 MI
DO SOL SI RE FA LA

SOL LA SI DO

FA LA DO MI

SOL LA SI DO
RE MI FA SOL LAST DO RE MI FA

 MI
DO SOL SI RE FA LA DO
FA LA DO MI SOL SI

28 feb Ing. Audio

Acustica
- arquitectura
- paisajismo

Propiedades de Sonido

Subjetiva
Volumen
tono
timbre

Objetiva
amplitud
freq
forma de onda

$$\sim + \text{R} = \text{m trigo}$$

$$\text{R} + \text{M} = \text{M sarraceno}$$

29 feb L. Musical

Jonica, Dorico, Fugio, Lídio, Mixo, Eolio, Locrio

sta tiene tritono entre B y F (4ta y 3ma)

Do Re Mi Sol La (pentatonic) Para armar una escala pentatonic
removerse la 6ta y la 3ma de su paralela mayor

Jonica 1 2 3 4 5 6 7 8

Dorico 1 2 b3 4 5 6 7 8

Fugio 1 b2 b3 4 5 b6 b7 8

Lídio 1 2 3 #4 5 6 7 8

Mixo 1 2 3 4 5 6 7 8

Eolio 1 2 b3 4 5 b6 b7 8

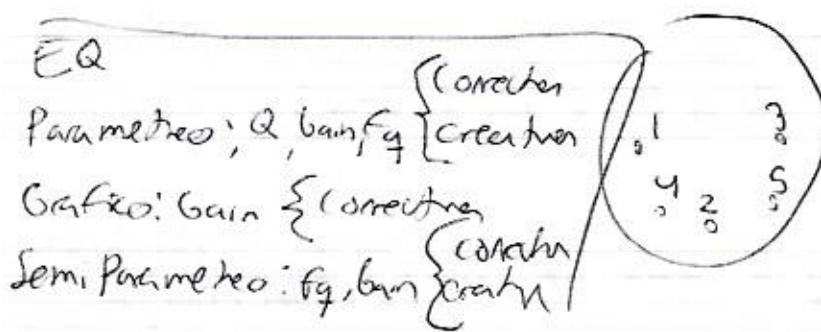
Locrio 1 b2 b3 4 b5 b6 b7 8

6ta "Suelo-Tu el litoral & tu Poco"

Diccionario	1	2	3 Gm	4	5	6	7	8
Intervalos	3 menor	Sta/Gm	(Am)	Sta intono	(Gm)	2da men	(Bm)	Gm
Acordes	Maj 7 m7	Maj 7 m7	Maj 7 m7	Maj 7	Maj 7 m7	Maj 7	Maj 7 m7	?

2 Mar ANA. F. D.

Emelle Berliner (inventor de mic de litoral)
C RCA, Gramofon



Cable MIDI

2 trns
4 Sust.
5 drds
1, 3 note whs

3 Mar L. M.

Cadenas $\text{I} \rightarrow \text{I}$ perfectas
~~Rota~~ Rota $\text{II} \rightarrow \text{III}$, $\text{IV} \rightarrow \text{III}$
 $\text{IV} \rightarrow \text{I}$ plazo

Se puede resolver de un II a un VI para más sonido de I ,
 $\text{II} \rightarrow \text{III}$ introspectivo.

Jónico (Mayor)

CΔ7 Dm7 Em7 FΔ7 G7 Am7 Gm7bs
Exo menor Cm7 Dm7bs EbΔ7 Fm7 Gm7 AbΔ7 Bb7

5 mar A. P., Negocios Regalías

13-16 contactos Regalías artistas Novos

15-17 medio

(7)-20 super estrella \hookrightarrow 1-2 milloes de copias vendidas

venta del disco \times porcentaje = Regalías
por cda

7 mar Acústica: Física del sonido

Magnitudes y propagación del sonido

La presión atmosférica (disminuye el sonido de amplitud) se mide en pascals (Pa)

$$Pa = \frac{1 N}{1 m^2} \quad N = \text{Newton}$$

presión atmosférica al aire libre = min Pres atmosférica

$$2 e^{-5} Pa$$

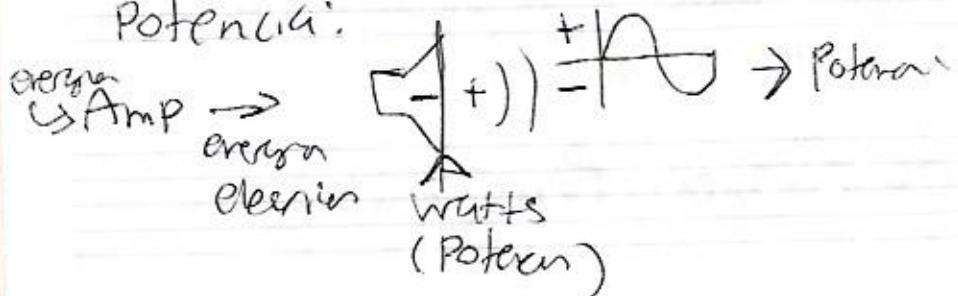
$$2 \times 10^{-5} Pa$$

$$0.00002 Pa.$$

(util para espacios cerrados y abiertos)

Predicciones electro-acústicas \rightarrow

Potencia:



watts \rightarrow cono de Bocina \rightarrow Intensidad acústica
 Watt m^{-2} (W/m^2)

$$\begin{array}{ccc} dB & \text{Decibel} \\ \downarrow & \\ \beta & \text{Bell} \end{array} \quad \frac{\text{Bell}}{10} = dB$$

$$X^{10} = dB$$

$$dB = 20 \log \left(\frac{x \text{ Pa}}{2e^{-5} \text{ Pa}} \right)$$

$$10 \cdot X = dB$$

SPL = Sound pressure level
 presión sonora
 dB_{SPL}

decibel de presión sonora

$$20 \log \left(\frac{1 \text{ Pa}}{2e^{-5} \text{ Pa}} \right) =$$

$$20 \log (50,000)$$

$$20 (4.6089\dots)$$

$$93.9794\dots dB_{SPL}$$



Modos armonizados

Mar 8 LM.

Jonico	1Δ?	2m?	3m?	4Δ?	5?	6m?	7m?bs
Donco	1m?	2m?	b3Δ?	4?	5m?	6?	b7Δ?
Fregio	1m?	b2Δ?	b3?	4m?	5?	b6Δ?	b7m?
Lidro	1Δ?	2?	3m?	#4?	5Δ?	6m?	7m?
MIXO	1?	2m?	3?	4Δ?	5m?	6m?	b7Δ?
EOLICO	1m?	2?	b3Δ?	4m?	5m?	b6Δ?	b7?
Locro	1?	b2Δ?	b3m?	4m?	b5Δ?	b6?	b7m?

E.A.

max renta! Penta Mai =
2 den pos

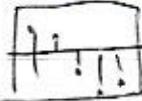
Mar 9 F.D.

Conversion Analogo-Digital

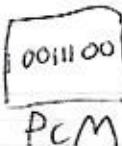
señal \rightarrow Filtro HP 20 KHz
LP 20 Hz

Sampleo (de tiempo) \rightarrow Sampleo (Bit depth) amplitud

Clock



Cuantización (números a serial Hold-end)



bits 1000111

Luz roja \rightarrow Salida

Pulse code Modulator

A D C

DAC o lo mismo pero ahora con
se agrega el Hold

PCM \rightarrow convertir \rightarrow Sampleo \rightarrow Filtro

El ADC al DAC causa latencia.

Tiempo de sampleo de Shannon - Nyquist
se necesita el doble de sampleo que la freq mas
alta de una señal Band-Pass cada

alineando señal 1 kHz

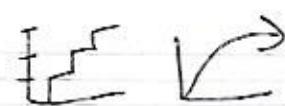
sampleado a 500 Hz

verán la diferencia entre
señal y sampleo
(500 Hz adicional)

DAC free filtro anti-alias

60 dBFS - 120 dBFS

Bit Depth:



Por cada Bit de profundidad

hay una diferencia de 6 dB

1 bit = 6 dBFS

8 bits = 48 dBFS

$\frac{60}{48} \approx 60 - 120$ (Rango de suma)

$\frac{60}{48} = 1.25$ dB por salto de B.F.

16 bits = 96 dBFS, 0.6 dB por salto

24 bits = 144 dBFS, 0.5 por salto

Bajar el Bit green errores a Quadrado
ahí entra el Dither.

CD 44.1 kHz
(C bts)

DVD 48 kHz
24 bts

BluRay a 60 kHz

24 bts

* 32 bts

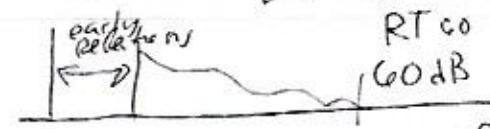
BluRay HD (4K)
192 kHz

32 bts

Mar 11 Reverb

(Plate, Spring) Reverb analogo

Reverb digital: algoritmo, convolución



*
Hf
Pink
noise

RT 60 Reverb time 60 dB

early reflector = pre-delay
Pad.

trær Rolo para verdes

SURF Rock

Dick Dale - Let's go Trippin
Wipeout - The Surfaris

Pipeline - The Chantays

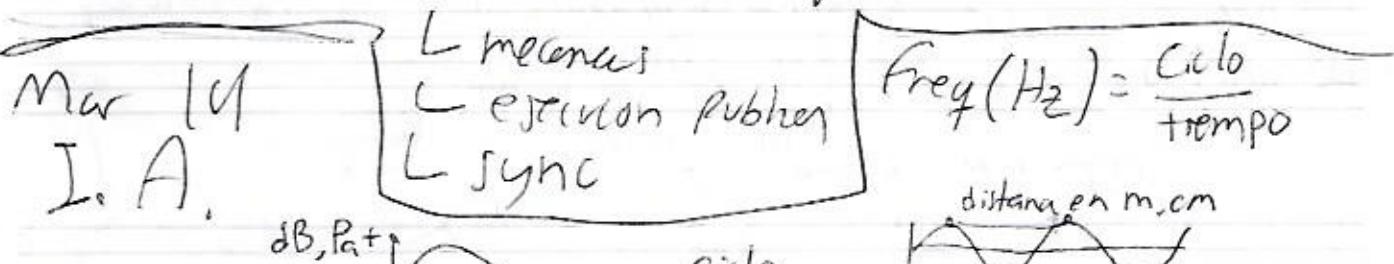
Beach boys - Surfing USA, Good Vibrations

Garage Rock

The Kingsmen - Louie Louie

Surfin Bird - The Trashmen

Publishing: derechos de autor, regalías, difusión de dinero
derechos patrimoniales, Plagiar



long. de Ondas necesitan la temperatura y Freq. ($^{\circ}\text{C}$, Hz)

$$\text{Freq} = \frac{\text{Ciclos}}{4 \text{ seg}}$$

$$\text{Periodo en segundos} = \frac{1 \text{ seg}}{\text{Freq}}$$

$$\text{Freg}(\text{Hz}) = \frac{\text{Ciclo}}{\text{tiempo}}$$

distancia en m, cm

longitud de Ondas
(cm, m), (m/s)

metros
segundo

Referencia
 $331 \frac{\text{m}}{\text{seg}} @ 0^{\circ}\text{C}$

$$\text{long. de Ondas} = \lambda, \lambda$$

$$\lambda = \frac{\text{Vel}}{\text{Freq}} \quad (\text{m/s})$$

~~$$\text{Vel de fondo} = n^{\circ}\text{C} + 0.6 \text{ (Ref)}$$~~

~~$$\text{Vel de fondo} = 19^{\circ}\text{C} + 0.6(331)$$~~

$$\text{Vel de sonido} = (n^{\circ}\text{C})(0.6) + \text{Ref}$$

$$\text{Vel sonido (19 grados)} = (19^{\circ}\text{C})(0.6) + 331 \frac{\text{m}}{\text{s}}$$

$$\text{Vel sonido (19)} = 342.4 \frac{\text{m}}{\text{s}}$$

$\lambda = \text{Siempre}$
es en
metros

contem. negativo
usa la Ref en
negativo
 $(n^{\circ}\text{C})(0.6) - \text{Ref}$

$$\lambda = \frac{\text{Vel}}{\text{F}} = \frac{342.4 \text{ m/s}}{80 \text{ Hz}} = 4.2 \text{ m}$$

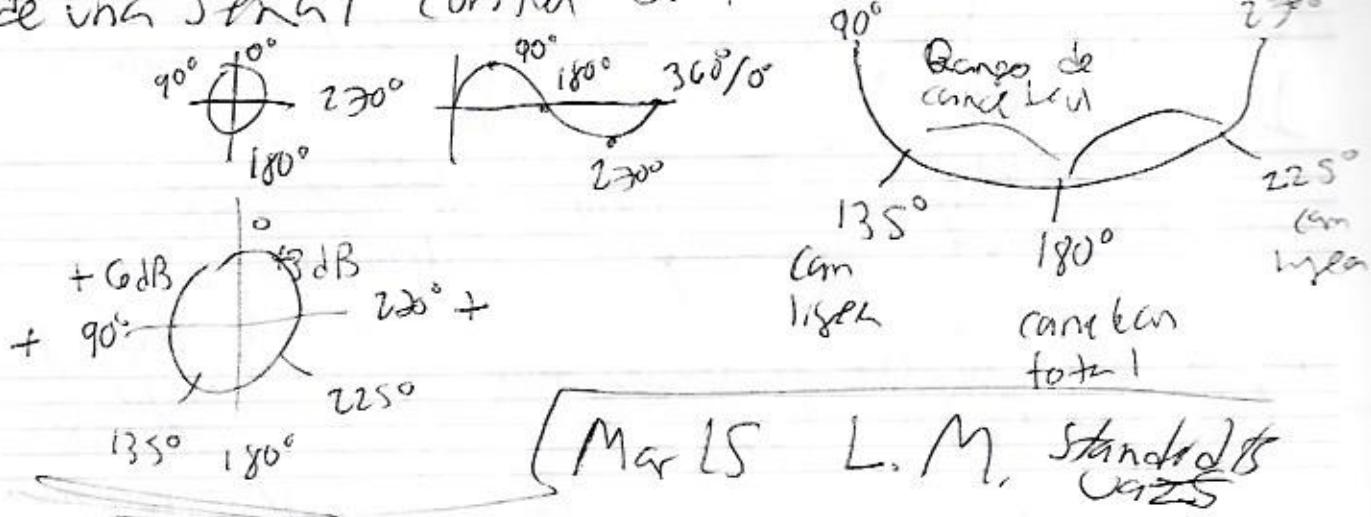
Ejemplo 2, 1000 Hz @ 19°C

$$\lambda = \frac{(n^{\circ}\text{C})(0.6) + \text{Ref}}{1000 \text{ Hz}} = \frac{(19^{\circ}\text{C})(0.6) + 331 \frac{\text{m}}{\text{s}}}{1000 \text{ Hz}} = \frac{342.4}{1000 \text{ Hz}}$$

$$\lambda = 0.3424 \text{ m}, 34.24 \text{ cm}$$

Hablando de la señal, tenemos la Polardia

polo pos + ~~-~~, la fase no es absoluta, es la Polardia
de una señal consta otra



[Mar 15 L. M. Standard]

Dominante Sustituto: acorde Mayor con Fm menor que se utiliza como Substitución de un Dominante, situando a un tono de distancia del Dominante original, comparte el mismo acorde destino con el Dominante.

Subdominante - Secundario

2^{do} relativo al Dom. Subs.
II⁷

Término para referirse al 2^{do} relativo a un Dom. Secundario
ejemplo

en lugar del S^{to} del S^{to}, es el 2^{do} del S^{to}
ejemplo
I⁴ of the time Harry Styles
F Dm C C7

2^{do} de S^{to}

tri-sub

~ ✓
 $\text{V} \rightarrow \text{I}$, $b\text{II}^7 \rightarrow \text{I}$

E.A ejecutado modes

- 1 menor? donco! / dlab ar do
2 never freq? echo? |
3 ~~one~~ 1. dia! ✓ |
4 freq, Donco x loco |
5 mto. |
6 Engs ✓ |
7 Jones ✓ | 16 Mar

Patron 3m
y 4ti
en modes

recomendaciones de libros:

- Understanding chords - Daniel M. Thompson
Understanding audio

Ovnilab.com (comp site)

LM

Don Secundo

I^7 en so Maj

I^7/II^7 D^7/III^7 II^7/IV^7 V^7/VI^7 $\text{VII}^7/\text{VII}^7$

ΔA^7

B⁷

C⁷

D⁷

E⁷

la fundamental tiene que ser diatónica, por eso el II^7 de VII no es F#, F# no es diatónico a CMaj

el V^7 tiene más tensión, por eso ignora las tensiones no dispolares

sin dominante

9 b13

y Jazz harmony Book Berkley Press

V⁷/II⁷ = mixo q b13

V⁷/III⁷ = mixo b9 b13

VI⁷/IV⁷ = mixo q 13

VI⁷/V⁷ = mixo q 13

V⁷/VI⁷ = mixo b9 b13

men, melódica

nica

Dream

AP 19 Mr

{ 1 2 b3 4 5 G 7

Psy / Acid Rock

the count five - Pyrotec Reaction
- the world

Blue Magoo

Regalos pt 2.

- hay publico "creativo" que juntas actos y buscan producto
- administran los derechos de las obras que tienen
- con apoyo de las sociedades de gestión (intendentes) se encargan que las art. sigan bien

Mar 22 L. M.

Sub de fondo

D-7 G⁷ C^{Δ7}

D-7 D^{b7} C^{Δ7}

i7 V7 Imaj7
ii7 ii67 Imaj7

now Guit 3rs, 3rd

example "Can't Help It"

Jackson, Slave w.

A → B^{b7}

Sub II⁷/II⁷

E^{b7} D-7

) resolution for semitone

G⁷ C^{Δ7}

Solo hay
Dom seccs
~~de~~

Sub III⁷/III^{Δ7}

F⁷ E-7

2 3 4 S 6 *

Sub IV⁷/~~IV~~^{Δ7}

G^{b7} F^{Δ7}

no 1 ni 7

Sub V⁷/V^{Δ7}

A^{Δ7} G⁷

Sub VI⁷/VI^{Δ7}

B^{b7} A⁷

Alt dom 1 b2 b3 b4 b5 b6 b7 Acordes ^{7bs}
1/10 b7 1 2 3 #4 5 6 b7

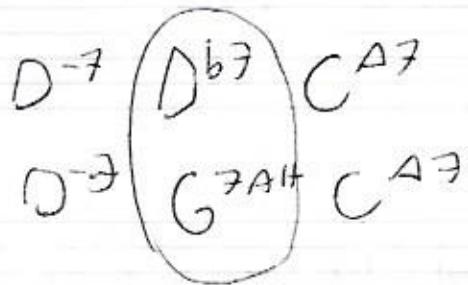
1 b2 b3 b4 b5 b6 b7

En harmonia

↓ ↓
#9 3

B^{7alt} toca todas las tercera
1 b9 #9 b5 b13

se usa
circular
Sub IV⁷ = lidio b7 G⁷alt = D^{b7 #11}



(Conceptos ritmicos) (Dinamicas)

(PP)	Pianissimo	Pianissimo	very soft	-
(P)	piano		soft	↓
(mp)	mezzo piano		mezzo soft	
(mf)	mezzo forte		mezzo forte	↓
(f)	forte		forte	
(ff)	fortissimo		very forte	+

24 Mar Redolucion Engañosas

Cadena Rota S-26, resolución deceptiva.

