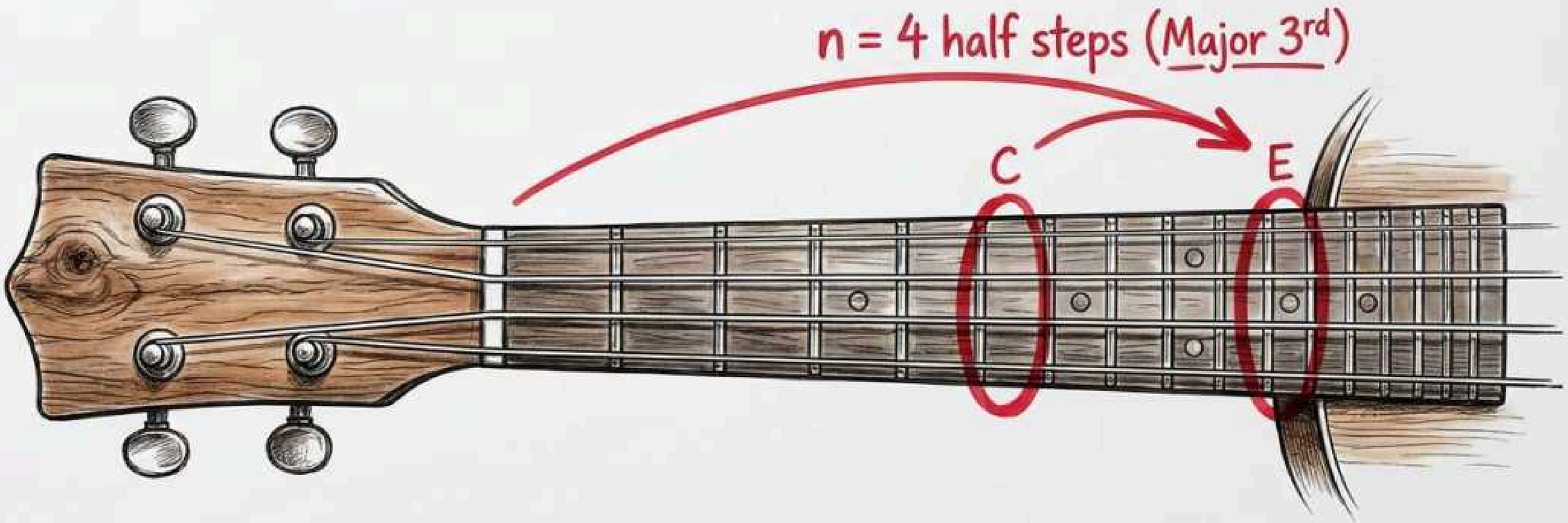
Defining the Interval

¶ 4.1

$$\text{Interval} = |\text{Note}_2 - \text{Note}_1|$$

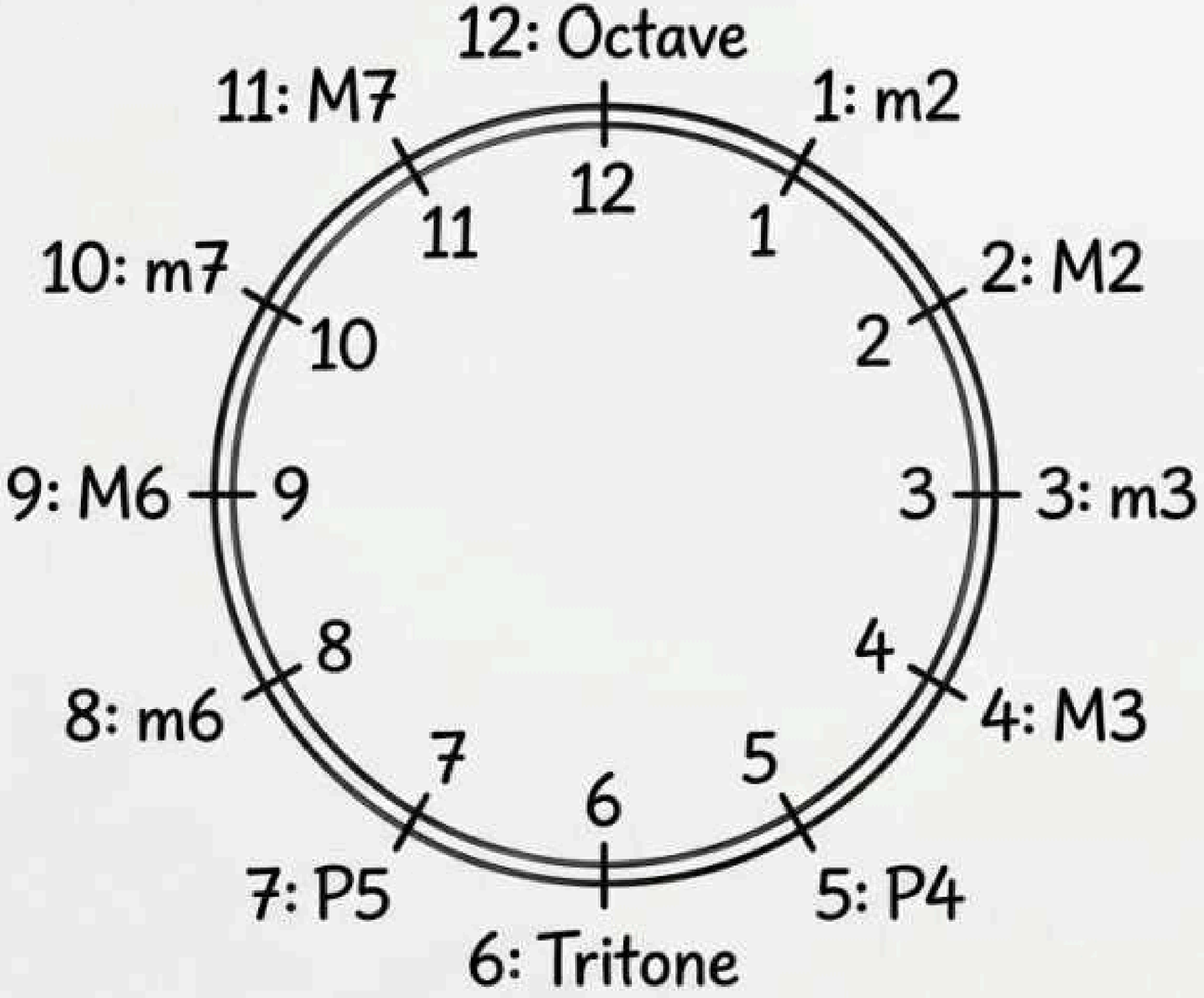
(measured in half-steps / frets)

