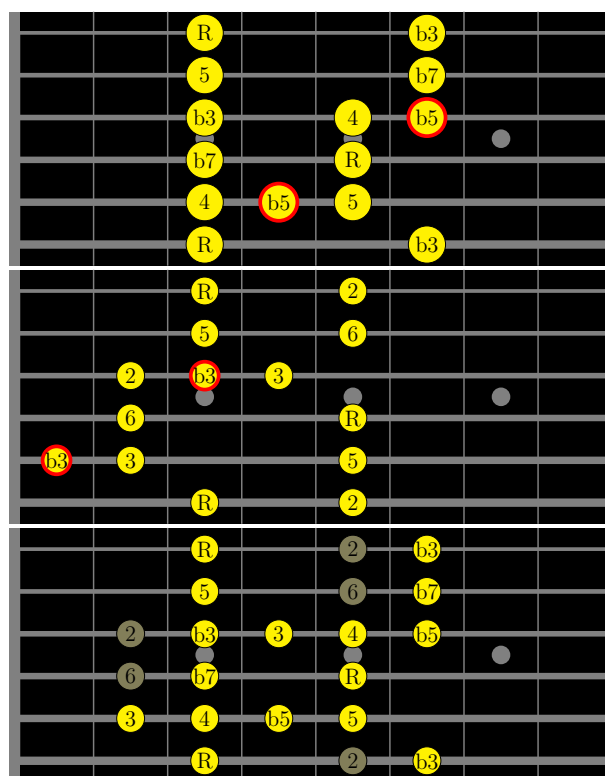


Figure 14: (a) Minor blues scale with blue note (b5). (b) Major blues pentatonic scale. (c) Blues scale

### 6.2 12-bar blues chord progression

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

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

I7	IV7	I7	I7
IV7	IV7	I7	VI7
ii7	V7	I7	ii7 - V7

Figure 15: (a) Basic Blues chord progression. (b) minor blues chord progression.  
(c) Basic Jazz Blues chord progression

## 7 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)



## 8 Transposition

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

## 9 Composition variation (Shred Master Scott)

- Pedal tone
- Inversion
- Voice leading

## References

- [1] Jake Lizzio. *Chord Progression Codex*. 2023.