G^{A7} (V⁷/ii) A⁷ → A^{b7} int. modul. bolero

no resuelve al ii, pero al II^{b7}, o engañoso

Mark Levin jazz piano book

Invasion Botanen

Mar 26

the Beatles

SKIFFLE

Iwana Hold Yr Hand esto can bajar

Geny and the Peacemakers - dont let the Sun catch you
Crying

the harsay Beats - dont turn around

the Mojos - Everything's alright

the who - my Generation

- I can't explain

the rolling Stones - Satisfaction (I can't get no)

yardbird - Heart full of sound

the Kings - a well respected man

~~Regalas~~ Regalas (Publishing)
y su monetización

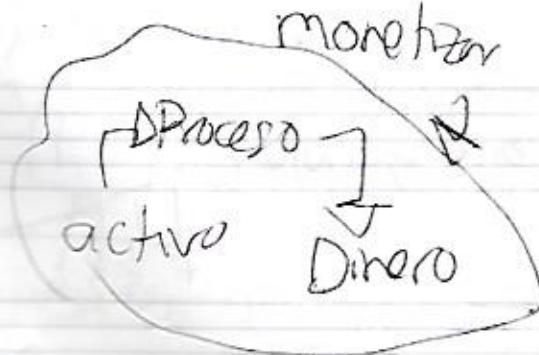
- Monetizar

- Activo

Monetizar regalas

mejorías

execuciones públicas.
sincronización



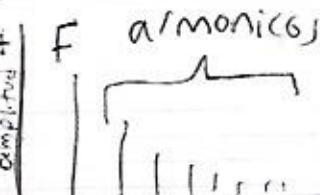
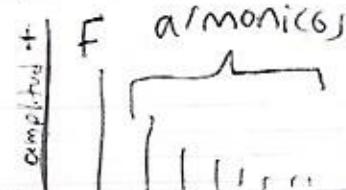
28 Mar. I.A.

Síntesis + Acústica

Serie armónica

~~Ondas~~ onda pura /
Periodica

en el mundo real, las ondas son ~~impresas~~
Real teórica



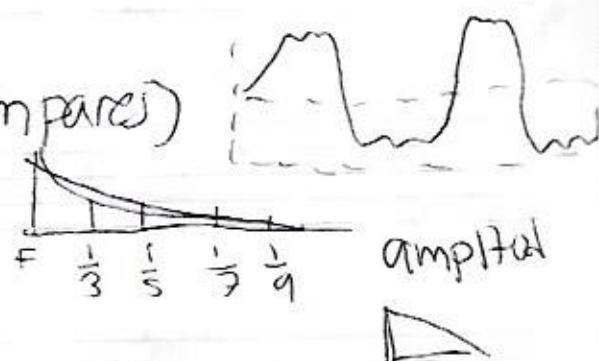
Batimiento
Amplitud.

~~Senoidal~~ Senoidal = no armónicos

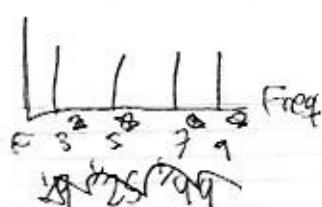
Senal constante

Suma de nubes (impares)
Amp = $1/N$

Intervalos
musicales
frecuencia



Senal triangular

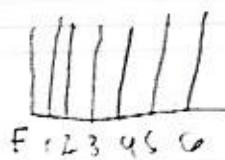


armónicos nubes (impares)

Amp $1/N^2$

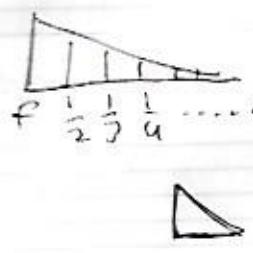


Senal Sierra (saw)



armónicos fondos y nubes

Amp $1/n$

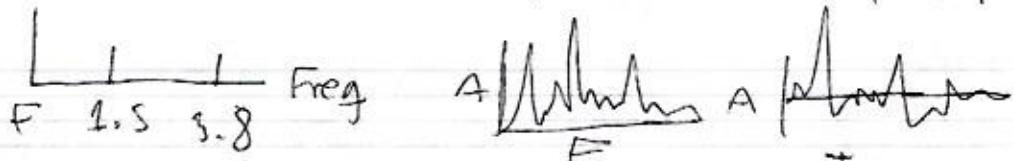


~ Peircing, sive, simple, "uh"

~ Brillante, nasal, "eh"

Inarmónicos

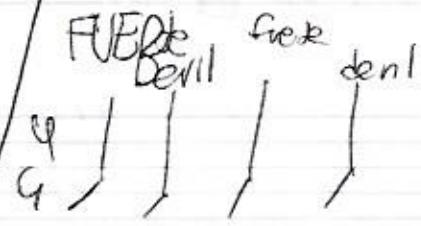
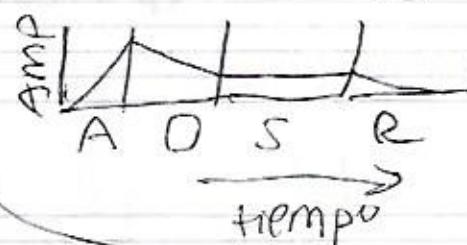
Larmónicos no relacionados
Intervalicamente a la fund.



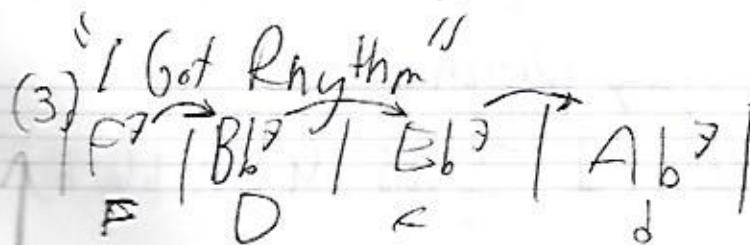
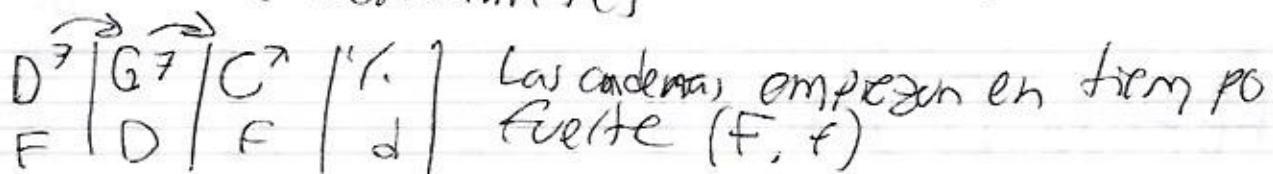
ADSR, Envolvente

29 Mar 22

Dominantes
Sin función
de Dominante



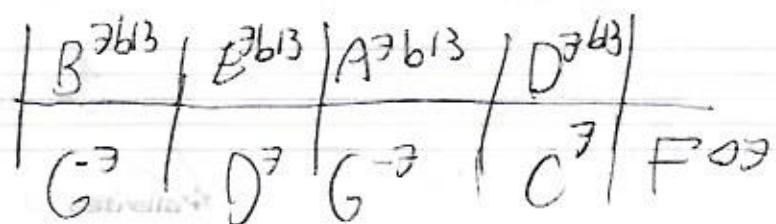
Cadenas de Dominantes



Escala Mayo 13

Alt (siendo cool)

Empieza en 2^{er} grado



1 b sta	sta ✓	i mixo? (realizo) ✗
2 S ⁺ jw) h	, b mo ✗	2 mixo otz. bz? ✓
3 3m	✓	3 Jonzo ✓
4 3 2 man	✗	4 menor eolico ✓
S sta	✓	5 Lider ✓

31 Mar
LM.

Dominante
sin función
de dominante

$$\text{IV}^7 \rightarrow \text{I}^7$$

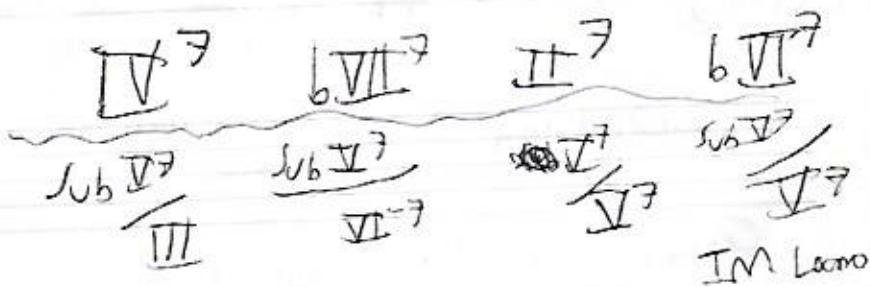
$$\text{F}^7 | \text{C}^7$$

el F⁷ no va a bB
no cumple la func
de dominante

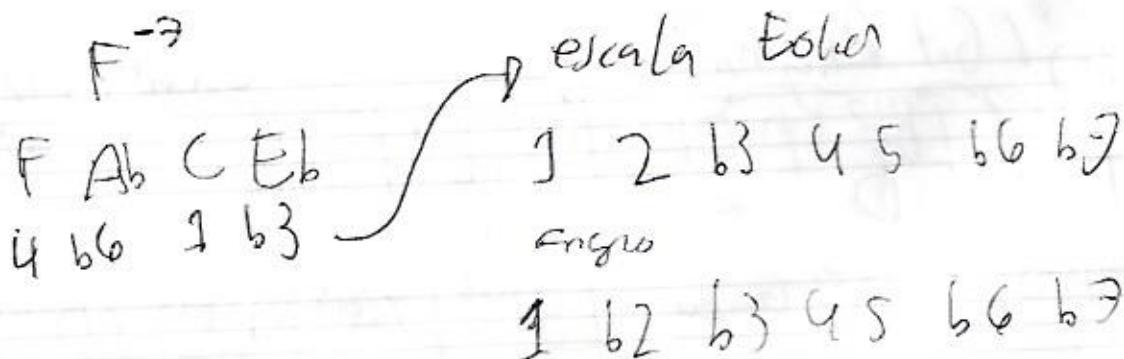
también puede ser...

$$\text{Sub IV}^7 / \text{III}^7$$

escala Lider b7



Repaso I. M.



ej IM de Eolico / Anglo

B_b Δ7

escalas ↗
Mixo

B_b D F A

1 2 3 4 5 6 7

#b 3 4 6

IM. de Mixo

D_b Maj7

D_b F A_b C

1 b2 2 b3 4 5 b6 7

b2 4 b6 1

Dictado

menor
reírse a ~~reírse~~

mixo b9 b13
reírse a ~~reírse~~

mixo 9 13

2do Gred

b9 13 } 4 } | .



- Apr 2 A.P. Hard Soft hard rock
 led Zeppelin - How many more times
 - Whole lotta love
 Deep Purple - Highway star
 Rainbow - Long live Rock N Roll
 Scorpions - No one like you
 ACDC - TNT

Regalos de Ejecutiva Publica

Sociedad de Gestión

{ ASCAP: Sociedad americana de autores, compositores y Ed. tores

{ BMI: Broadcast Music Inc

Mexico { SACM: Sociedad de autores
 y compositores de Mexico

Asignación de los Ingresos por Reparto

a) Transmisiones Radio-fonos

IA. (apto)

b) transmisiones por TV

Psicoacustica

c) por Internet

- Psicofisiología (percepción)

d) giras

Frecuencia → Sensibilidad a medios y agudos

Sonido { Amplitud → Siempre voy a escuchar cosas con mayor volumen

Efectos Psicoacusticos

Enmascaramiento (freq y amp)

1kHz > , tamp

1kHz @ 90dB SPL

3kHz @ 70dB SPL ← esta sonora mas fuerte
a pesar de tener menor
amplic. (as freq mayores
que 1kHz, pasa esto)

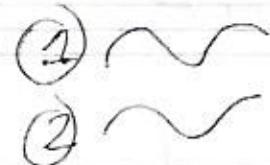
efecto

Arias

30ms

dos sonidos con
misma amp

Silencios



si 1 → 2 no estan
desfasados por ± 30 ms

y aumenta la amp
al ser la misma
freq en 2 canas

Batimiento

7-25 Hz de difente amplitud

dos sonidos con dif amplitud, ~~modulacion~~

→ 85Hz ① 
modula 80Hz ② 

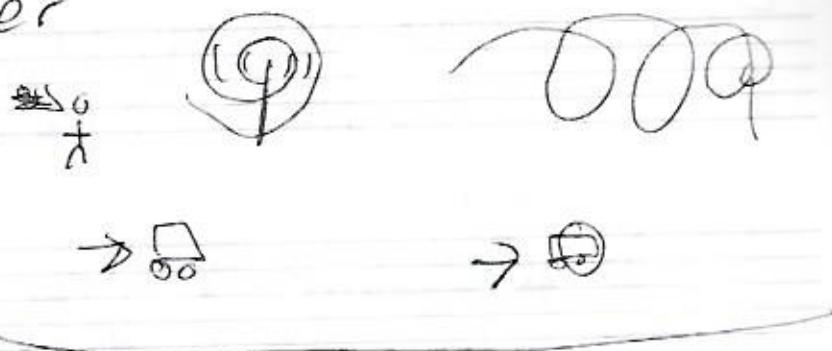
La señal con mayor
amp modula la de menor

80 se escucha pero buzz y sum
el vol ^{estrella} al ritmo de 85

mas efectos picoables

cambio de tono

Ley de Doppler



Objetos	subido
Fórmula	timbre
Freq	tono
Amp	vol

timbre \rightarrow contenido armónico

Freq \rightarrow N° de ciclos

Amp \rightarrow cambio de presión

$$Vel_{sonido} = (n C^\circ)(0.6) + Ref$$

Ref = $331.4 \frac{m}{s} \Rightarrow 331.4 \frac{m}{s}$

$$\lambda = \frac{vel_{sonido}}{Freq} \text{ (ms)} \text{ en metros}$$

ejemplo 22°

$$Vel = (n C^\circ)(0.6) + 331.4 \frac{m}{s}$$

$$Vel = (22^\circ)(0.6) + 331.4 \frac{m}{s}$$

$$Vel = 344.6 \frac{m}{s}$$

Ejemplo

λ 1500 Hz @ 27°

$$\lambda = \frac{(27)(0.6) + 331.4}{1500 \text{ Hz}}$$

$$\lambda = \overset{\circ}{0.2317} \text{ m}$$

$$= 23 \text{ cm}$$

$$F_q = \frac{\cancel{\text{Vel}}_{\text{onda}}}{\lambda}$$

$$F_q = \frac{\text{Vel}}{\lambda}$$

$$\text{Vel} = F_q \times \lambda$$

Periodo

$$\text{Per} @ 4.8 \text{ Hz} \quad \text{Periodo} = \frac{1}{F_q}$$

$$\text{Periodo}_{4.8 \text{ Hz}} = \frac{1}{4.8} = 0.2083 \text{ seg}$$

Decibeles

$$0.83 \text{ Pa} \rightarrow \text{dB}_{\text{spl}}$$

$$\text{Ref} = 2 \times 10^{-5}$$

$$\text{dB} = 20 \log \left(\frac{0.83 \text{ Pa}}{2 \times 10^{-5}} \right)$$

$$= 20 \log \left(\text{ } \right)$$

$$\text{dB} = 20 \log \left(\frac{x}{\text{Ref}} \right)$$

Lunes 18

miér 20

leng

ing

a P

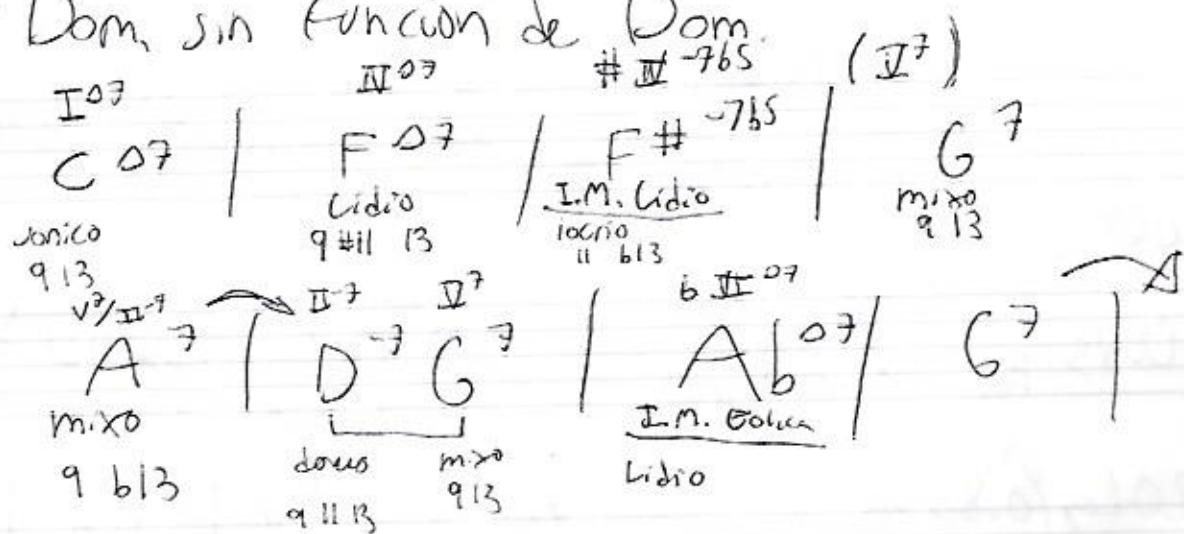
cer

L.M. temas

- Intercambios Modales
- Dom. Secundarios (Segundos Relacionados)
- Análisis
- Sub. Tritono (Segundos Relacionados)
- Resolución engaña (subs.)