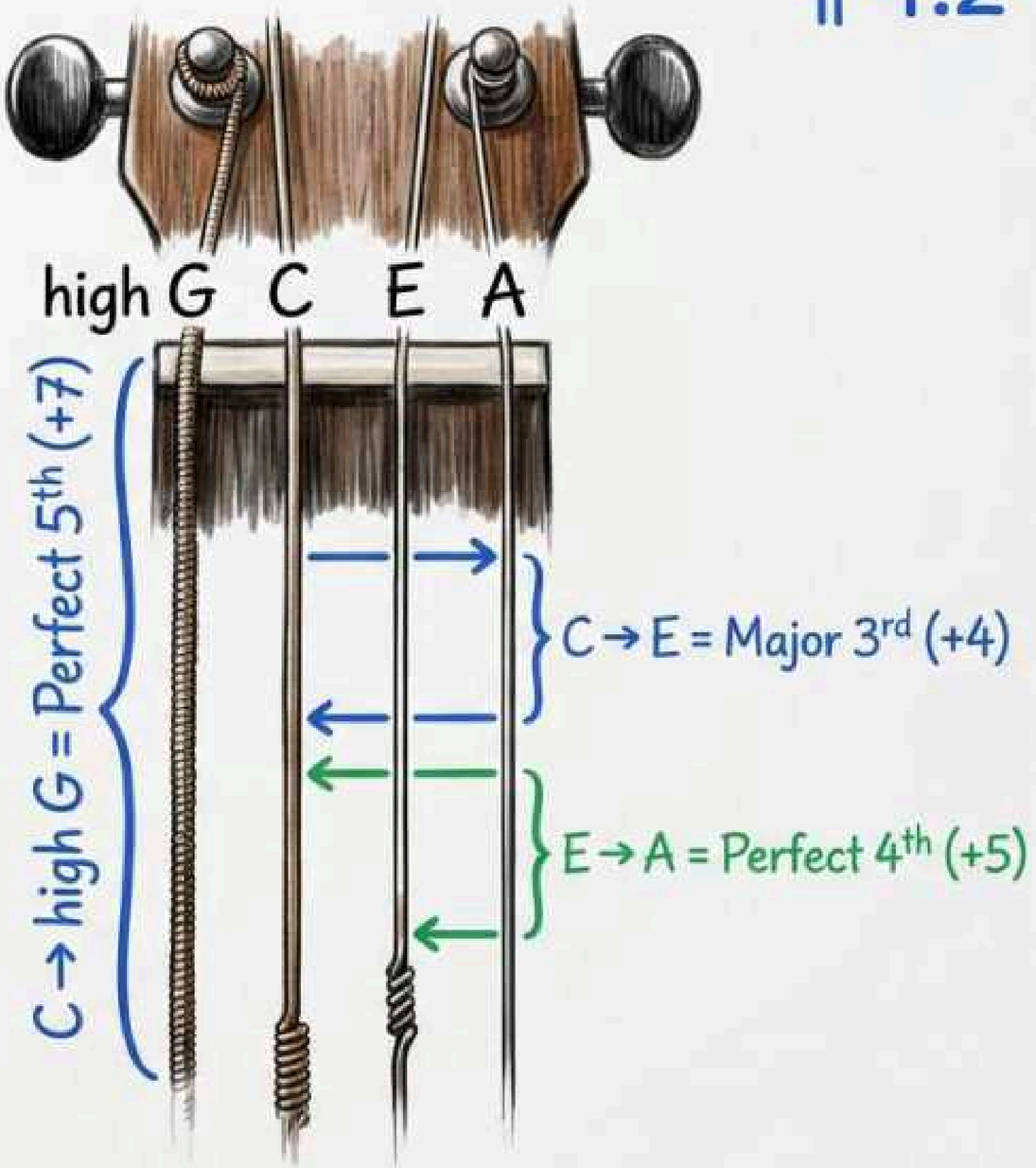
- Core Logic: Span of letter names + Quality of distance
- Example: C to E = Major 3rd (4 half steps)
- Example: C to E^b = Minor 3rd (3 half steps)