- Cadena de Dominantes

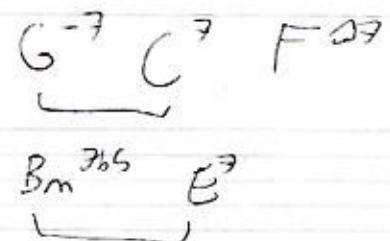
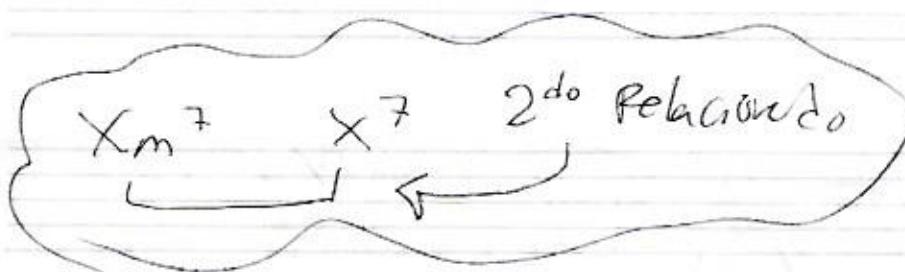
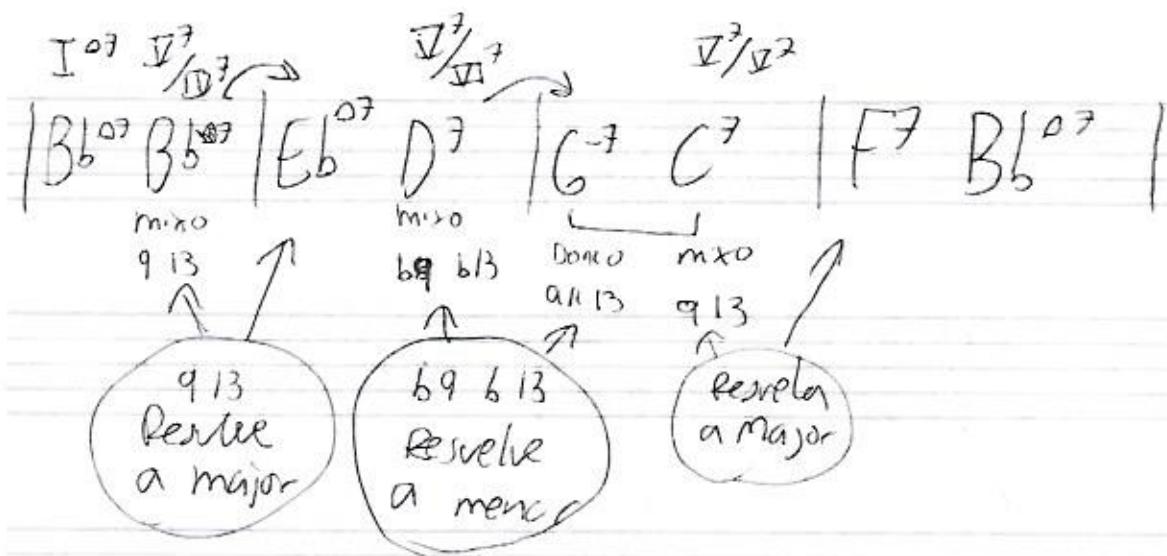
- Dom. sin función de Dom.



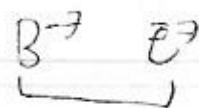
← tensiones ; mínimo 1 tono de distancia de nota del acorde

9, 11, 13

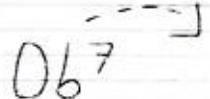
Dont know why
Donna Shores



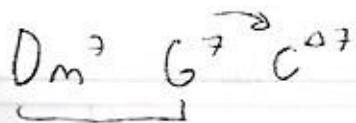
Doble función A⁷ Eolico
Dionco



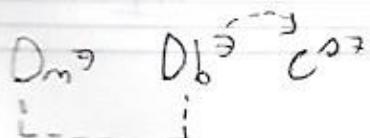
SUBS



↑ Resolver por
dominante



↑ Resolver por
octava ó Síntesis



↓ 2^{do} Relacionado

↓ 2^{do} Rel. por dominante

Abm⁷ D⁹ → C⁰⁷ Substituto del 2^{do} Relacionado



estrella

$F^{\#-7}$

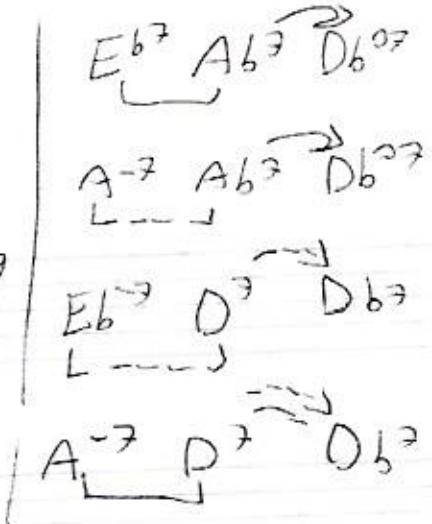
B^7

$E^{\Delta 7}$

Sub
 F^7

C^{-7} $\rightarrow B^7 \rightarrow E^{\Delta 7}$

1 2 3 4 5
 D^7 -7 D^7 D^7 D^m
-
63 63 63 7



Diction					S
1	2	3	4	5	
9ma	8ma	Qhanwar	10ma	12-11	
b13	x	3m	613		

C

V^7
 \cancel{II}^7

$\cancel{IV}^7 / D^7 \rightarrow A^7$, Sub E^b

+
utz

en fa

V^7
 $\cancel{III}^7 \rightarrow E^7$

Sub V^7
 $\cancel{III}^7 \rightarrow B^b$

en sib

V^7
 $\cancel{IV}^7 \rightarrow B^b$

Sub V^7
 \cancel{IV}^7

en mi b

V^7
 $\cancel{V^7}$

V^7/II^7

C (0) E F G A B
 II^7

↓

Dm7
D F * A C

la Sta del
 II^7 es A

A⁷ o el V^7/II^7

E^b F G A^b (B) C D

$\text{V}^7/\text{II}^7 = \text{F}^7$

Sub $\text{V}^7/\text{II}^7 = \text{C}^7$

V^7/II^7

C (0) E F G A B

el II (D) + una 4ta
te lleva a A⁷

F G A (B) C D E
 $\text{V}^7/\text{II}^7 = \text{E}^7$

F G A B C D E F G A B C D E
Sub $\text{V}^7/\text{II}^7 = \text{G}^7$

B^b C D (E) F G A

$\text{V}^7/\text{II}^7 = \text{B}^7$

A^b B^b C D E F G

B^b C D E F G A B^b C D E b F G A

Sub $\text{V}^7/\text{II}^7 = \text{F}^7$

umbral de DOLOR

120 dB

Abril 28

Suma de dB.

$$f(x) = \left\{ \begin{array}{l} \text{Bell} = \log \left(\frac{I_1}{I_0} \right) \\ y = 2^{10x} \end{array} \right. \quad \text{Deci-Bell} = 10 \cdot \log \left(\frac{I_1}{I_0} \right)$$

Decibeles acústicos =



dB_{SW} Sound Watt (Potencia acústica)

dB_{SIL} Sound Intensity Level (Intensidad acústica)

mas medidas (de amplitud, no presión)

Ponderación:

$\text{dB}_A \rightarrow 35 \text{ dB} - 45 \text{ dB}$

$\text{dB}_B \rightarrow 45 \text{ dB} - 75 / 80 \text{ dB}$ 2-4 horas sin descanso

$\text{dB}_C \rightarrow 80 / 85 \text{ dB} - 120 \text{ dB}$

dB 's eléctricos

dB_U Unity Gain

(representación eléctrica de
 dB_{SPL})

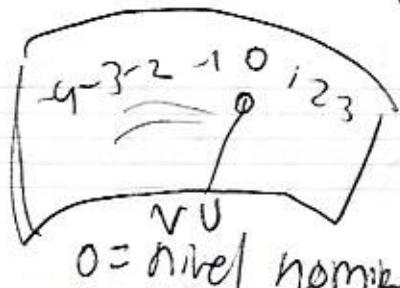
dB_V Voltage

(Alimentación energética
del circuito, después del preamp)

dB_m (dB_{mw}) milli-Watt (intensidad electrica)

dB_w Watt (Potencia Electrica)

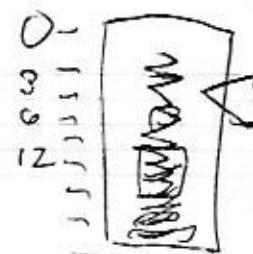
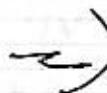
$\text{dB}_v \rightarrow \text{dB}_{\text{FS}}$ Full scale



0 = nivel nominal

0 = nivel de linea

(line level)



0 = nivel disp

$$0 \text{ dB}_v \approx -12 \text{ a } 6 \text{ dB}_{\text{FS}}$$

Suma de dB

- formula General

- Aprox (comparando 2 valores) difieren de 0, 1 = $\pm 3 \text{ dB}$

- Proporcional

$$10 \log \left(\frac{1}{2} \right) \left(\frac{3}{1} \right) \\ -3.01$$

$$10 \log \left(\frac{N_1}{10} + \frac{N_2}{10} + \frac{N_3}{10} \dots \right) \text{ mali!}$$

mejor forma, por el valor mas alto

$$\begin{aligned} 20 + 20 &= 23 \\ 21 + 20 &= 23 \end{aligned}$$

$$2, 3 = +2 \text{ dB}$$

$$4, 5, 6, 7, 8 = +2 \text{ dB}$$

$$9 \text{ o mas} = \text{formula} \geq \text{dB}$$

Tarea

Home theory

7.1 Cables

$$L = 58 \text{ dB}_{\text{spl}}$$

total de dB?

$$LC = 54 \text{ dB}_{\text{spl}}$$

(suma)

$$C = 60 \text{ dB}_{\text{spl}}$$

$$\approx 10 \log(46.3)$$

$$RC = 53 \text{ dB}_{\text{spl}}$$

$$\approx 38.35$$

$$R = 60 \text{ dB}_{\text{spl}}$$

$$+ 60$$

$$= 98.35$$

$$LB = 59 \text{ dB}_{\text{spl}}$$

76.65

$$LR = 56 \text{ dB}_{\text{spl}}$$

$$SUB = 59 \text{ dB}_{\text{spl}}$$

Apr 29 LM

Acordes Dim todos son "inversiones"

$$B^{\circ 7}$$

$$BDFAb$$

$$D^{\circ 7}$$

$$DFAbB$$

$$F^{\circ 7}$$

$$FABD$$

~~$$G^{\circ 7}$$~~

$$Ab^{\circ 7}$$

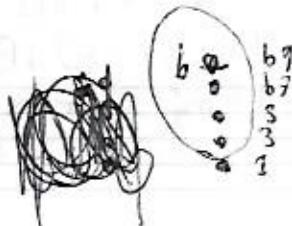
$$AbDF$$

7ma dimonda = 6ta mayor

escala-acorde

$$m^{\text{7bs}} \quad \text{vs} \quad \text{dim}^{\circ 7}$$

Dom lechoso con general omitido
(con fundamental omitido)

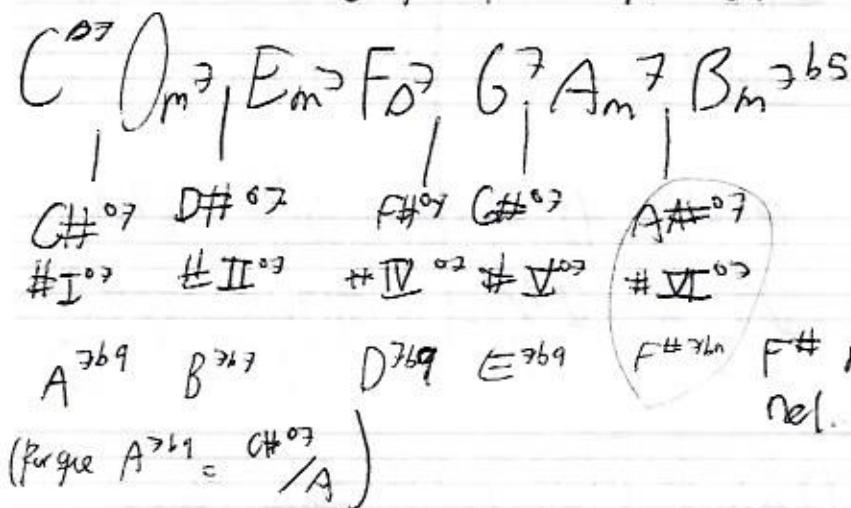


$$B^{\circ 7}/G$$

$$G^{\circ 7}b^{\circ 9}$$

C_{maj}^7 A^7 D_m^7 G^7
 C_{maj}^7 $C\#^{\circ7}$ D_m^7 G^7
 C_{maj}^7 $A^{\circ7b5}$ D_m^7 G^7

Se Relaciona
 con los Dom
 secundarios



Punto:
 menor armonía

A Primera Vista Pedro
 A primera vista Pedro

E_m^7 $G\#^{\circ7}$ A_m^7 $F\#^{\circ7}$ F_{maj}^7 $F\#^{\circ7}$ F_{maj}^7 Pedro

leng. Binario, Decimal y Hexadecimal

Binario 0 1

Decimal 0 1 2 ... 8 9

Hexa (Base 16) 0 1 2 3 4 5 6 7 8 9 A B C D E F

256	128	64	32	16	8	4	2	1
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

179 1 0 1 1 0 0 1 1

que

deben

repite

1.2, si tiene periodo agregar 1, si no agregar 0 → repite

Arcades D_{im} pt 2

# I ⁰⁷	# II ⁰⁷	# IV ⁰⁷
C# ⁰⁷	D# ⁰⁷	F# ⁰⁷
A ⁷ C ⁷⁶⁹	B ⁷⁶⁹ D ⁷⁶⁹	D ⁷⁶⁹ B ⁷⁶⁹
V ⁷ /II ⁷ V ⁷ /IV ⁰⁷	V ⁷ /III ⁷ V ⁷ /V ⁷	V ⁷ /I ⁷ V ⁷ /III ⁷

V⁰⁷

G#⁰⁷

E⁷⁶⁹

G⁷⁶⁹

V⁷/II⁷

6th Diminished Scale

Berry Arms

Drop 2 Mark levitt

C⁶ D⁰⁷ C⁶ D⁰⁷ C⁶ D⁰⁷ C⁶ D⁰⁷

b⁶ b⁶ b⁶ b⁶ b⁶ b⁶ b⁶ b⁶

o o o o o o o o

$D^{#02}$ E^{-7}
 E^{b07} G/D
 $D^{7b9} \rightarrow G$

++

100101001

-0

1011001000

11001110100110

11 00 1

16842 ↴

572 286 1964 3266 8 9 2 1

1 1 (0 | 1 1 0 (1) 0 0

40046281201 572 286 1964 3266 8 4 2 1

1 0 11 0 1 1

69 32 14 8 9 2 1

$E_m^2 \oplus M_2 / A \oplus B_2, A \oplus G_{m,2}$

$E_m^2 \oplus A_2 / F_m^2 \oplus G_{m,2} A_2$

$$\begin{array}{r} 1 \\ 16 \\ 15 \\ \hline 2 \end{array}$$

7E4E

$$2^2 + 2^5$$

$$2 \cdot 2 + 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$
$$4 + 32$$

25BA

$$\begin{array}{c} \underline{100} \quad \underline{101} \quad \underline{0101} \quad \underline{1011} \quad \underline{1010} \\ 2 \quad S \quad B \quad A \end{array}$$

A12

$$\begin{array}{c} \underline{10} \quad \underline{10} \quad \underline{0001} \quad \underline{0010} \\ A \quad 1 \quad 2 \end{array}$$

D4

$$\begin{array}{c} \underline{1101} \quad \underline{0100} \\ D \quad 4 \end{array}$$

O3CB

$$\begin{array}{c} \underline{\quad} \quad \underline{0011} \quad \underline{1100} \quad \underline{1011} \\ 0 \quad 3 \quad 6 \quad 8 \end{array}$$

Hexadecimal \rightarrow Binary

0
1

$$\begin{array}{c} 1110, \underbrace{0100}, \underbrace{1001} \\ \text{E} \quad 4 \quad 9 \end{array}$$

8 4 2 1

$$\begin{array}{r} 8421 \\ -1001 = 9 \\ 0100 = 4 \\ \hline 3657 \end{array}$$

2
3
4
5
6

$$\begin{array}{c} 1100 \cdot 0011 \\ \text{C} \quad 3 = 1A5 \end{array}$$

$$\begin{array}{r} 1110 = 14 = E \\ 0011 = 3 \\ 1100 = 12 = C \\ \hline 1111 = 15 = F \end{array}$$

7
8
9

$$\begin{array}{c} \overbrace{0010}, \underbrace{1100}, \underbrace{1110}, \underbrace{1111} \\ 2 \quad C \quad E \quad F \end{array}$$

$$\begin{array}{c} 0010, 1111, 1011, 1010 \\ 2 \quad F \quad 3 \quad A \end{array}$$

10 A
11 B
12 C

$$\begin{array}{c} \overbrace{0010}, \underbrace{1011}, \underbrace{1100} \\ 2 \quad B \quad C \end{array}$$

13 D

$$\begin{array}{ccccccccc} 32768 & 16384 & 8192 & 4096 & 2048 & 1024 & 512 & 256 & 128 \\ 2^{15} & 2^{14} & 2^{13} & 2^{12} & 2^{11} & 2^{10} & 2^9 & 2^8 & 2^7 \\ \hline & & & & & & & & \end{array}$$

14 E
15 F

$$1 \quad 1 \quad 1 \quad 0, 0 \quad 1 \quad 0 \quad 0, 1 \quad 0 \quad 0.$$

Mayo 2

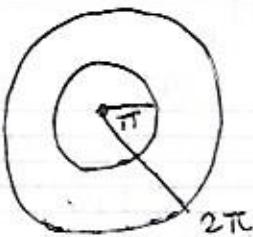
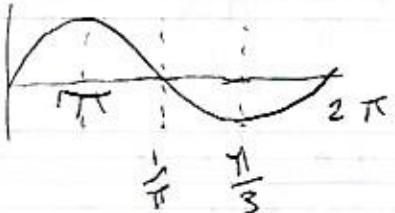
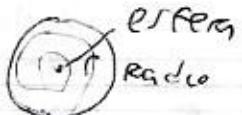
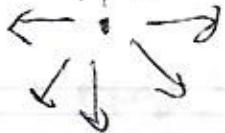
Propagación Acústica