The Interval Matrix

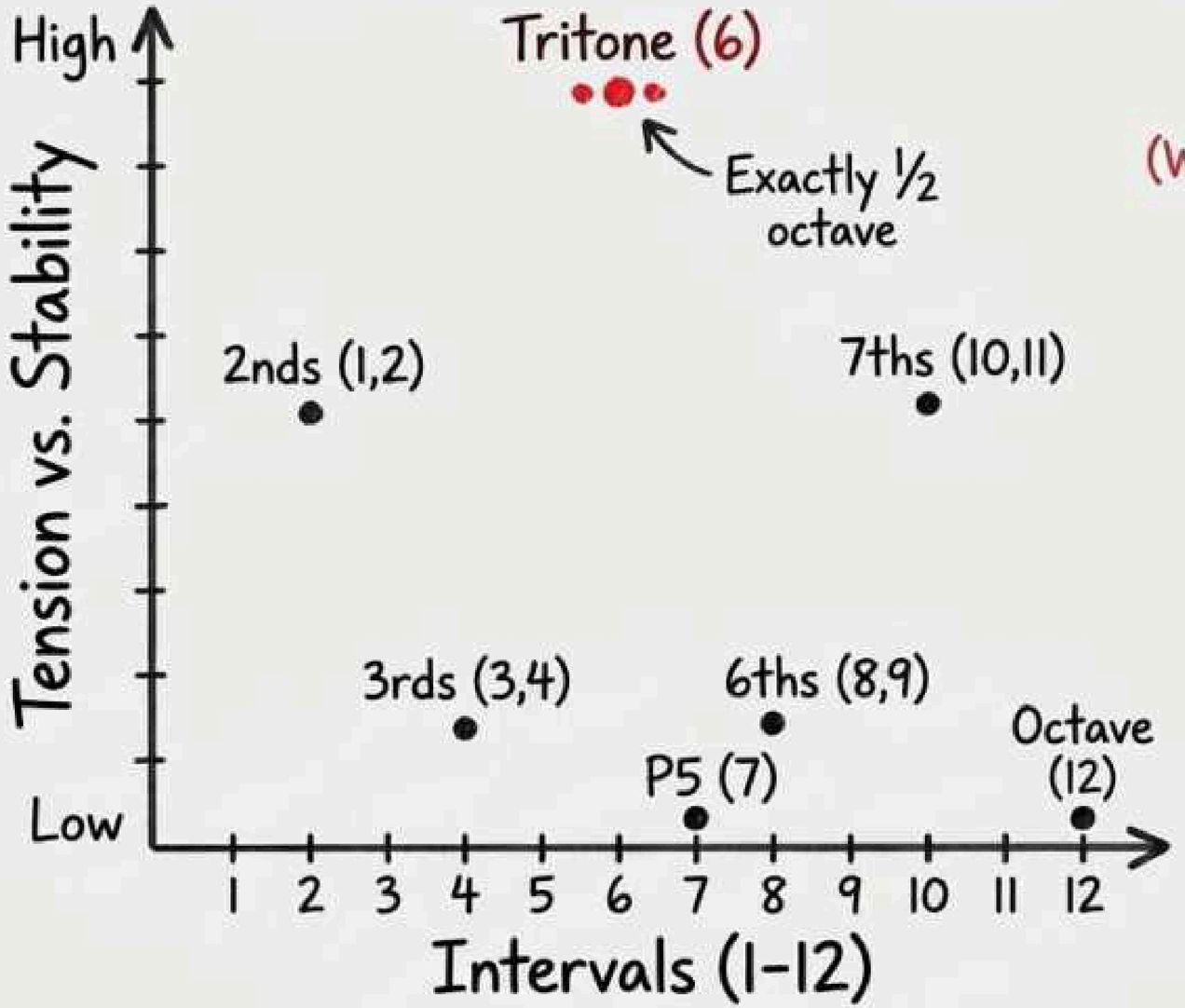
¶ 4.2





The Physics of Tension and Release

¶ 4.3

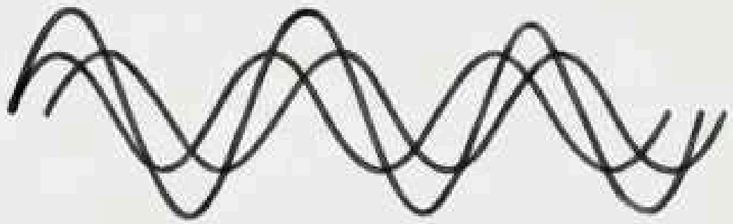


Tense
(Wanting to move)



Tense intervals → Resolve to stable ones

Stable
(Open/Full)



Constructing the Triad

¶ 4.4

Triad = Root + 3rd + 5th



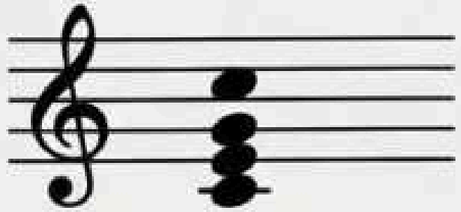
Total span = Perfect 5^{th}

C $\xrightarrow{+4}$ E $\xrightarrow{+3}$ G = C_{maj}

The Four Triad Formulas
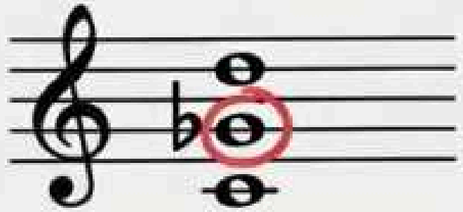
Major

$R + 4_{hs} + 7_{hs}$
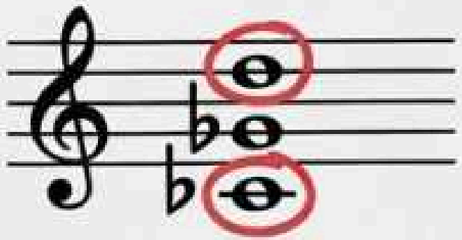


Minor

$R + 3_{hs} + 7_{hs}$
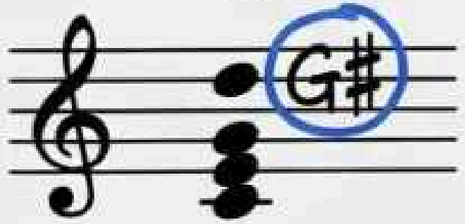


Diminished

$R + 3_{hs} + 6_{hs}$



Augmented

$R + 4_{hs} + 8_{hs}$



Sonic Qualities and the Single Half-Step
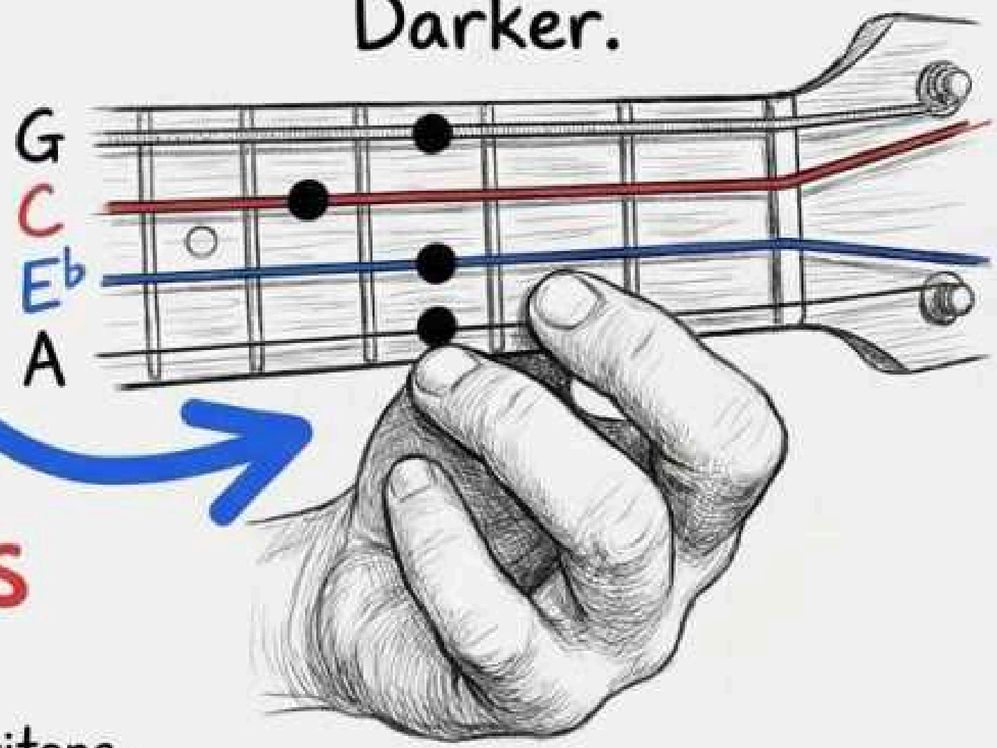
¶ 4.6

Bright, settled.



$-\Delta 1_{hs}$

Darker.



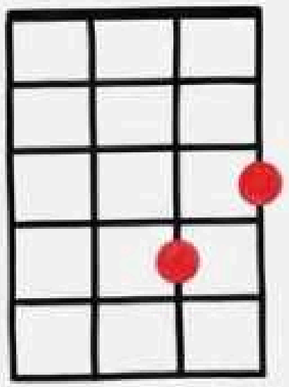
(Diminished = tense/tritone.
Augmented = unresolved/dreamy).

The Four-String Dilemma: Doubling

The Solution: Double one note for fullness without altering the triad formula.

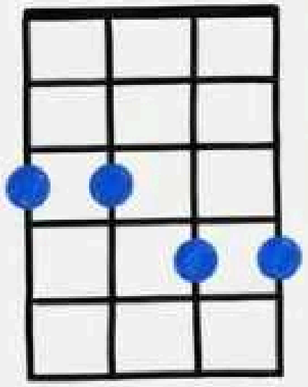


C (0003)



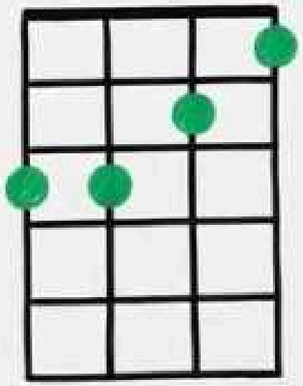
Doubles Root

Am (2000)



Doubles Root

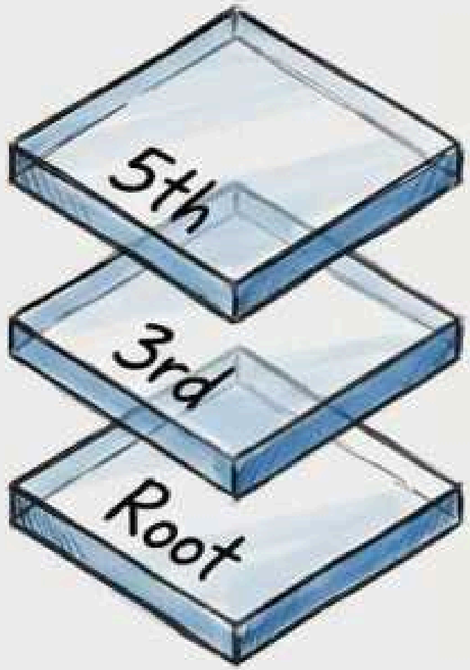
F (2010)



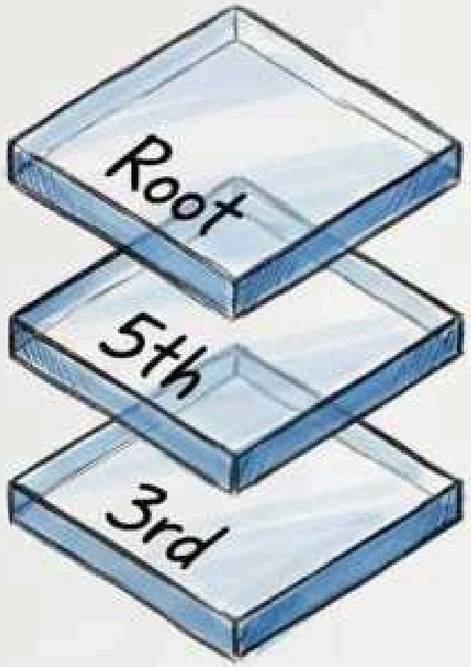
Doubles Third (exception)