Iso-tropico : a todos lados por igual

Iso - tropico

propagación omnidireccional

Igual cambio
Giro



Propagación Radial

Propagación

1D \rightarrow Cuerda de guitarra

2D $\star (x, y)$ Dirección y amplitud

3D $\star (x, y, z)$

3 tipos de Propagación 3dimensional

• Isotropia (puntual)

de un punto arbitrario

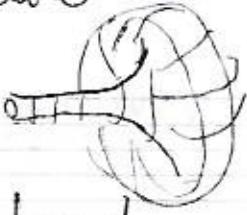
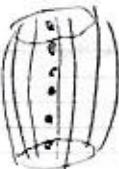


esfera

Respetar la Isotropia
Compleja

• Lineal (de Eje)

Cilíndrica, mas concentrada
después de cierta distancia
de comportar punto



distancia
Centra,
enfoque,
corte

• Plana

Muy constante



los agudos tienden a ser planos

Ley del cuadrado inverso

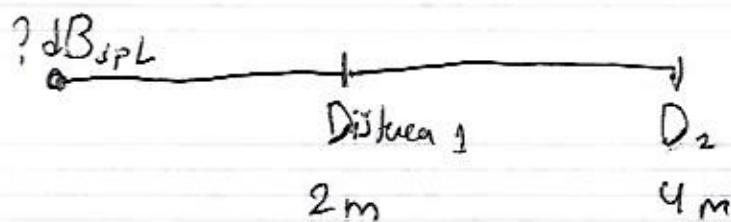
calculo para ver perdida de energia a traves de la distancia

involucra una fn cuadratica y un inverso multiplicativo
no aplica exclusivamente en acustica

Se refiere a algunos fenomenos fisicos cuya intensidad es inversamente proporcional al cuadrado de la distancia de la fuente

- Fuente emisora
- Posicion de fuente receptor (Ref)
- Posicion del receptor final

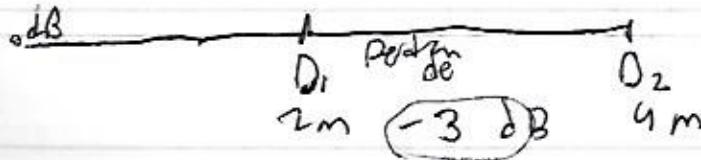
Puntual



Perdida

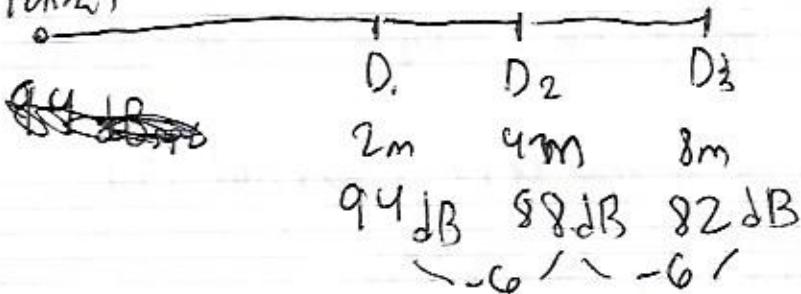
-6 dB

Linea 1



Ejemplo

Punto 1



ley de fund inverso

$$20 \log \left(\frac{D_?}{D_{ref}} \right)$$

level

$$10 \log \left(\frac{D_?}{D_{ref}} \right)$$

2.5 m 88 dB dB? 13.7

$$20 \log \left(\frac{13.7 \text{ m}}{2.5 \text{ m}} \right) =$$

$$= 20 \log (5.48)$$

$$= 20(0.738)$$

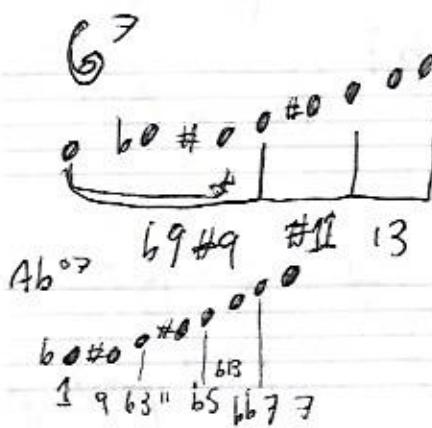
$$= 14.76$$

$$88 - 14.76$$

$$73.24 \text{ dB SPL}$$

Mayo 3 CM

Exab, Simetrical Diminida "octatonica"
Simetrical Dominante "Doble Diminida"



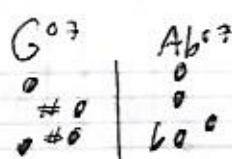
simetrical dominante
st +

ten disports

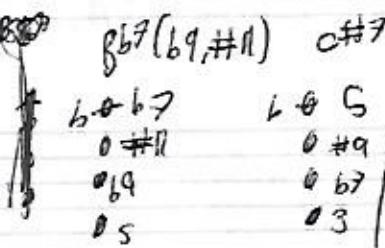
b9, #9, #11, 13

simetrical diminuta
+ st

9, 11, b13, 7



"Doble dimidiado?"

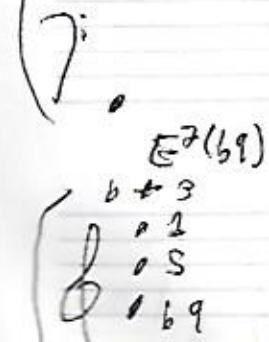


Joe Henderson - before



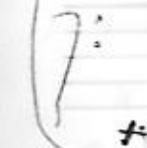
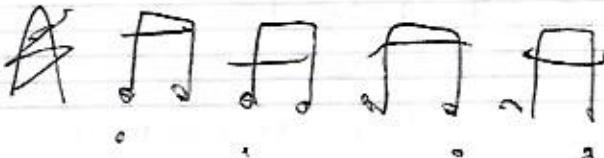
b9

#9



b9

#9



*

estrella *

Mayo S

Symétrier Dominale
Dominante
Dominante

~~7 7 7 7 7 7~~

(B^{b7}, D^{b7}, E⁷)

G Sim. Dominale

1 3 5 b7
b9 #9 #11 13 = G⁷

B Simetrier Diminut

9 11 b13 7 = B⁰⁷

(D⁰⁷, F⁰⁷, Ab⁰⁷)

#I⁰⁷

Cmaj⁷ C#⁰⁷ D-7

[F B D] C : } B⁰⁷

(A⁷)

(IV⁷ / II⁻⁷)

A⁷ C⁷ E^{b7} G^{b7} Sustituto de Diminuto

9 11 13
1 2 3 4 5 C 7

1 2 b3 4 b5 b9 b6 7 b8

Sim Dom STT (1 b2 3 #2 5 #6 b7 6)

Sim. Dom. T, ST:

1 b2 b3 b4 b5 b6 b7 b8
ST T ST T ST T ST

1 2 b3 4 b5 b6 b7 7 (b8)
+ + + + + + + +
ST ST ST ST ST ST ST

Diatonico intervalos

1	2	3	4	5
Sto b3	#4	4	7	
+47	b6	b3	b2	5

8	b3 b6?	b3 2dn	#4? #4?	b7 #7? ?m7
---	-----------	-----------	------------	------------------

Escalas

1	2	3	4	5
Lydian	mixo	mixo	mixo	mixo

Mixo amo
mel.
nat.

mixo	mixo	mixo	mixo	mixo
b2	Dore	Joni		

"los Grados de la Maj"
"Formula intervalos"

Dionico (Maj)

(1 2 3) (4 5) (6 7)
Major susto menor

1 2 3 4 5 C 7
tonitro

Dionico

Cmaj7

1 2 b3 4 5 G7
9 11 13

C7

1 2 3 #4 5 6 7

9 #11 13

1 2 3 4 5 G7
9 11 13

C7

Cmaj7bs

1 b2 b3 4 b5 b6 b7
9 11 b13

Fijo

1 b2 b3 4 5 b6 b7
9 11 b13

C7

edxo

1 2 b3 4

9

C7

tonitro

SIG b7

b13

locrio

b9

C7

1 b2 b3 4 b5 b6 b7
9 11 b13

menor
melódica

modes

todas dispo

1	2	b3	4	5	#6	7
9			ii		b13	

Cm Maj7

Dórico b9 (modo 2
En modo 4)

1	12	b3	4	5	6	7
b9			ii		13	

Cm?

modo 3

Lídio aumentado

1	2	3	#4	#5	6	7
9			#ii		8	

S7n
aumento

Cm Maj7 #5

modo 4

Dórico #4 (modo 4)

Solo nota
Lídio b7

1	2	3	#4	5	6	b7
9			#ii		13	

C7 modo 5 te "va" el ii, b13

Mixto 9 b13 pero como
completo SI

esta dijeron
"ii" se va

1	2	3	4	5	b9	b7
9			ii		b13	

~~menor~~
menor melódico
modo 6

Locro 99

1	2	b3	4	5	b6	b7
9			ii		b13	

Cm 7 b5

modo 7

Altered Dominante

1	12	b3	b9	b5	b8	b7
			b9		b11	

Cm 7 b5

C7 alt (b9, #9, b5, b13)

en = si

B C D Eb F G A

1 b2 b3 b9 b5 b6 b7

1	b9	#9	3	b5	b3	b7
					B>	g/f

todas tensiones disponibles

B 7 #7 ≠ B 7 b5

Menor armonica modos

modo 1

m. armonica

1 2 b3 9 5 b6 7
9 " b3

Cm^{b7}

modo 2

locrio 4 6

1 b2 b3 9 b5 6 b7
b9 " 13

Cm^{7b5}

modo 3

jonico armata 26

1 2 3 9 #5 5 7
9 b6 13

C47#S

modo 4

Donico #11 (#9)

1 2 b3 #4 5 6 b7
9 b11 13

Cm⁷

modo 5

mixo b9 b13

1 b2 3 4 5 b6 b7
b9 " b13

modo 6

Idio #9

1 #2 3 #9 5 0 7
#9 #11 13

Cmaj7

modo 7

Altered b6 7

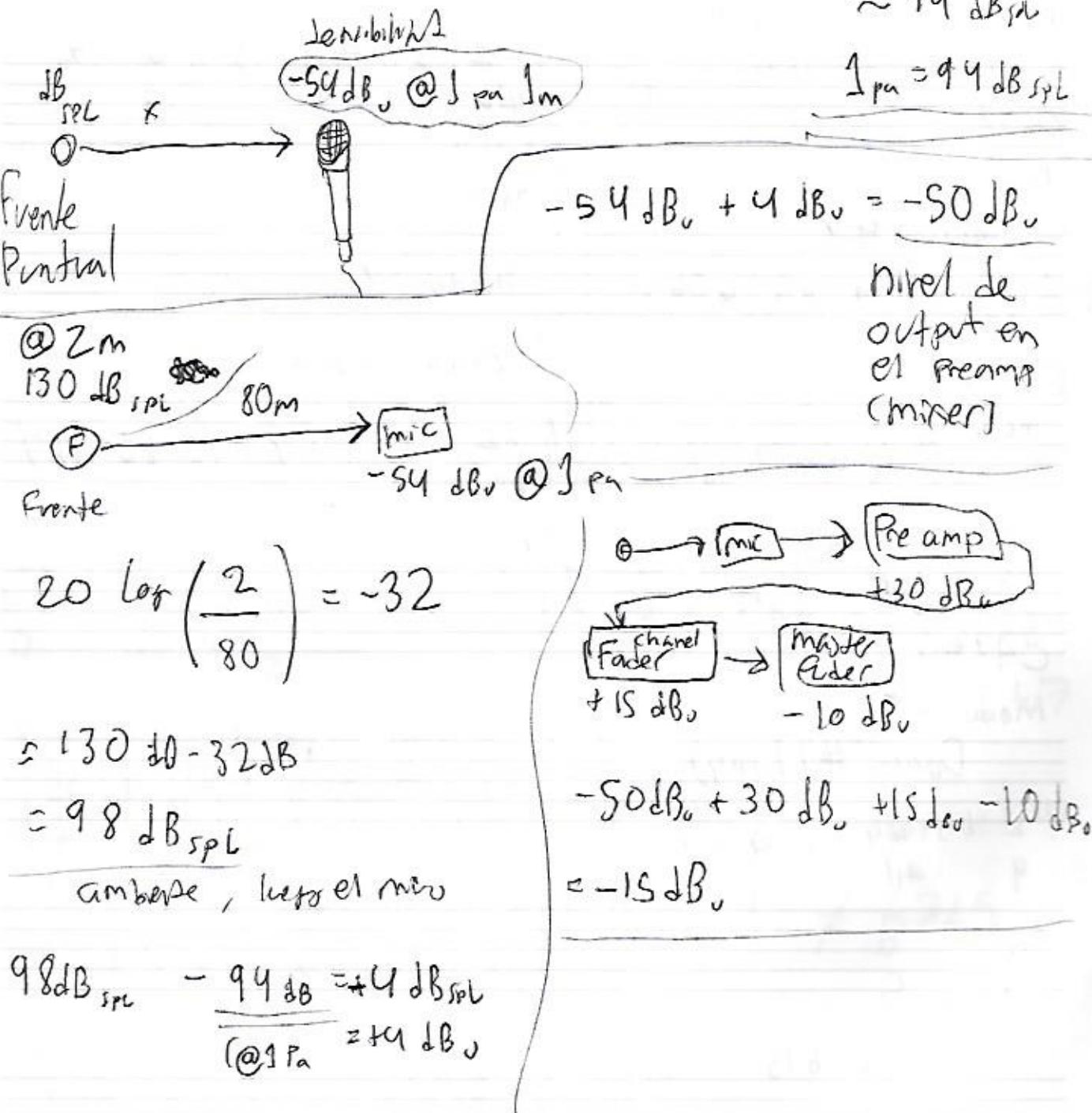
1 b2 b3 b9 b3 b6 b7
b9 b11 b13

C⁶⁷

Mayo 9 Estructura de Ganancia

- Input

- Flujo de señal → Ganancia no-lineal

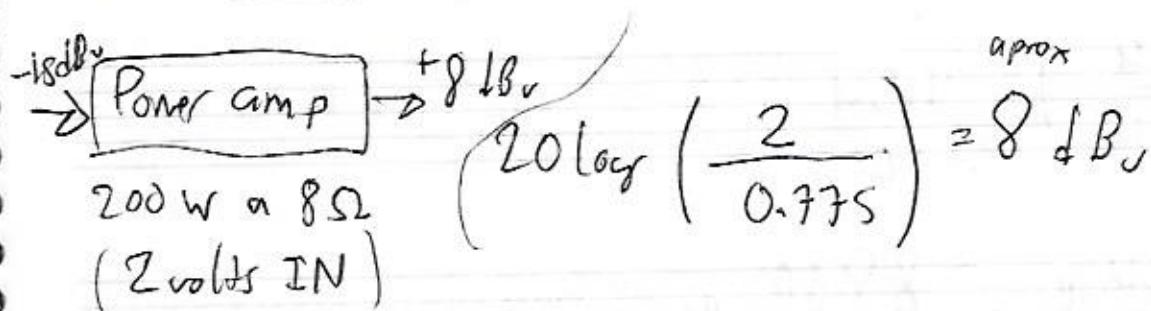


Ref

$$dB_0 = 0.775 \text{ volts}$$

Wirel Mic = 0.001 volt

Nivel Lineal = 1 volt

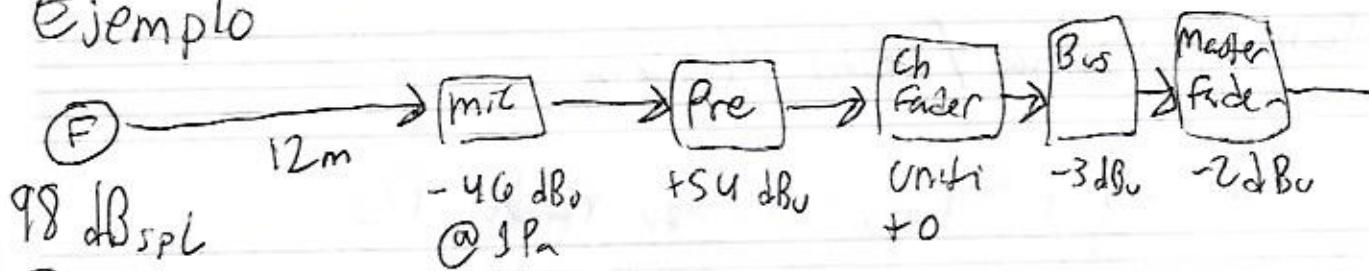


$$(-18 \text{ dB}) (+8 \text{ dB}) = -23 \text{ dB}_0 \rightarrow \text{Cuanto en Watts?}$$

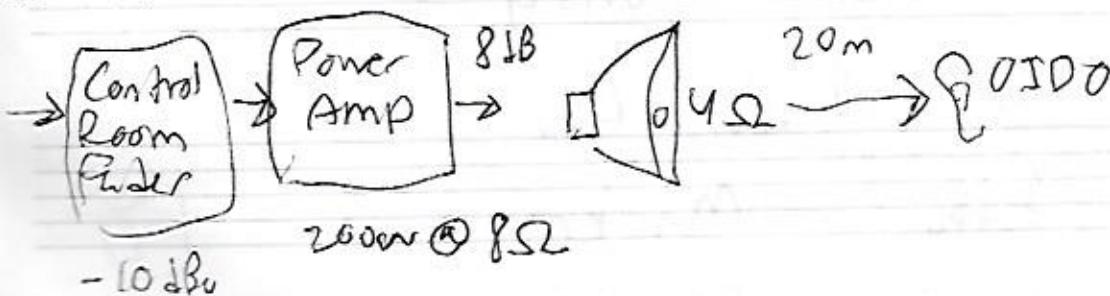
$$-23 = 10 \log \left(\frac{X_w}{200 \text{ W}} \right) = \left(10^{\frac{-23}{10}} \right) 200 = (10^{1(-2.3)}) 200$$

$$= 1.002 \text{ W}$$

Ejemplo



@ 4 m



Paso 1 Ponderar de datos

$$20 \log \left(\frac{u}{i_2} \right) = -9.54 \\ \approx -10$$

$$98 \text{ dB}_{\text{SPL}} - 10 \text{ dB}_{\text{SPL}} = 88 \text{ dB}_{\text{SPL}}$$

Paso 2 Restar Input - Ref para el

$$88 \text{ dB}_{\text{v}} - \boxed{94 \text{ dB}_{\text{v}}}^{\text{Ref}} = -6 \text{ dB}_{\text{v}}$$