Voicing and Inversions

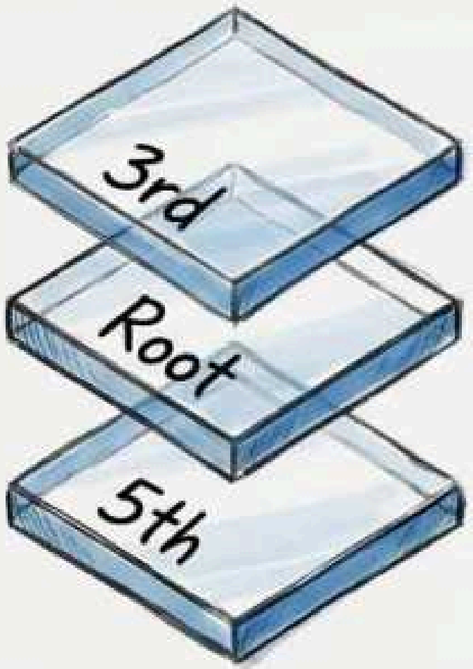
¶ 4.8



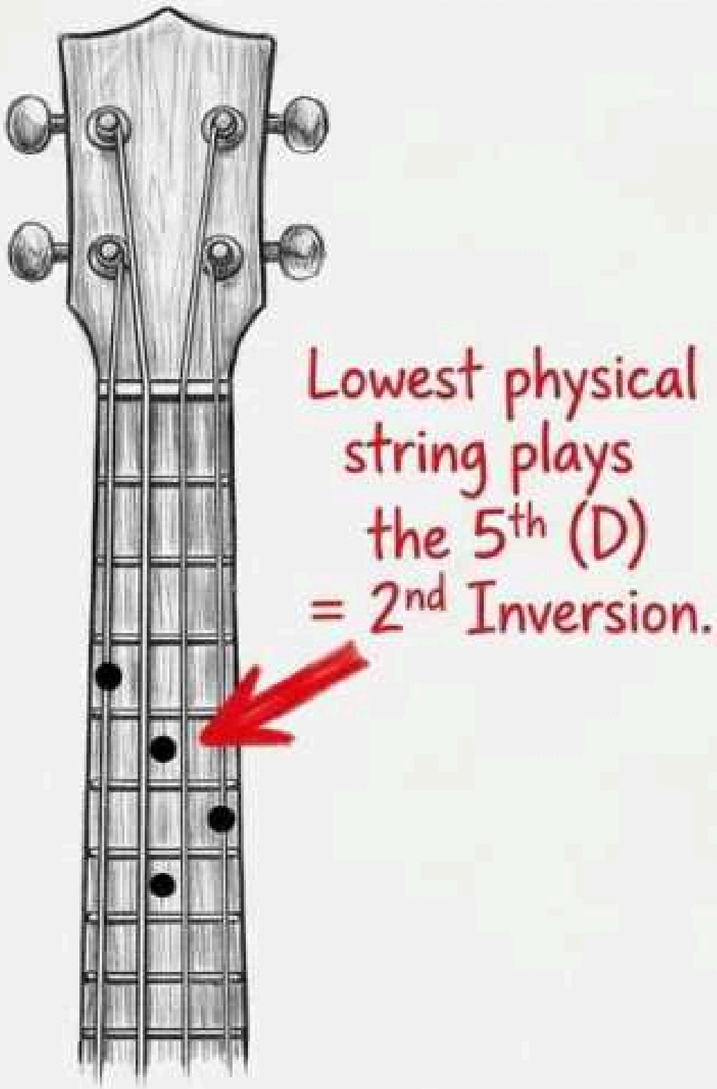
Root Position
(e.g., Open C)



1st Inversion



2nd Inversion

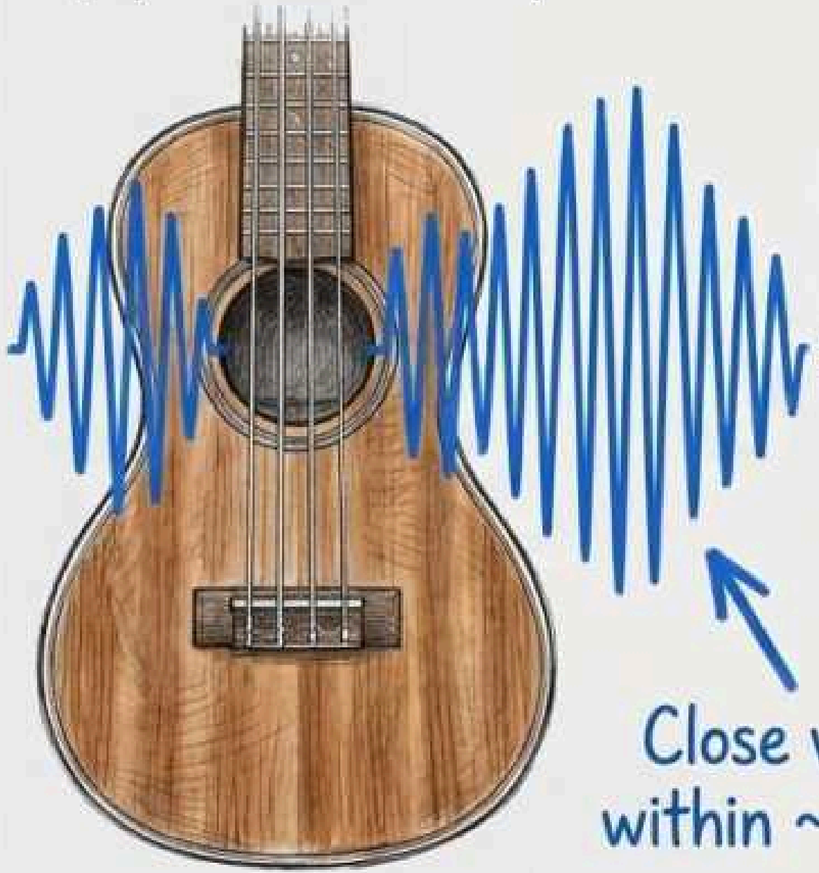


Lowest physical string plays the 5th (D) = 2nd Inversion.