Sensibilidad - diferencia
Sensibilidad

$$\boxed{-46 \text{ dB}_{\text{v}}} - 6 \text{ dB}_{\text{v}} = -52 \text{ dB}_{\text{v}}$$

Paso 3 Sumar / Restar cada uno

$$-52 \text{ dB}_{\text{v}} + 54 \text{ dB}_{\text{v}} = +2 \text{ dB}_{\text{v}} \text{ Ponder Pre}$$

$$+2 \text{ dB}_{\text{v}} + 0 = +2 \text{ dB}_{\text{v}} \text{ CMT y}$$

$$2 \text{ dB}_{\text{v}} - 3 \text{ dB}_{\text{v}} = -1 \text{ dB}_{\text{v}} \text{ Bv}$$

$$-1 - 2 = -3 \text{ dB}_{\text{v}} \text{ Master}$$

$$-3 - 10 = -13 \text{ dB}_{\text{v}} \text{ at ROOM}$$

Paso 4 Power amp

$$-13 \text{ dBv} - 8 \text{ dBv} = -21 \text{ dBv}$$

$$\text{in/out} = -21 \text{ dBv}$$

$$\left[10^{\frac{1}{10}} \left(\frac{-21}{10} \right) \right] (200) \stackrel{\text{wattaje}}{=} 1.58 \text{ W} \\ \approx 1.6 \text{ W}$$

$$\rightarrow \text{Bocina de } 4\Omega \\ 1.6 \text{ W} \times 2 \\ = 3.2 \text{ W}$$

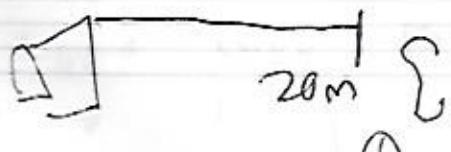
$\times 2$	$8\Omega \xrightarrow{\text{Amp}} 4\Omega$
$\times 2$	$4\Omega \rightarrow 8\Omega$
=	$2\Omega \rightarrow 2\Omega$



medi
89 dB_{SPC}

$$20 \left(\log \left(\frac{4}{2\Omega} \right) \right) = -14 \text{ dB_{SPC}}$$

④ @ um



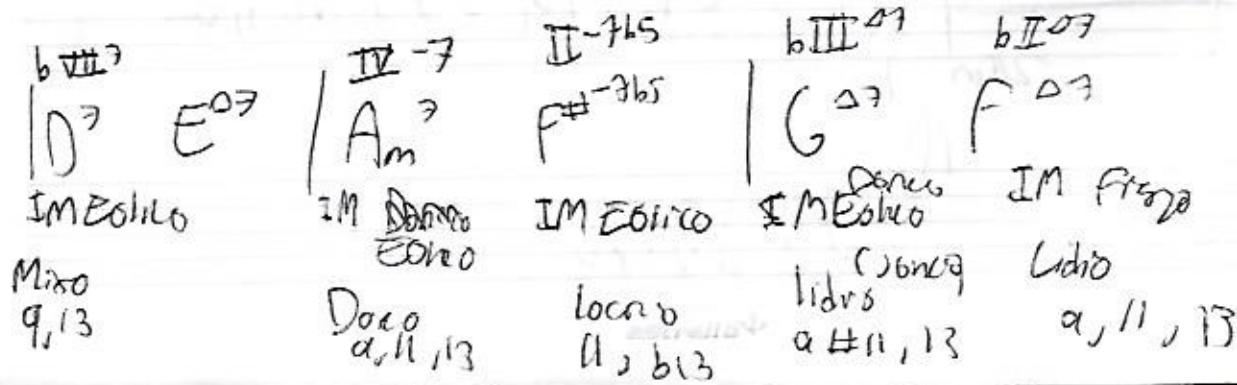
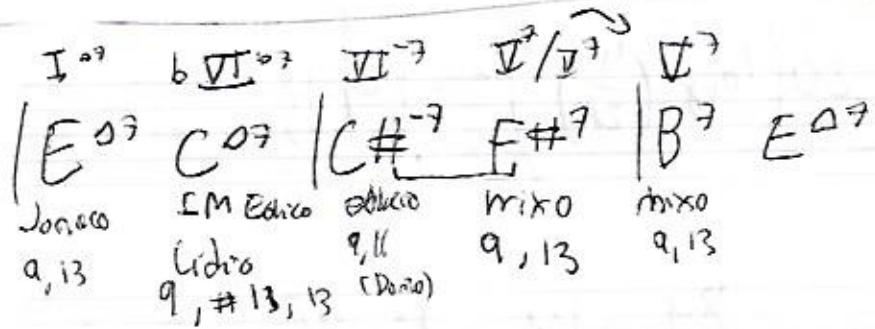
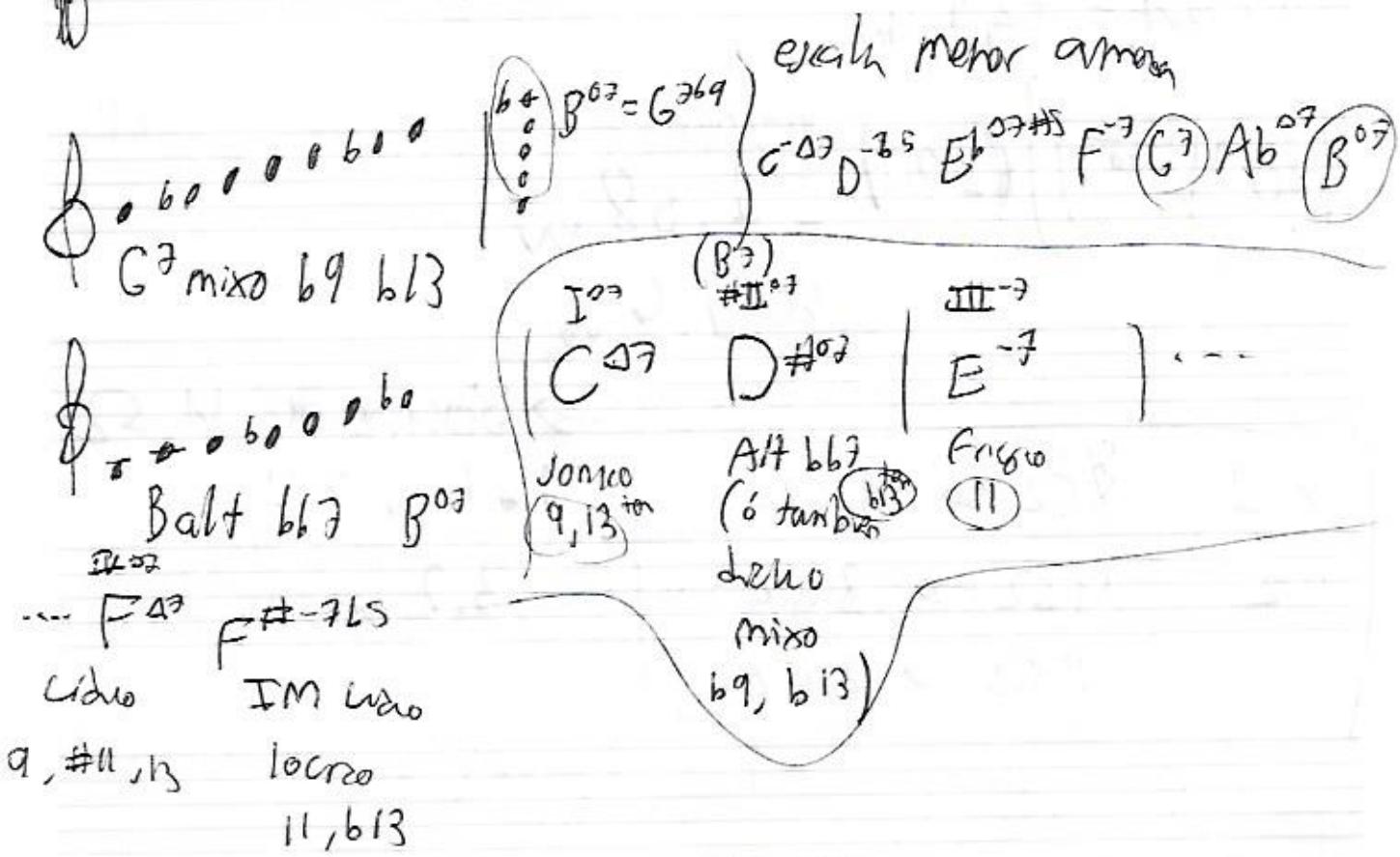
$$89 - 14 = 75 \text{ dB_{SPC}}$$

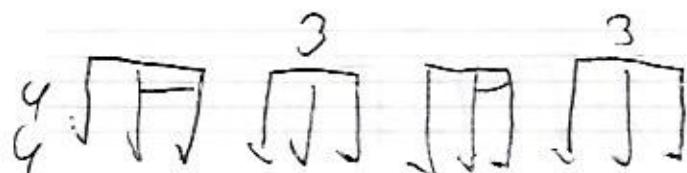
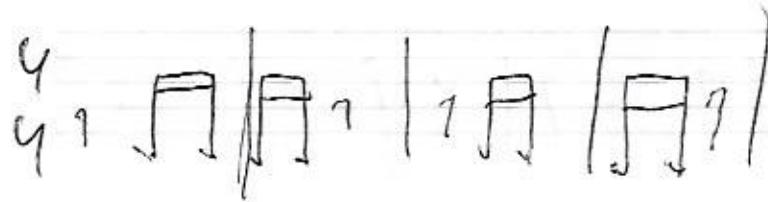
{
R

75 dB_{SPC}

May 2018 10 Mayo LM

Escalas Acordes Disminuidos





C#⁶⁷

Sub #I⁰⁷
A B^{b9} D-7

Simetria
dom 9
b9, #9, #11, 13

E b B^{b9} D-7 | C B^{b9} D-7 | G b B^{b9} D-7

Auxiliar Diminuto I⁰⁷, II⁰⁷

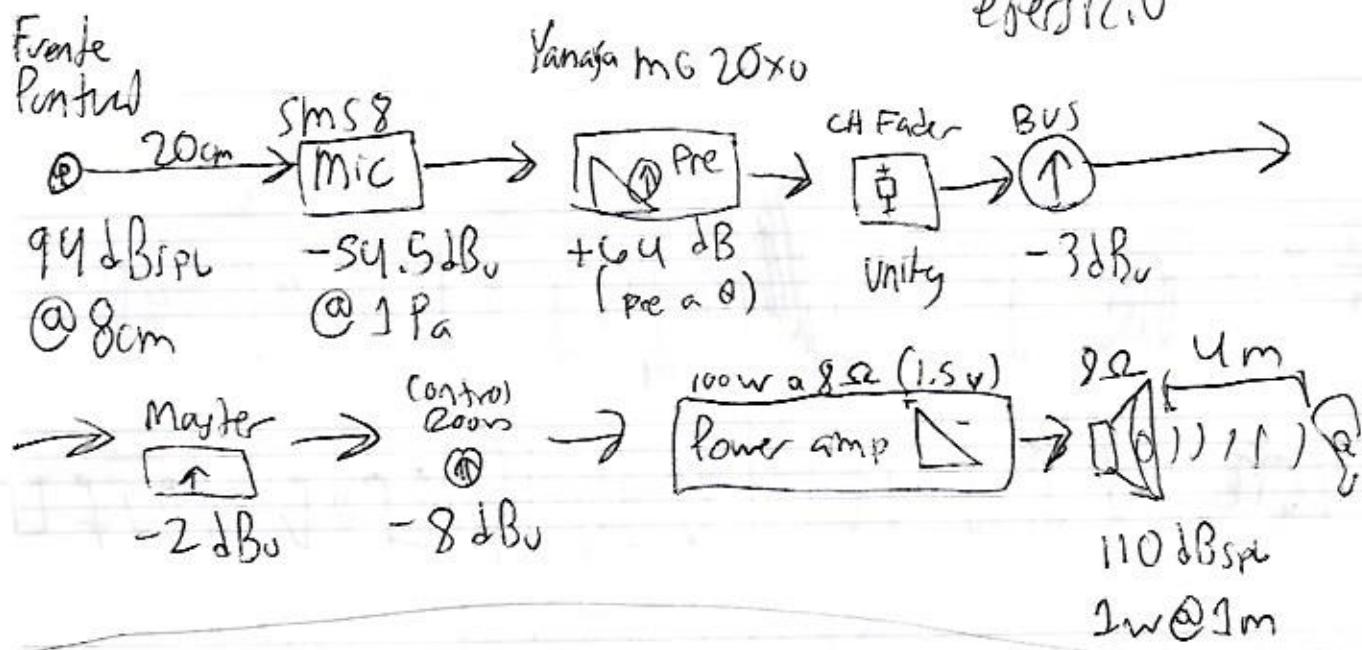
| D-7 G⁷ | C⁰⁷ | } | D-7 G⁰⁷ | G⁷ | C⁰⁷ |

Sim. d.s.
9, 11, b13, 7

Sim. d.s.
9, 11, b13, 7

C⁰⁷ → C⁰⁷
b9 b9
b9 0 0
+ +

Subst.
Mas Diminuto
Res Par Ut Res Par Si.
Res Par tono Res Par #S (b6)
Subst. de
Diminuto 12mz



$$20 \log \left(\frac{8 \text{ cm}}{20 \text{ cm}} \right) = -7.95 \approx -8$$

$$P_a = 94 \text{ dB}_{SP,L}$$

$$94 \text{ dB}_{SP,L} - 8 \text{ dB}_{SP,L} = 86 \text{ dB}_{SP,L} \leftarrow \text{esta llega al mic (en SPL)}$$

$$86 \text{ dB} - 1 \text{ Pa} = 86 \text{ dB}_{SP,L} - 94 \text{ dB}_{SP,L} = -8 \text{ dB}_{SP,L}$$

$$-54.5 \text{ dB}_{SP,L} - 8 \text{ dB}_{SP,L} = -62.5 \text{ dB}_u \leftarrow \text{NOI output mic}$$

→ Preamp

$$-62.5 \text{ dB}_u + 94 \text{ dB}_u = 1.5 \text{ dB}_u$$

→ Fader unity

$$1.5 \text{ dB}_u + 0 = 1.5 \text{ dB}_u$$

→ Bus

$$1.5 \text{ dB}_u - 3 \text{ dB}_u = -1.5 \text{ dB}_u$$

→ meter

-3.5 dB_v

$$Ref = 0.775$$

→ Control Room

-11.5 dB_v

→ AMP

loop w a 8 Ω
(1.5 Volts)

input = -11.5 dB_v out = ?

-17.2 dB_v out = 5.7 dB_v

$$\begin{aligned} & 20 \log \left(\frac{x_{out}}{Ref} \right) \\ & 20 \log \left(\frac{1.5}{0.775} \right) = 5.7 \end{aligned}$$

distancia entre In y Out

→ what do I

$$\left(10^{\frac{1}{2} \times (-17.2)} \right) 100W$$

100W de (100W a 8 Ω)
secs

$$= 1.9W \approx 2W$$

→ Badna

Specs: 110 dB_{SPC}, 1w@1m, 8 Ω

$$10 \log \left(\frac{110 \text{ dB}_{SPC}}{4 \text{ m}} \right) = 14.39 \text{ dB}_{SPC}$$

Distancia entre Box y oido

→ transducir al oido en el ambiente

$$20 \log \left(\frac{14.39}{110 \text{ dB}_\text{SPL}} \right) = -17.66$$

↑ Rec de Bourne

→ Distancia

$$110 \text{ dB}_{\text{SPL}} - 17.66 \text{ dB}_{\text{SPL}} = \underbrace{92.34 \text{ dB}_{\text{SPL}}}_{\text{al OIDO}}$$

formulando (desque)

en el ambiente (arre)

Fuente → Transductor

① Perdida : $20 \log \left(\frac{\text{Distancia Initial}}{\text{Dist. Final}} \right)$ ~~dB~~

$$\text{dB}_{\text{REF}} - \left(20 \log \left(\frac{\text{dist. initial}}{\text{dist. final}} \right) \right) = \text{dB}_{\text{Finales}}$$

② m/c

$$\text{dB}_{\text{Finales}} - \text{constante de 1 Pascal}$$

$$\text{dB}_{\text{Finales}} - 94 \text{ dB}_{\text{SPL}} = \text{dB}_{\text{Residuales}}$$

dB_{volts}

$$\text{dB} \quad +/- \quad \text{dB}_{\text{v restantes}} = \text{dB}_{\text{v}} \quad \nwarrow \text{mic level}$$

(-) Sensibilidad
de mic

③ ~~mixer~~

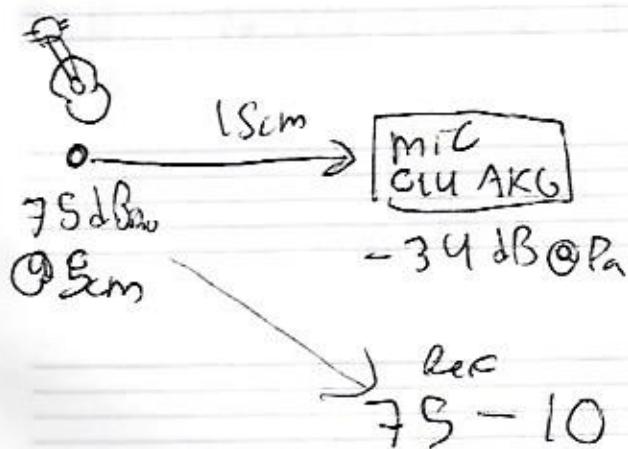
③ mix

L pre: $\text{dB}_{\text{v mic level}} \rightarrow \text{dB}_{\text{v line level}}$

$O = ?$	$\text{dB}_{\text{v enel Pre}}$
unity level	$\text{dB}_{\text{v enel Pre}}$

Pensa los SPECS!

aplicando



$$20 \log \left(\frac{S_{\text{enel}}}{S_{\text{mic}}} \right) = -12.04 \text{ dB}$$