Re-entrant Tuning and Close Voicings

¶ 4.9

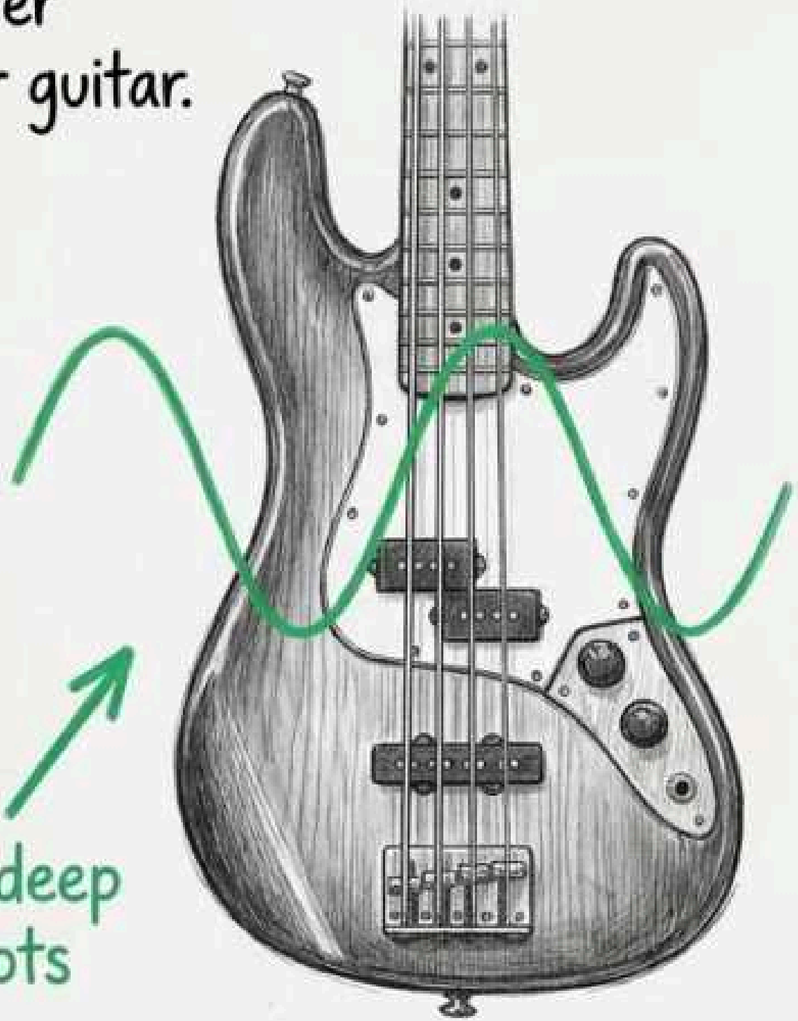
Because the ukulele lacks a true bass note, inversions matter psychoacoustically less to the ear than they do on piano or guitar.



Close voicings within ~1 octave

Acoustic Harmony: The frequencies lock together seamlessly.

Provides deep bass roots



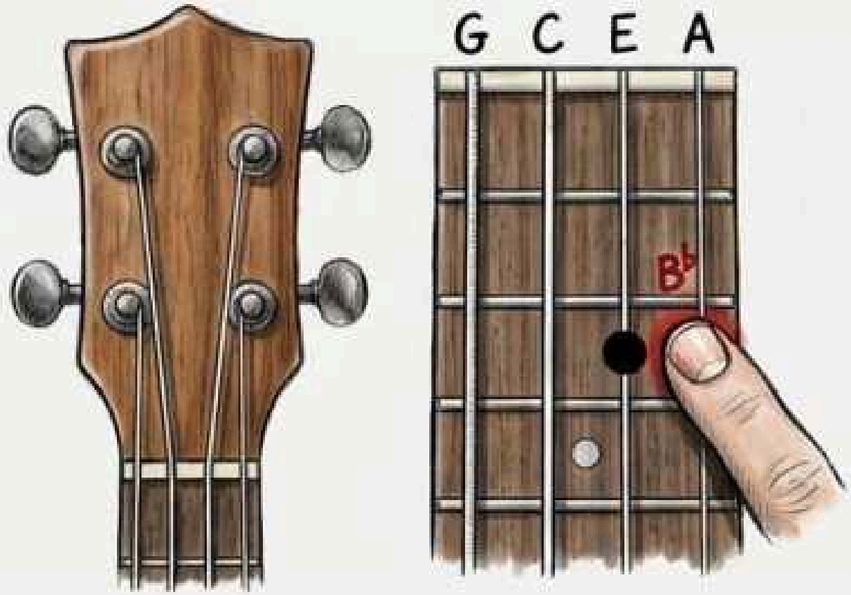
Seventh Chords: Adding the 4th Note

¶ 4.10

7th Chord = Triad + Another Third

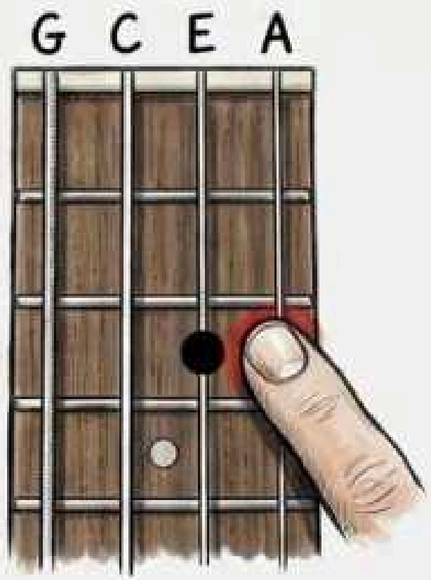
Dominant 7th (C7)

{C, E, G} + Bb



Major 7th (Cmaj7)