~~75 - 10 - 12.04 = 42.96~~ $= -9.54$

~~75 - 10 - 12.04 = 42.96~~ ≈ 10

$$I_{\text{Pa}} \quad 75 - 10 = 65 \text{ dB SPL}$$

$$65 - 94 = -29 \text{ dB}$$

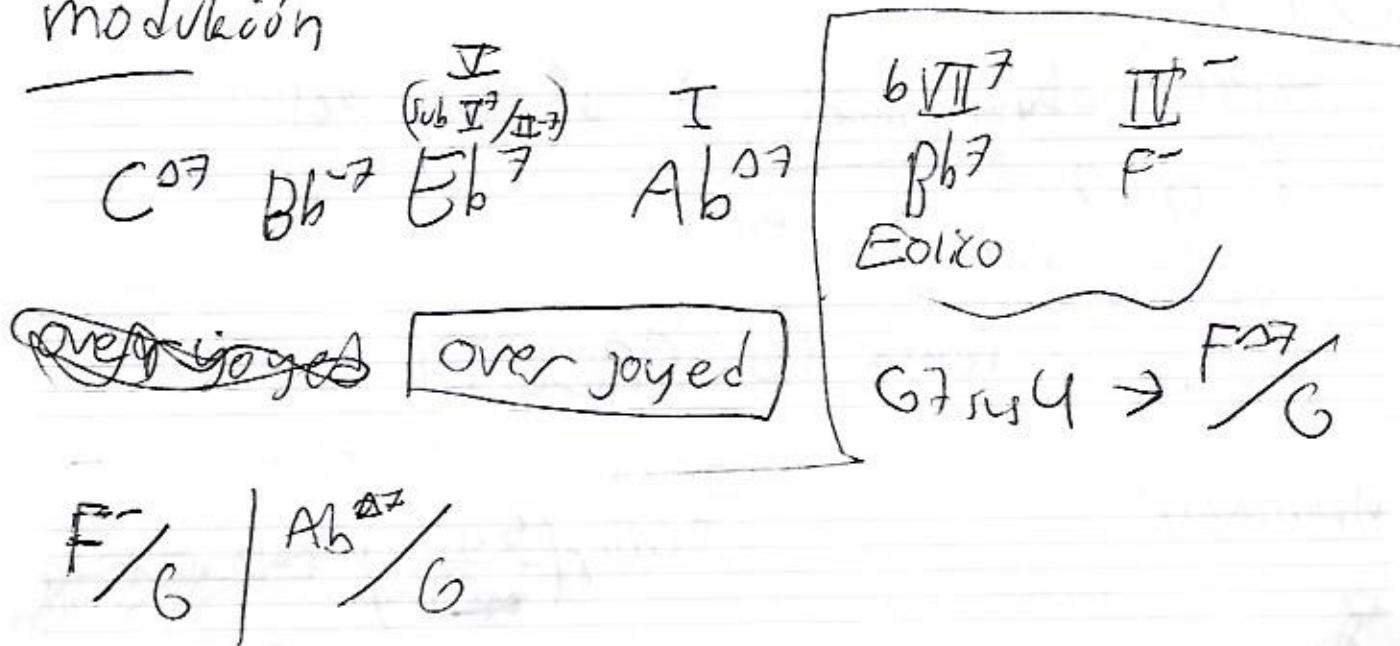
$$-34 - 29 = -63 \text{ dB}_{\text{v}} \quad \leftarrow \text{output de MIC}$$

estrella

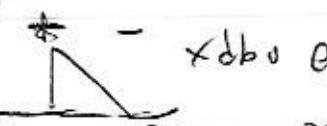
LM Modulación

- Pivote (usa acorde en común entre las 2 tonalidades)
- Directo (sin pivote o preparación)
- Preparado (2sl, con cadencia)

también se puede usar IM para "preparar" una modulación



Continuación de fórmulas (GanStage)

AMP 

$$\Rightarrow \begin{array}{l} \text{x dB IN} \\ \text{x dB Entrega} \\ \text{• "X" watts Ref} \\ \text{• "n" volts (input)} \end{array} \rightarrow 20 \log \left(\frac{\text{"n" volts IN}}{0.775V} \right) \leftarrow \text{Ref}$$

↑
Fórmula de dB
de entrega

x dB IN difieren con x dB Entrega

$$= (\text{x dB IN} + \text{x dB Entrega}) = \text{Dif Input}$$

↑

Siempre es negativo

~~$$\text{Dif IN/out} = 20 \log \left(\frac{\text{x watts}}{\text{Ref}} \right)$$~~

$$\text{Dif IN/out} = 10 \log \left(\frac{\text{watts}}{\text{watts Ref}} \right)$$

$$\text{watts} = \left(10^{\frac{\text{Dif IN/out}}{10}} \right) \text{watts Ref}$$

↑

watts que entrega el AMP

wattage en Bocina



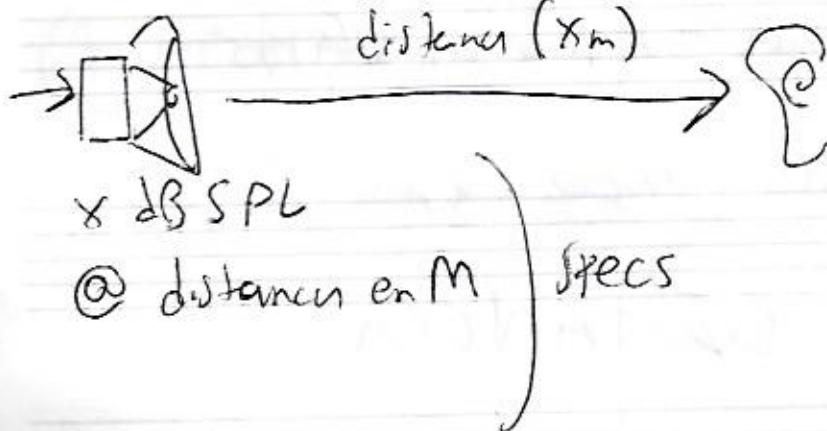
Si los Ω de las Bocinas y amp
son iguales la cantidad de watts de
salida del amp se mantiene,

Si los Ω de la Bocina se divide $\frac{1}{2}$
(la salida del Amp (watts)

AMP	BOCINA	wattage
$n\Omega$	$n\Omega$	igual
Ω	$+\Omega$	$\frac{1}{2}$
$+n\Omega$	$n\Omega$	$\times 2$

AMP	BOCINA	wattage
Igual	Igual	Igual
menor	Mayor	$\frac{1}{2}$
mayor	menor	$\times 2$

Bocina sonido a escuchar



$$10 \log \left(\frac{x \text{ dB SPL}}{x_m} \right) = "B"$$

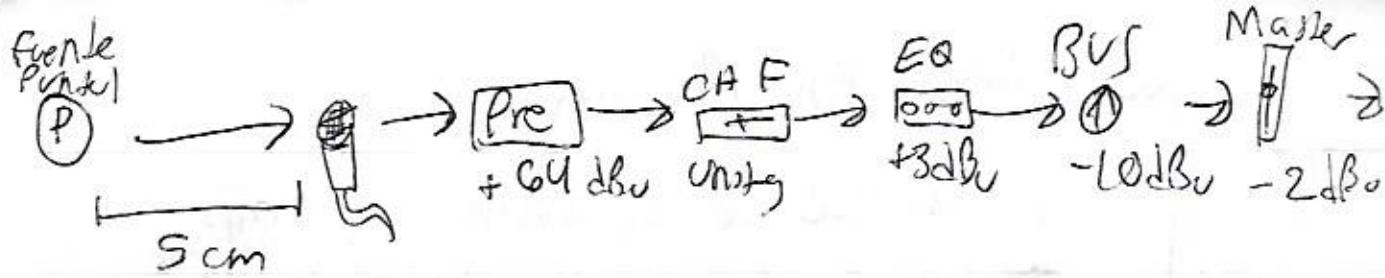
$$20 \log \left(\frac{"B"}{x \text{ dB SPL}} \right)$$

$$20 \log \left(\frac{\left[10 \log \left(\frac{x \text{ dB SPL}}{x_m} \right) \right]}{x \text{ dB SPL}} \right) = \text{Pérdida final}$$

↓

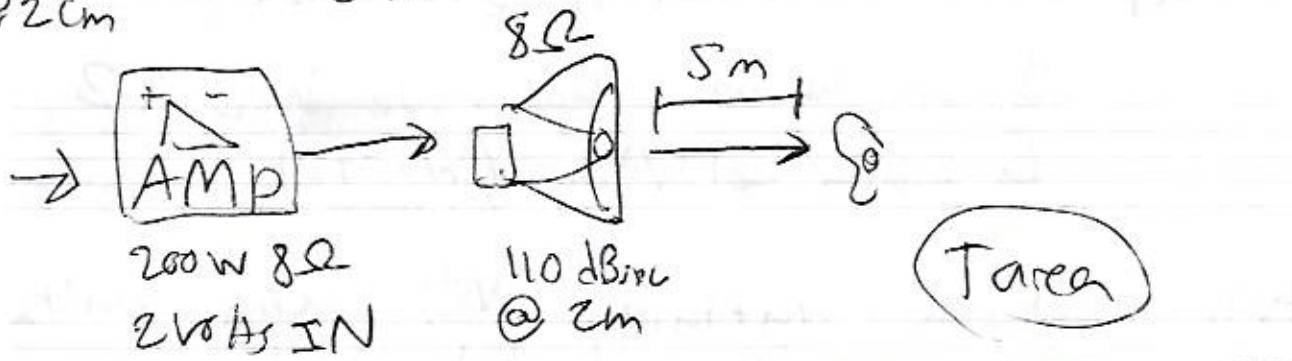
$$x \text{ dB SPL} - \text{Pérdida} = \text{dB}$$

escucha



PS dB_{PL}
@ 2cm

-56dB_U
@ Pa



Tarea

~~acustica pt 2~~

La amplitud se mide en:

Intensidad, Presión, Potencia

↳ Potencia acústica = se mide en Watts

↓
Propagación acústica (se mide de pres.)

↓
Propagación en DISTANCIA

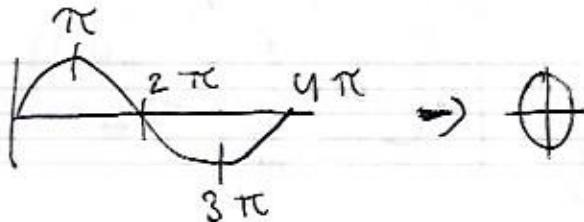
INTENSIDAD acústica = se mide en $\frac{\text{Watts}}{\text{m}^2}$

"S" = Superficie = forma de propagación

en una Fase Puntal:

$$\text{Potencia ac} = \tilde{W} = (I)(S)$$

$$(I) \text{Intensidad ac} = W/m^2 \rightarrow dB_{SIL}$$



$$\text{Superficie } (\tilde{S}) = (U)(\pi)(r^2)$$

$$\tilde{I} = P_a^2$$

$$\text{Presión sonora} = 1.2 \text{ pa}$$

$$\text{Distancia} = 30 \text{ m}$$

$$(1.2 \text{ pa})^2 = I$$

$$dB_{SPL} = dB_{SIL}$$

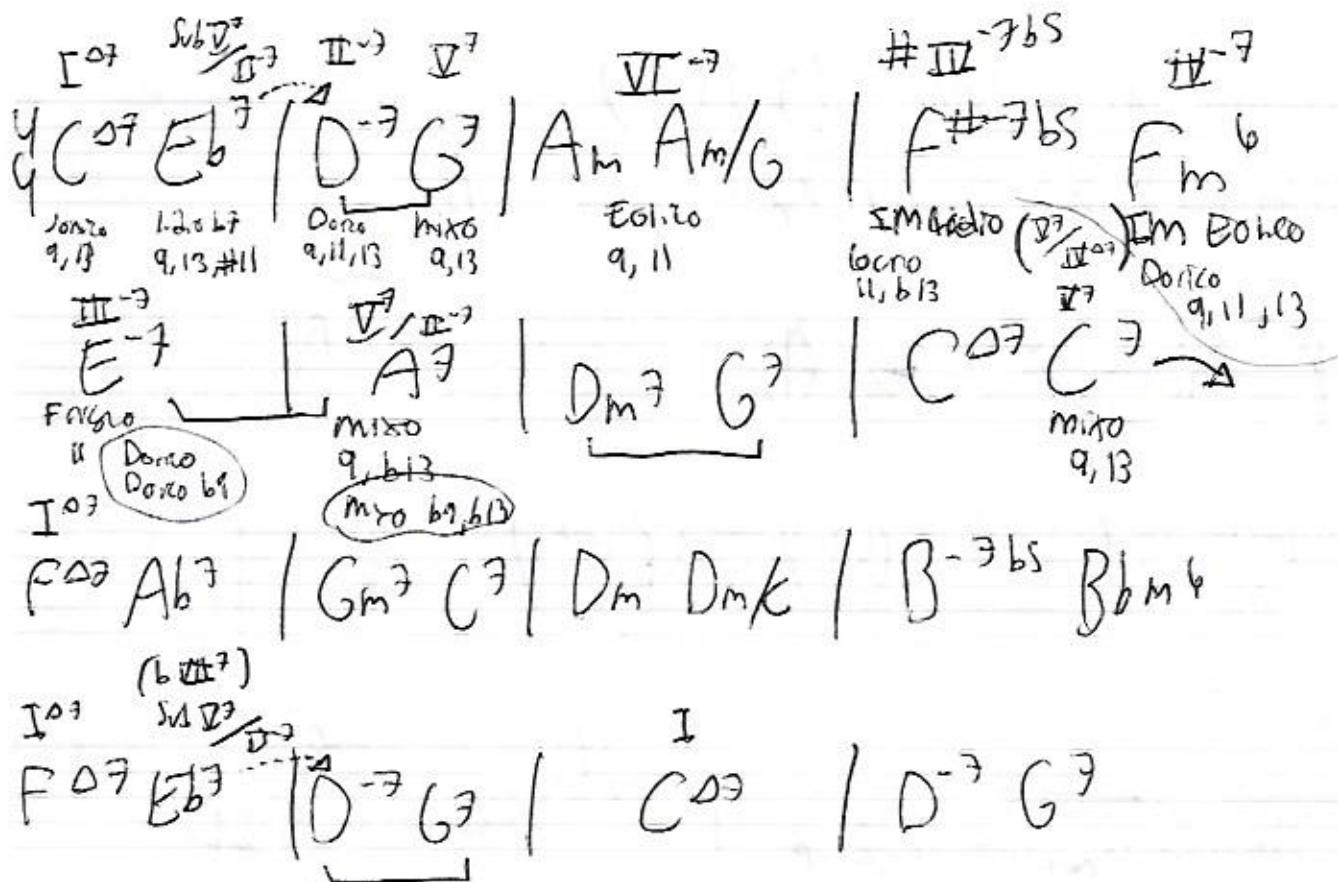
Sound Intensity Level

$$2 \times 10^{-5} = 0.00005 \text{ pa}$$

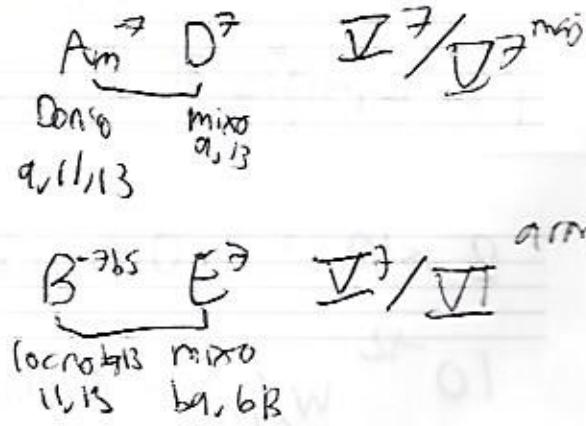
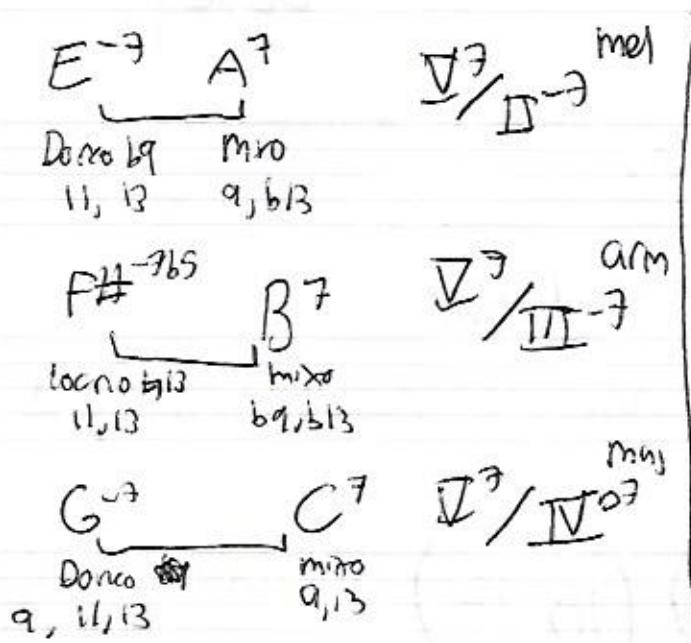
$$10^{-12} \text{ w/m}^2 = 0.00000000001 \text{ w/m}^2$$

$$\begin{aligned} dB_{SEL} &= 10 \log \left(\frac{I}{10^{-12}} \right) \\ &= \left(10^{\log \frac{I}{10^{-12}}} \right) (10^{-12}) \end{aligned}$$

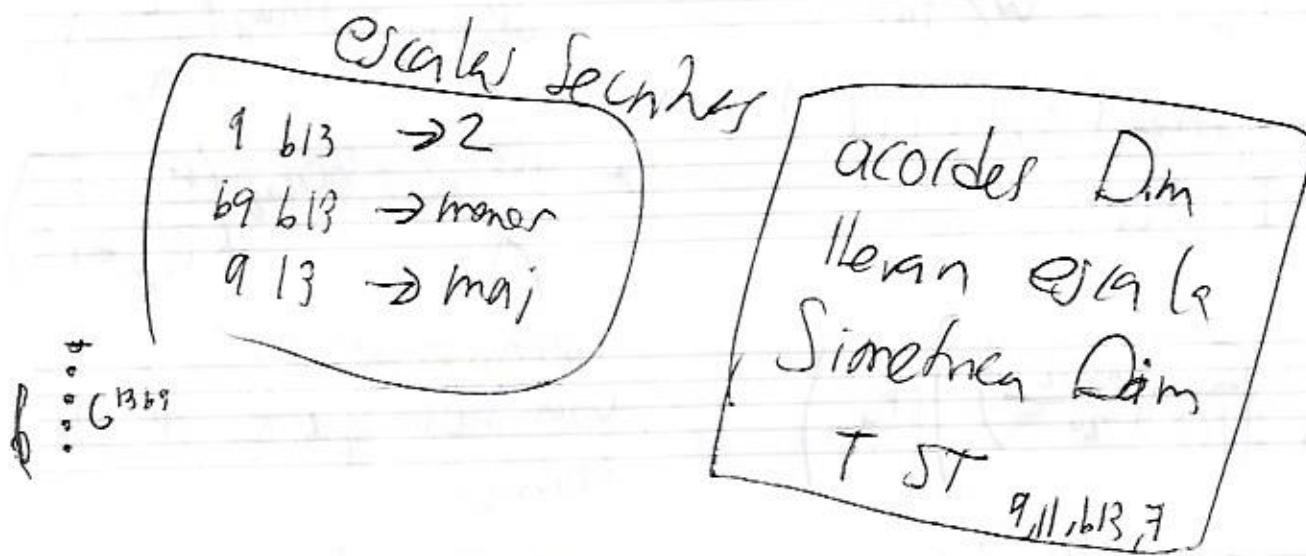
CM



Segundos Relacionados



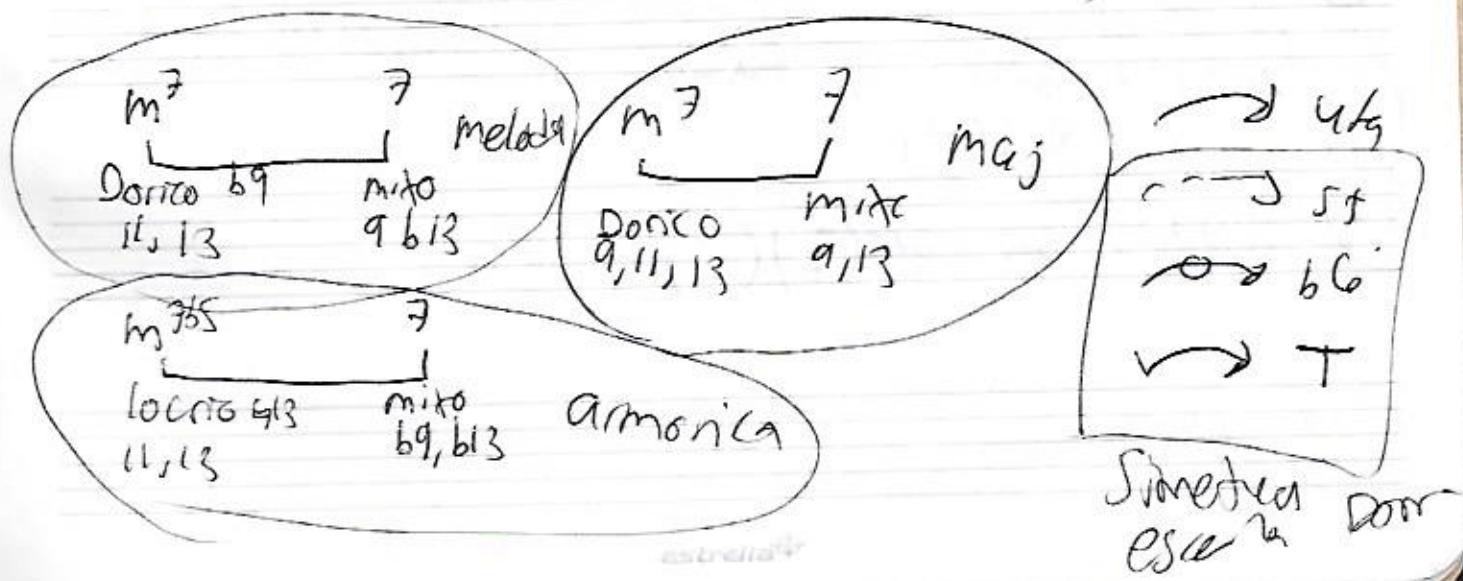
en Yesterday: $\underline{Em^7b5}$ A^7 ↗ en la otra parte
 $\underline{Em^7}$ A^7 ↗ en este



Sim diminución (T, ST) 9,11,b13,7 → C°7

Sim dominante (ST, T) b9, #9, #11, 13 → D13^{b9}

Segundo Rehabs (Relaciones)



In general

$$w = \underset{\text{potencia}}{(I)}(S)$$

$$I_{\text{intensidad}} = w/m^2$$

$$S_{\text{surface}} = (4)(\pi)(r^2)$$

$$I = P_a^2$$

$$P_{a?} = \left[10^{\frac{dB_{SPL}}{20}} \right] (P_{a_0})$$

$$I? = \left[10^{\frac{dB_{SIL}}{10}} \right] (I_0)$$

$$w = (I)(S)$$

$$\textcircled{1} \quad dB_{SPL} \rightarrow S_{SIL}$$

$$\textcircled{2} \quad S_{SIL} \rightarrow "I"$$

$$\textcircled{3} \quad \text{Sustituir distancia en Radio}$$
$$S = (4)(\pi)(r^2)$$

$$\textcircled{4} \quad \text{Sustituir en } w = (I)(S)$$

$$\overset{REF}{P_{a_0}} = 2 \times 10^{-8} \text{ Pa}$$
$$\overset{REF}{I_0} = 1 \times 10^{-12} \text{ W/m}^2$$

$$dB_{SIL} = 10 \log \left(\frac{I?}{I_0} \right)$$

$$* \quad dB_{SPL} = 20 \log \left(\frac{P_{a?}}{P_{a_0, \text{REF}}} \right)$$

Formulas precisan
usa REF que te da el
Problema

Hablemos de
potencia (w)
(en fuente puntal)

una persona escucha 100 dB_{SPC} a 5 metros
Calcula la Potencia acústica

100 dB_{SPC} @ 5m

① $100 \text{ dB}_{\text{SPC}} \rightarrow 100 \text{ dB}_{\text{SIL}}$

② $I = [10^1 \left(\frac{\text{dB}_{\text{SIL}}}{10} \right)] (I_0)$

$$I = \left(10^1 \left(\frac{100}{10} \right) \right) \left(1 \times 10^{-12} \right)$$

$$I = 0.01 \text{ } \cancel{1 \times 10^{-2}} \text{ en } \text{W/m}^2 \rightarrow I = 0.01$$

③ $S = 4 \pi r^2$

$$S = 4 \pi (5)^2$$

$$S = 314.15$$

④ $w = (I) (S)$

$$w = (0.01) (314.15)$$

$$\underline{w = 3.1415...}$$

un tambor emite 0.0028 watts de Potencia

Y se deseara a 3 metros, cuanto dB_{SPL}?

0.0028 @ 3m

$$W = (I)(S)$$

$$0.0028 = (I)(4\pi(3)^2)$$

$$0.0028 = (I)(4\pi^2)$$

$$0.0028 = (I)(36\pi)$$

$$\frac{0.0028}{36\pi} = I$$

$$I = 2.2 \times 10^{-5}$$

$$I = .000022$$

$$\rightarrow dB_{SL} = 10 \log \left(\frac{I}{I_0} \right)$$

$$dB_{SL} = 10 \log \left(\frac{.000022}{10^{-12}} \right)$$

$$dB_{SL} = 73.42$$

$$dB_{SL} \rightarrow SPL$$

~~dB~~

$$73.42 \text{ dB SPL}$$

el Gan formularo

$$P_a \rightarrow I$$

$$\textcircled{1} P_a \rightarrow dB_{SPL}$$

~~dB~~

① Cuanto son P_A a I ?

$$dB_{SPL} =$$

$$20 \log \left(\frac{P_A}{P_{A0}} \right)$$

$$20 \log \left(\frac{I}{2 \times 10^{-9}} \right)$$

$$= 116,9 \text{ dB}_{SPL} \rightarrow 116,9 \text{ dB}_{SIL}$$

$$I = \left[10^{-1} \left(\frac{116,9}{10} \right) \right] (10^{-12})$$

$$\underline{I = 0,48 \text{ W/m}^2}$$

② $I \rightarrow P_A$; $0,000,000,35 \text{ W/m}^2$ a P_A

$$I = 35 \times 10^{-9}$$

$$dB_{SIL} = 10 \log \left(\frac{I}{I_0} \right)$$

$$= 10 \log \left(\frac{35 \times 10^{-9}}{2 \times 10^{-12}} \right)$$

$$= 10 \log (35 \times 10^3)$$

$$= 55,44 \text{ dB}_{SIL(SPL)}$$

$$10^{\frac{(55,44)}{20}} P_0 = 0,011$$

$$= 11 \times 10^{-9}$$

③ IIS dB_{SPL} @ 1 m, ? dB_{SPL} @ 6 m

$$\text{Cantado} = 20 \log \left(\frac{d_1}{d_0} \right)$$

$$= 20 \log \left(\frac{6}{1} \right)$$

$$\text{Perdida} = 15,563 \text{ dB}_{SPL}$$

115,563 - 115 dB

$$115 - 15,563 = 99,44 \text{ dB}_{SPL}$$

④ (cuanto) "W" acusticos son 98 dB SWL

$$98 \text{ dB}_{SIL} = 10 \log \left(\frac{I}{I_0} \right)$$

SIL y SWL comparten
comunes

$$10^{\frac{98}{10}} \cdot I_0 =$$

$$\left(10^{\frac{98}{10}} \right) \left(10^{-12} \right) = 0.0063$$

$$= 0.0063 \text{ W}$$

$$= 6.3 \text{ e}^{-3} \text{ W}$$

$$6.3 \text{ mW}$$

⑤ $I = 0.000,000,7532 \text{ w/m}^2 @ 2.5\text{m}$

$W = ?$

$$W = (I)(S)$$

$$W = (7532 \times 10^{-10})(S)$$

$$W = (7532 \times 10)(4\pi r^2)$$

$$(7532 \times 10)(4\pi(2.5)^2)$$

$$W = (7532 \times 10)(25\pi)$$

$$W = 5.9 \text{ eS}$$

$$W = 00005954\dots$$

Sum dB

$$10 \log \left(\frac{N_1}{10} + \frac{N_2}{10} + \frac{N_n}{10} \dots \right) \leftarrow \text{ERROR}$$

formula no fake

$$\Rightarrow 10 \log \left(10^{10} \left(\frac{N_1}{10} \right) + 10^{10} \left(\frac{N_2}{10} \right) + 10^{10} \left(\frac{N_n}{10} \dots \right) \right) \dots$$

⑥ 68 dB + 74 + 80 + 97 + 110 + 109 + 96 + 89

$$10 \log \left(10^{10} \left(\frac{68}{10} \right) + 10^{10} \left(\frac{74}{10} \right) + 10^{10} \left(\frac{80}{10} \right) + 10^{10} \left(\frac{97}{10} \right) + 10^{10} \left(\frac{110}{10} \right) + 10^{10} \left(\frac{109}{10} \right) + 10^{10} \left(\frac{96}{10} \right) + 10^{10} \left(\frac{89}{10} \right) \right)$$

~~68~~

(converges), sum dB, key consider perf.

			Free in the knowledge	E	F#	G	A	B	C	D
intro	I- Em	V- Bm	bVI ⁰⁹ Cmaj7				2-S-G			

verso	I- Em	III A IM. Vonic I (coro 9, 11, 13)	bVII D		III sus Gsus2		1-9-7-3
-------	----------	---	-----------	--	------------------	--	---------

coro	V- Bm	bVI ⁰⁹ Cmaj7	V- Bm	II ^{m3} Am7/r.	V- Bm	bIV ⁰⁹ Cmaj7
------	----------	----------------------------	----------	----------------------------	----------	----------------------------

V- Bm	IV ⁻² Am7	V- Bm	bIII ⁰⁹ C	S-G S-9 S-C S-4 S-G
----------	-------------------------	----------	-------------------------	---------------------------------

Puente pt 1 = Intro x4	Puente 2:	IV ⁻² Am7	V- Bm	bVI ⁰⁹ C	bIII D	4-S-G-9
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Outro IV ⁻² Am7	V- Bm	bVI ⁰⁹ C	X	4-S-G
-------------------------------	----------	------------------------	---	-------

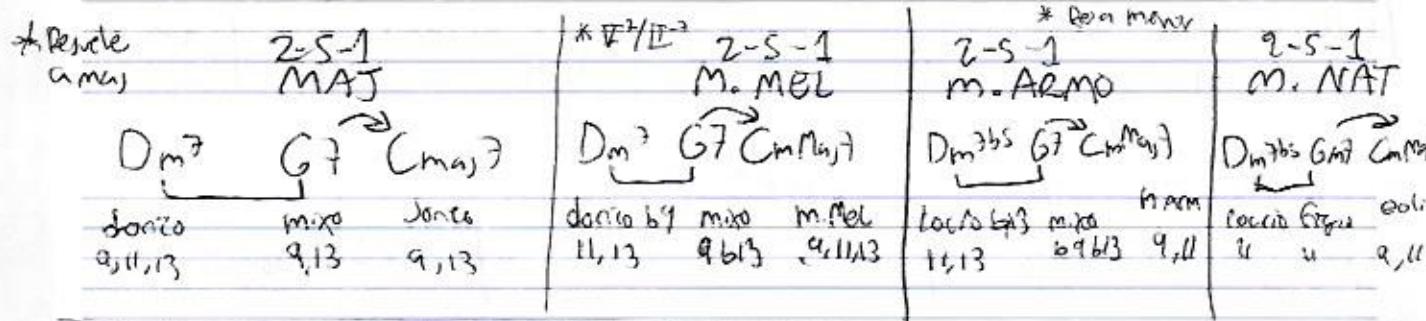
1234567

M.AJ	Cmaj7	Dm7	E ^b m7	Fmaj7	G7	A ^b m7	Bm7bs
Jonico	dorico	ii	lido	mixo	polico	locno	
9,13	9,11,13	9,11,13	9,11,13	9,13	9,11	11,13	

M.MEL	Cmaj7	Dm7	E ^b m7*	F7	G7	A ^b m7bs	B ^b A/H(Bm7bs)
	doce b4	lido ave	1,2,3,b3	mixo 9,13	locno 9,13	1,2,3,4,5,6,7	A/H D.M.
9,11,13	11,13	9,11	9,11,13	9,13	9,11,13	6,9,10,11,12,13	6,9,10,11,12,13

M.ARMO	Cmaj7	Dm7	E ^b maj7*	Fm7	G7	A ^b maj7	B ^b 7
	lido ave	1,2,3,b3	Jonico Am	Dorico #11	mixo b9,b13	lido #9	A/H b6
9,11	11,13	9	9,11,13	9,13	b9,b13	#9,11,13	b13

M.NAT	Cm7	Dm7bs	E ^b maj7	Fm7	Gm7	A ^b maj7	B ^b 7
polico	locno	jonico	lido	mixo	locno	mixo	6
9,11	11	9,13	9,11,13	11	9,11,13	9,13	



Dominante Secundaria	Subs	Resolucion Maj
VII/I ⁷ A7 Dm7	Sub VII/I ⁷ E ^b m7 Dm7	Dorico mixo 9,11,13 9,13
VII/II ⁷ B7 Em7	Sub VII/II ⁷ F7 E ^b m7	
VII/IV ⁷ C7 Fmaj7	Sub VII/IV ⁷ Gb7 Fmaj7	
VII/V ⁷ D7 G7	Sub VII/V ⁷ Ab7 G7	
VII/VI ⁷ E7 A ^b m7	Sub VII/VI ⁷ Bb7 A ^b m7	

Escala = 1,2,3,b3

9,11,13

VII/I⁷ → Dorico mixo
11,13 9,13

Norma

Reggae (mento (is))

- \$0.1 / 60'
- Prev al Reggae 15 kg
- ejemplos:
 - Harry Belafonte (Banana Boat song day, 0)
(Jamaica Farewell)
 - Count Carter Calypso Queen (water in garden)

Regalías & Sync

L tarifas
TV

L TV abierta / Cable súbdito : USD \$ 2,500
\$ 5,000

(años)

Program en Extras USD \$ 15,000

Vídeo Jingle: Pago al año (\$ 8,500 - 10,000

theme Song: \$ 4,000 - 10,000

Portadas Comun (americas, canad, Brasil) \$ 1,000 - \$ 3,000

Comercios y Videojuegos

L comercial (año) \$ 75,000 - 500,000

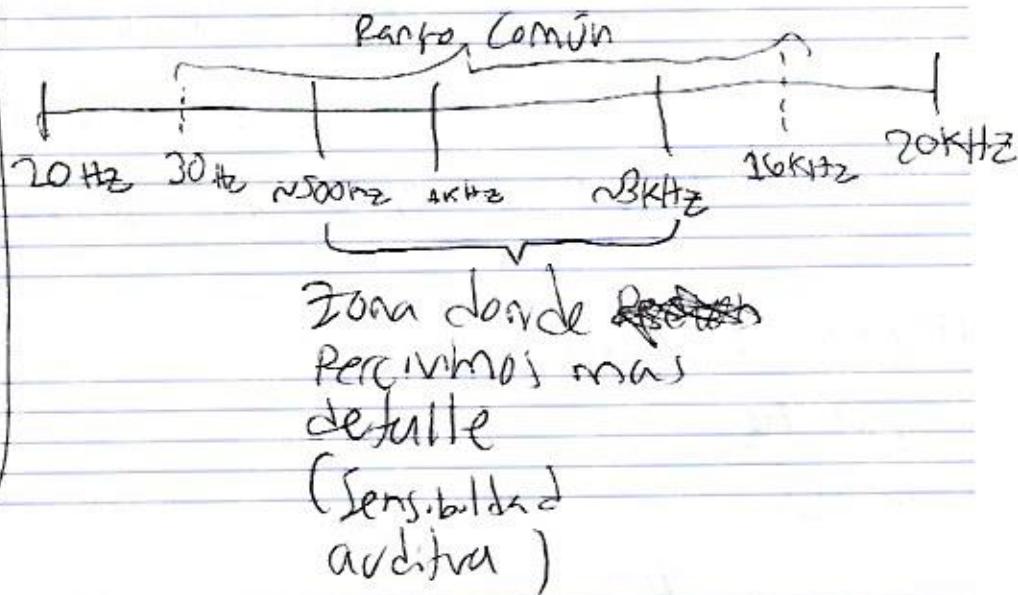
L videojuegos \$ 5,000 - 10,000

audio-metra "250-500"

500 Hz 1000 Hz 5000 Hz 2500 Hz 2500 Hz
 ↓ ↓ ↓ ↓ ↓
 com. 440 Blip de Cite Flúter & son
 mas alto "Bajo" "Bajo" TRK Cateq. Mej.