{C, E, G} + B

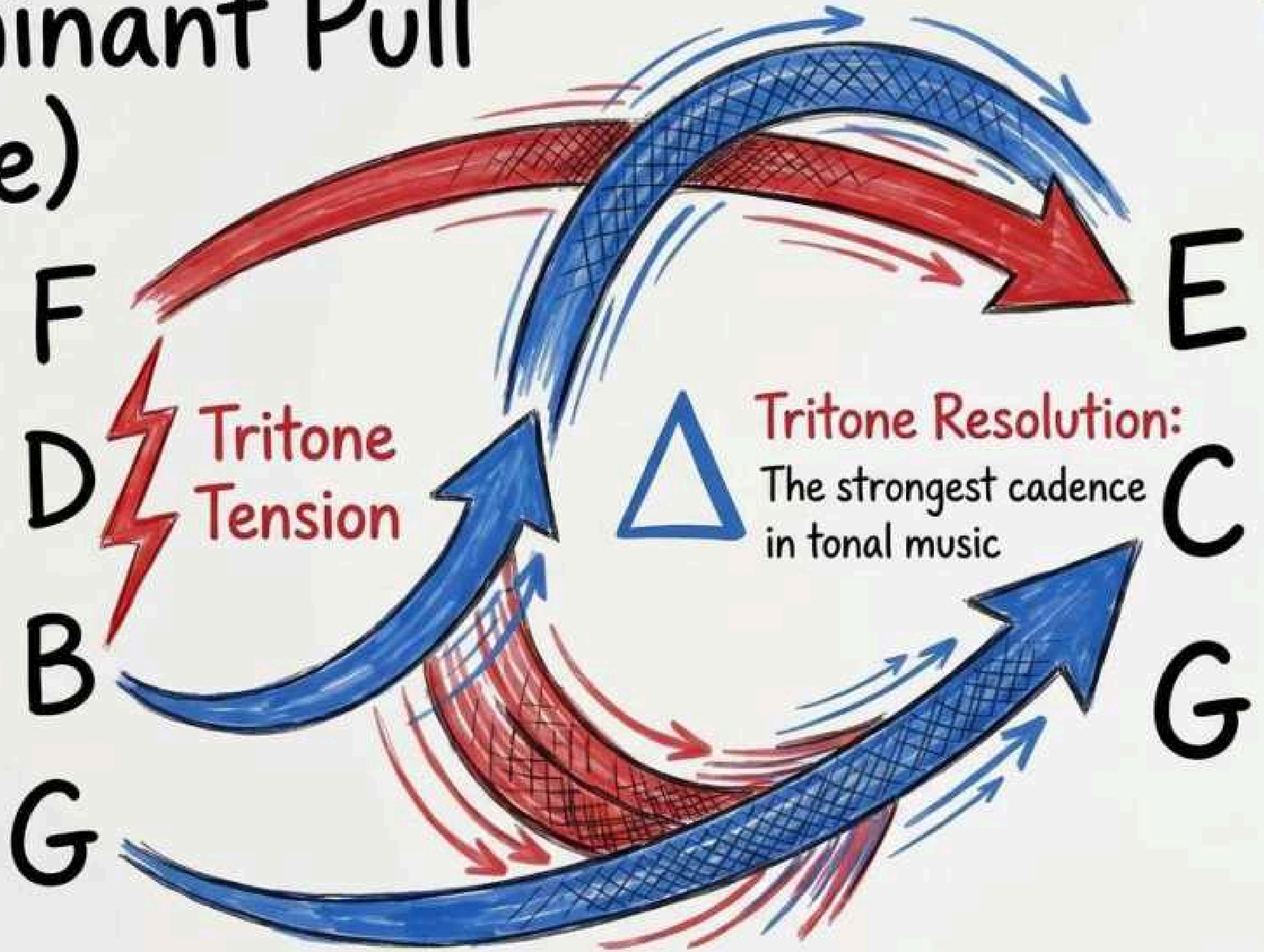


Minor 7th (Am7)

{A, C, E} + G



The Dominant Pull (Cadence)

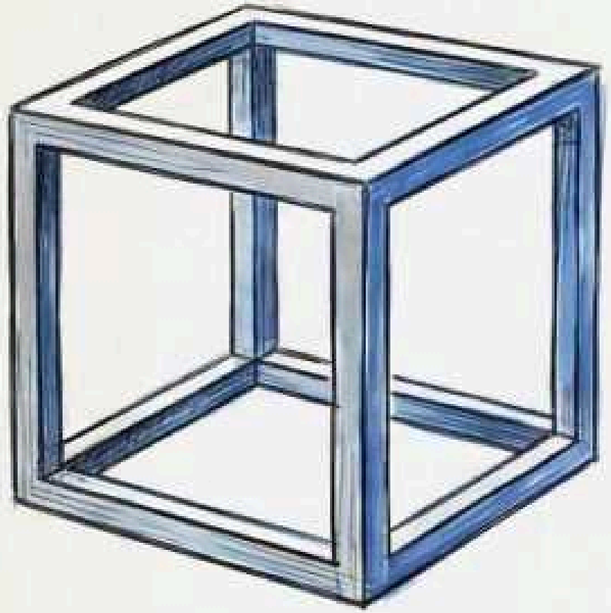


Sixth Chords and Ambiguity

¶ 4.12

$$Am7 \equiv C6 \equiv \{A, C, E, G\}$$





- C6 (Triad + 6th degree) evokes a sweet Hawaiian/swing sound.
- The Acoustic Illusion: Am7 and C6 share the exact same physical notes. The brain relies entirely on bass context to define the chord's identity.

Suspended Chords (sus)

¶ 4.13

Triad − ~~3rd~~ + 4th = sus4

Removing the 3rd leaves the chord open and unresolved (neither major nor minor).

Csus2 = {C, D, G}



Csus4 = {C, F, G}



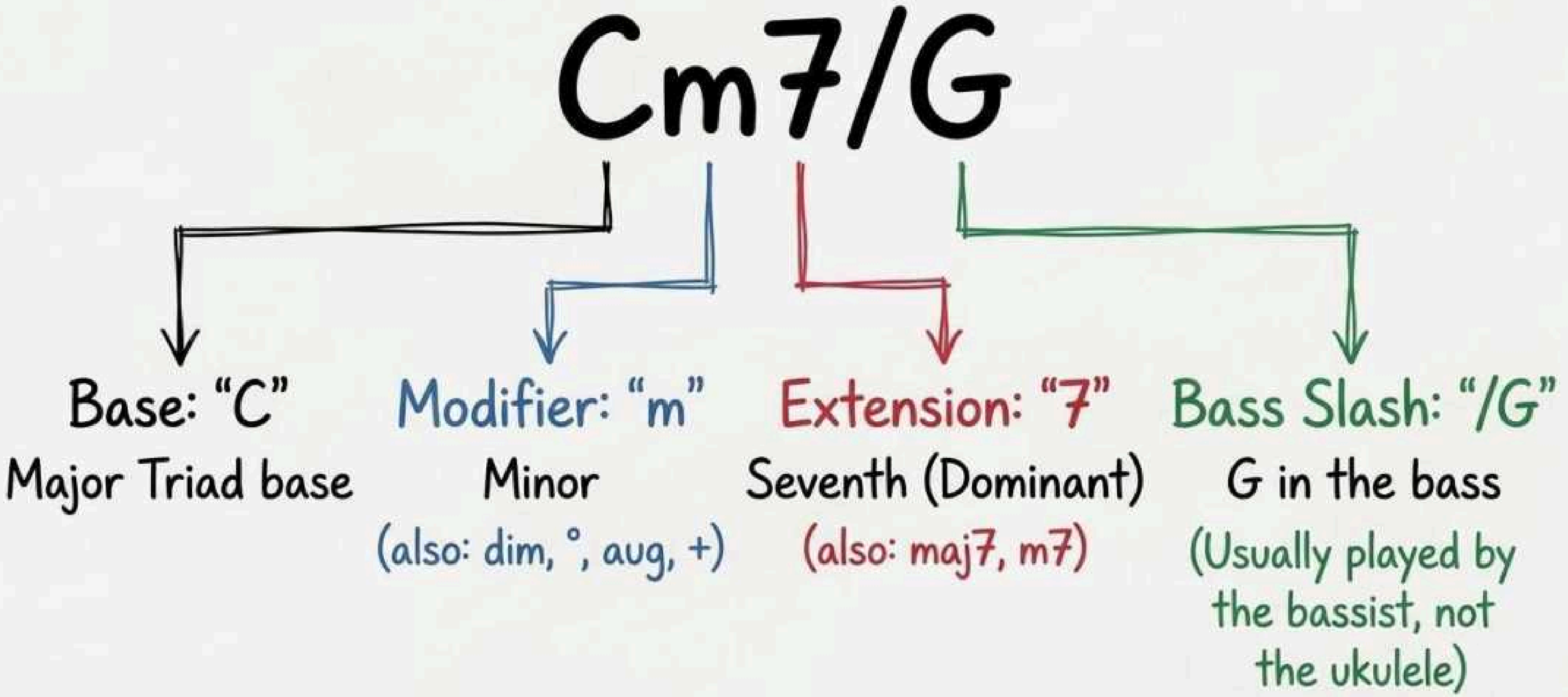
Cadd9 = {C, D, E, G}



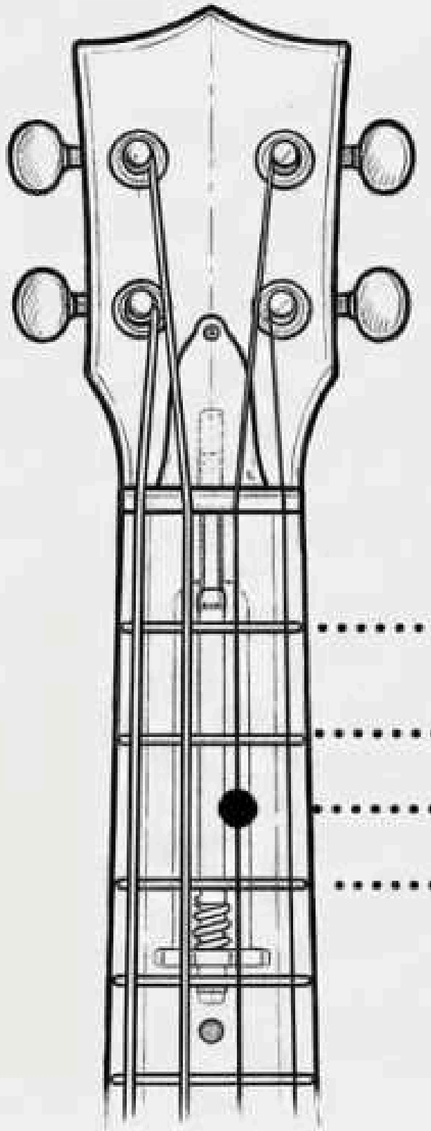
add9 contrast: Adds the 2nd WITHOUT sacrificing the 3rd.

Chord Naming Grammar

¶ 4.14



Verification by Intervals



→ A (Root)

→ C (+3_hs = Minor 3rd)

→ E (+7_hs = Perfect 5th)

→ A (Octave / Doubled Root)

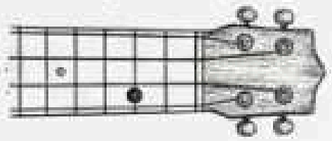
Root + m3 + P5 = Minor Triad.
The intervals verify the shape.

The Essential 1st-Position Shapes

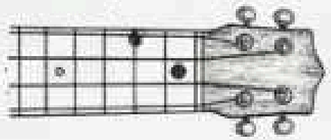
¶ 4.16

Major

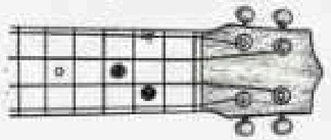
C (0003)



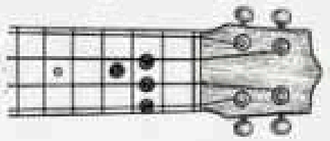
F (2010)



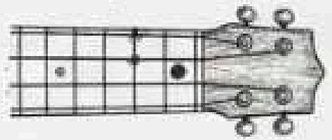
G (0232)



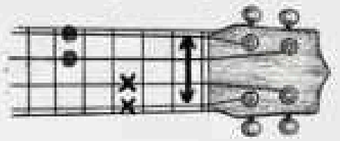
D (2220)



A (2100)

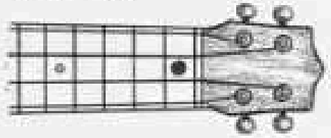


B♭ (3211)

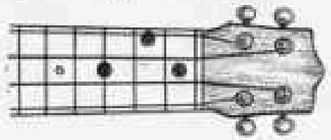


Minor

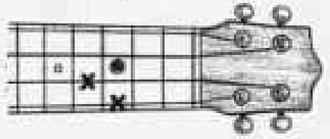
Am (2000)



Dm (2210)

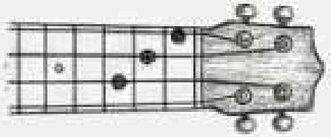


Em (0432)

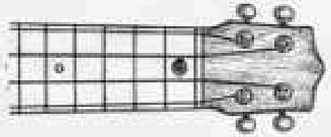


Seventh

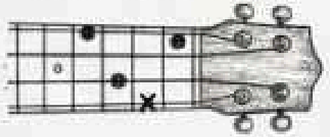
G7 (0212)



A7 (0100)



E7 (1202)





The Horizon: Move these core shapes up up the neck to unlock every other chord.