- ① 5000, 2500
- ② 1000
- ③ 2500, 5000
- ④ 500
- ⑤ 250
- ⑥ 1000
- ⑦ 5000
- ⑧ 280
- ⑨ 1000
- ⑩ 2500, 5000

IN6. 20 Jun



~~flexible~~

Flüchter
Munsson

Curras ISO Fónicas

Curras Flücker-Munsson

Robinson + Danson) → estandarizadas (curras ISO Fónicas)

ISO 226 = equal loudness Level J. right

mas sensible a $\sim 2000 - 5000$

Norma

Curvas de ponderación

FREQ - AMP

Ruido de Piso

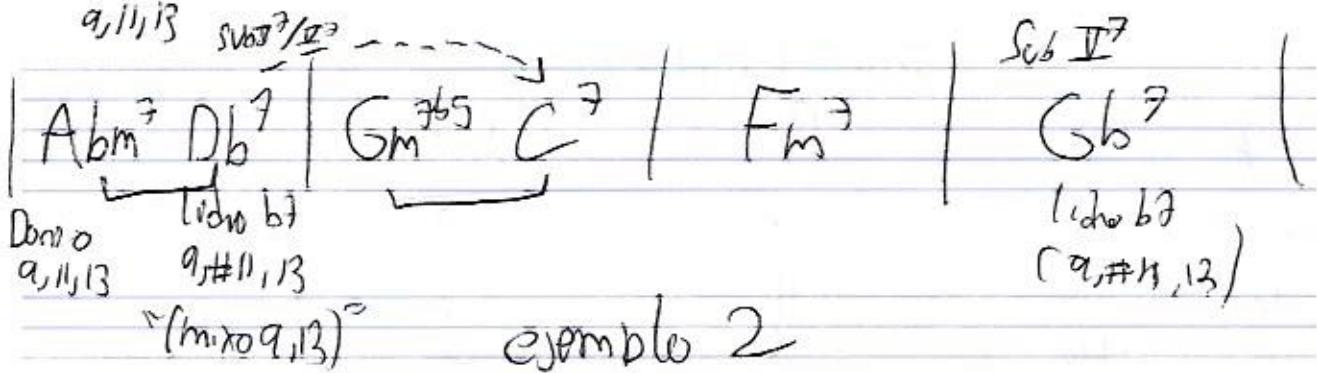
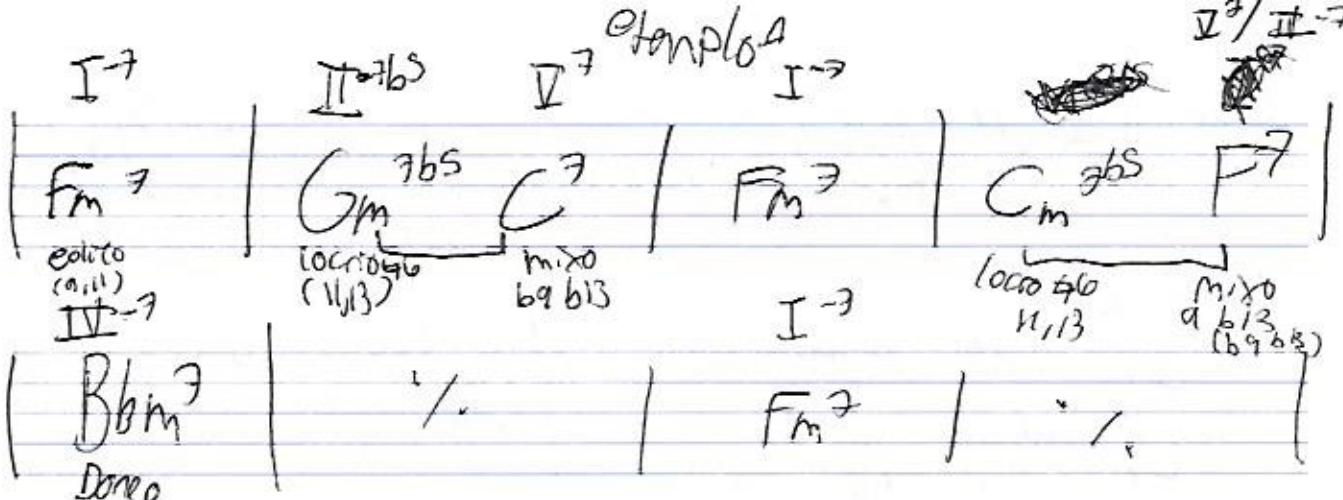
3 curvas

L A Bajo Níquel dB SPL
B medios 45 - 80
C Altos 80 - 120

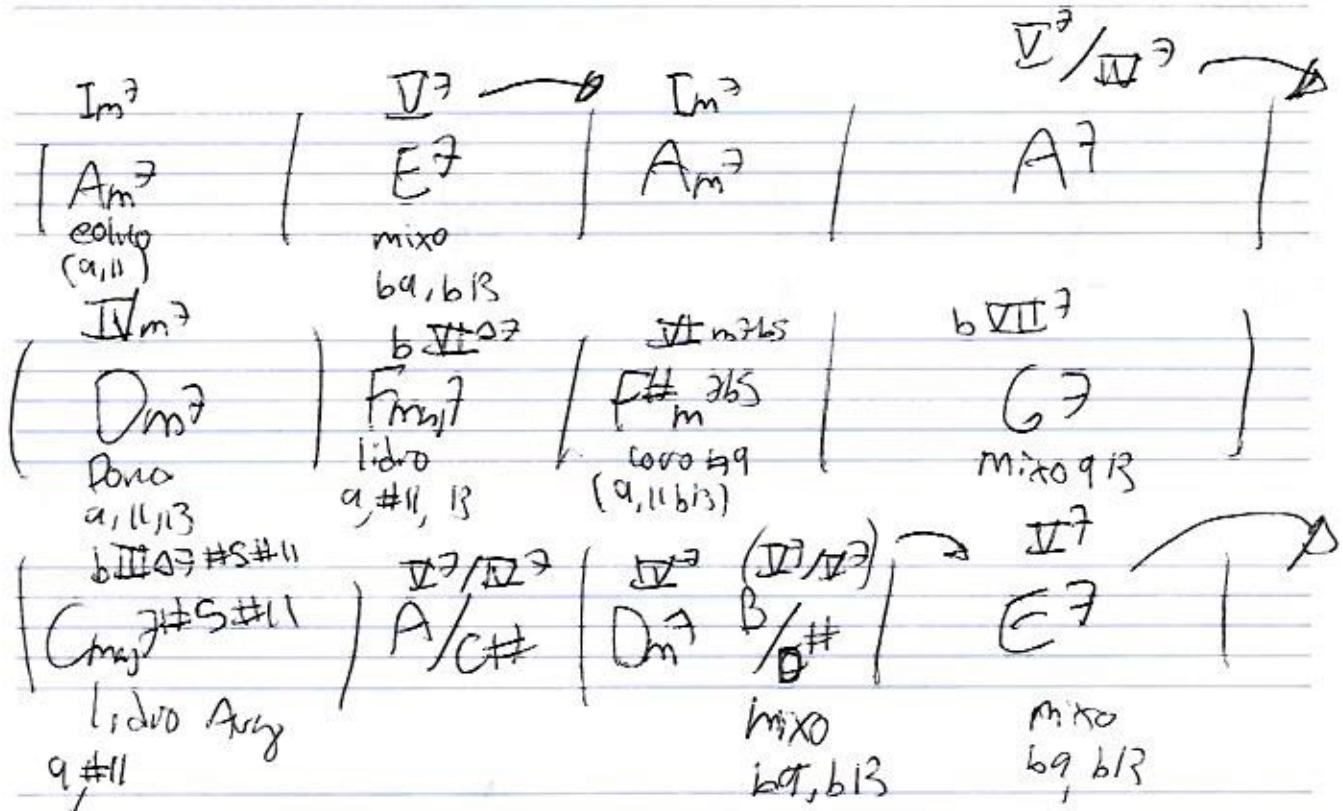
- eléctrico
- acústico
- digital

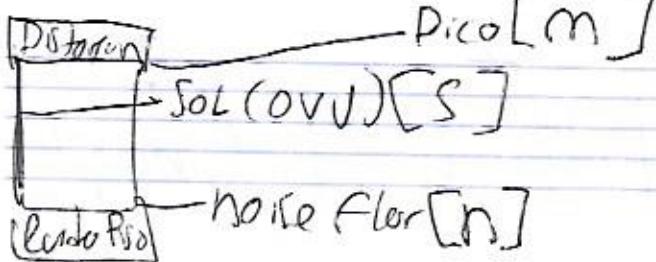
Curvas (dB SPL)

F_f	A	B	C
31.5	-39	-17	-3
63	-26	-9	-1
125	-16	-4	0
250	-9	-1	0
500	-3	0	0
1000	0	0	0
2000	+1	0	0
4000	+1	-1	-1
8000	+4	-3	-3

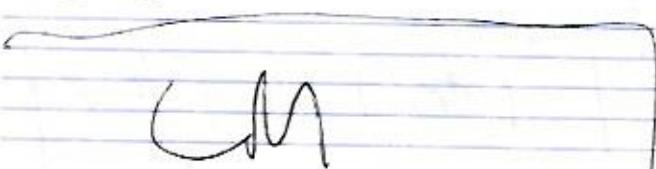


ejemplo 2





Rango dinamico
m - n

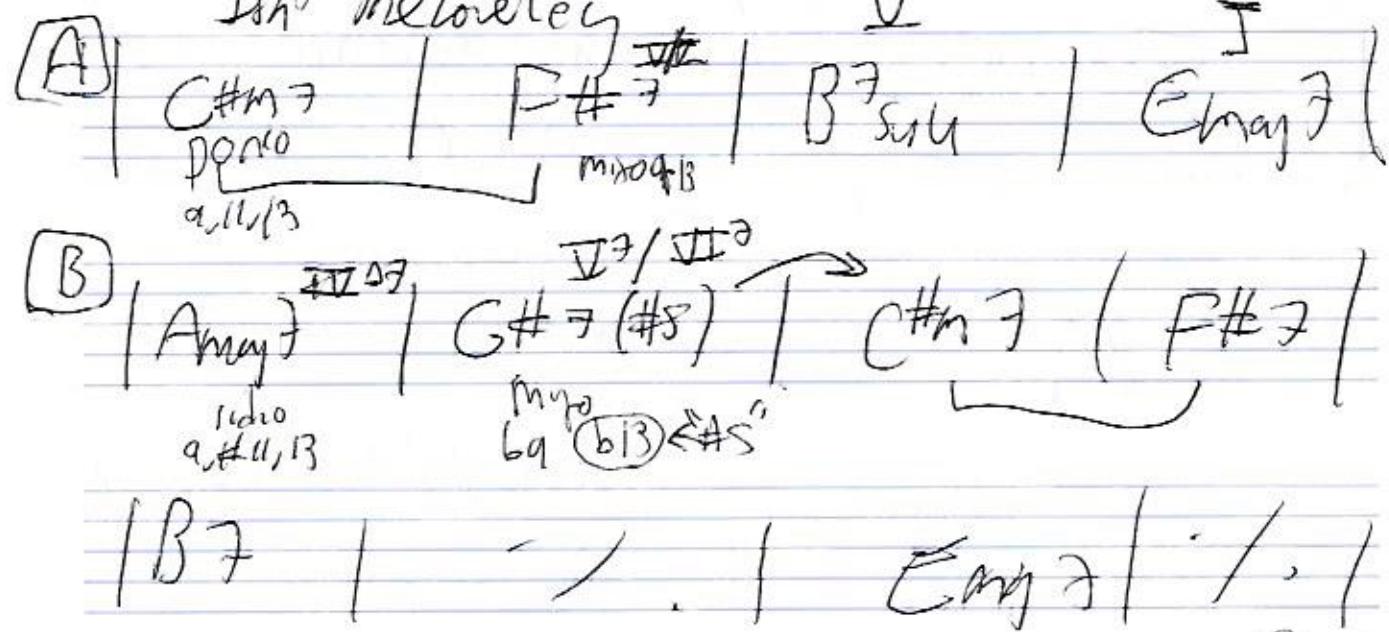


Head Room
m - s

Signal / Noise Ratio
S - n

$b\text{II}^7\text{C7}$ A_{Bb} $\text{ido} \Delta 9$ $\#9, \#11, 13$	IV^7 A^7 mixo $b9, b13$	I^6 D_m^6 $m.\text{mel}$ $9, 11, 13$	$\text{V}^7/\text{IV}^{-7}$ $A_m 765$ $D 759$ $(\text{aro} \Delta 9)$ $11, 13$
G_m^7 Doro $9, 11, 13$	$\text{IV}^7\text{(E7)}$ $G \# 07$ $\text{A}+\text{bb7}$ $b13$	$b\text{III}$ F/A tonico $9, 13$	$B/bmij$ $i\text{do}$ $9, \#11, 13$
E_bmg7 Fm R2x1 $i\text{do}$ $9, \#11, 13$	D_m^6 $\text{Gm7}\text{G7}$	$\text{V}^7/b\text{III}$ $C-\text{7}$ $F-\text{7}$	V^7 $E_m 795$ A^7 $\text{conto} \Delta 6$ $11, 13$
			$\text{mito} \Delta 9$ $b13$
			dono $9, 11, 13$
			$m\text{mel}$ $9, 13$

Int She/oreley



Reggae de Jamaica

Sty: -Gos

-envelopes & RnB

-Exponents: Derrick Morgan, Toots Hibbert, Justin Hinds, Prince Buster

-Prince Buster - Madness

-One step beyond - madness

-Derrick Morgan: the conqueror

-Milie Snell: my boy lollipop

Rock steady

1960 Jamaica | Gaylord, maggete, Pergons

-Sister Rosetta

-Freewheelin' | Johnny Nash: hold me tight

Norma

día 27

SKHz 2.5K 1K 500Hz 250Hz

día 27

- | | |
|----------|--------|
| 1 2SK/SK | 6 1K |
| 2 4K | 7 SK |
| 3 250 | 8 2SK |
| 9 SK | 9 1K |
| 5 500Hz | 10 280 |

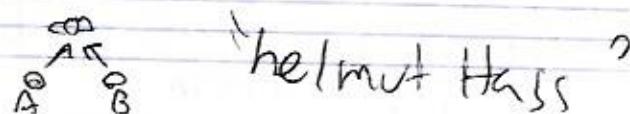
ING

sensación) Psicoacústicas

Efecto Hass

- percepción
- interacción
- sensación

- Nro de veces tiempo (fase)



- 30 ms como ventanas
(25-30)

referido sonido en ruido

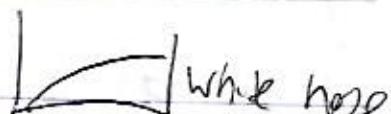
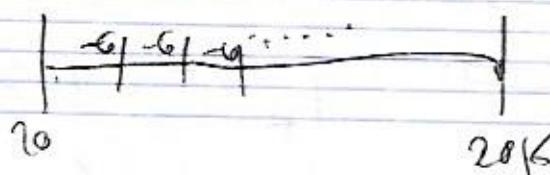
Gabardina (Mix)

"Curva Hass"

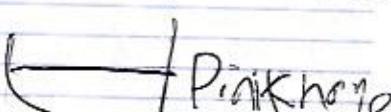
mezcla (RF)

• Enmascaramiento

je pierden 6dB cada oídos



white noise



Pink noise

• mecanica hole

• Plecher

IV ⁷ B ⁷	V ⁷ C ⁷	I ⁷ F _m ⁷	V ⁷ / _b VII ⁷ Ebm ⁷ Ab ⁷
Donna a, b1, b3	Mixa b9, b13	echico a, b1	Donna a, b1, b3 mixa b9, b13
II ⁷ 9bs Gm ⁷	C ⁷	F _m ⁷	IV ⁷ 9bs B ⁷ #11
Tocino a, b9 a, b1, b3			Ido b9 a, b1, b3

C/ ^b Ab ⁷	b VII ⁷ C/Eb	b VII ⁷ C ⁷	V ⁷ Cm ⁷ B ⁷
Cidro arg a, #11	Sim dom b9, #9, #11, b3	Echico a, #11, b3	Donna a, #11, b3

Sim dJ

1 2 3 } 4 b5 b6 bb7 a 7

JN6

128 250 500 1000 2.5K SK SK 10K

Pulse acc.

- ⑦ 1000
- ⑨ SK + 10K
- ⑩ SK / 10K
- ⑪ White
- ⑫ Pink
- ⑬ 2.5K
- ⑭ 500? ✓
- ⑮ 2.5K ≠ SK 10K
- ⑯ 250 → 125

Efecto Doppler

$$F_E = F_E \left(\frac{V_r \pm V_e}{V_s \pm V_E} \right)$$

frente
Receptor

frente
Emisor

$$\approx V_s / Freq$$

$$V_s = (TEMP) (.6) + REF$$

(300Hz)
Grenze
Erzielung

Rezeptor



30 mrs

TEMP = 21°C

$$f_R = f_E \left(\frac{V_s \pm V_e}{V_s \pm V_e} \right)$$

$f_{R\text{max}}$

$$V_s = (21^\circ C / (0.6)) + 331.4$$

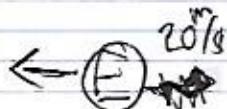
$$V_s = 344 \text{ m/s}$$

$$f_R = 300 \text{ Hz} \left(\frac{344 \text{ m/s} + 30 \text{ m/s}}{344 \text{ m/s} + 0 \text{ m/s}} \right)$$

$$f_R = 300 \text{ Hz} \left(\frac{374}{344} \right)$$

$$f_E = 300 \text{ Hz} (1.08)$$

$$f_R = 324.16 \text{ Hz}$$



300Hz

Vs = 340 m/s

$$f_E = f_E \left(\frac{V_s \pm V_e}{V_s \pm V_e} \right)$$

$$f_E = 300 \left(\frac{340 + 0}{340 - 20} \right)$$

$$f_E = 300 \left(\frac{340}{320} \right)$$

$$f_R = 318.75$$

90 m/s 35 m/s
300 Hz

$$F_R = F_E \left(\frac{V_S \pm V_E}{V_S \mp V_E} \right)$$

$$V_S = 340$$

$$F_R = 300 \left(\frac{340 - 35}{340 - 20} \right)$$

$$F_E = 300 \left(\frac{305}{320} \right)$$

$$F_R = 300 (0.95)$$

$$F_R = 285 \text{ Hz}$$

Batimento

Amp modulación
en freq constante

$$\text{Periodo} = \frac{1}{\text{Freq}}$$

$$F_{\text{bat}} = F_1 - F_2$$

ING Repaso 11 Jul 22

① $\lambda = 256 \text{ Hz} @ 18$

$$\lambda = \frac{\text{vel}}{\text{freq}}$$

REF

$$\lambda = \frac{(n \cdot c)(0.6) + 331.4}{\text{freq}}$$

$$\lambda = \frac{(18)(0.6) + 331.4}{256}$$

λ ≈ 1.33 m

$$\textcircled{2} \quad P_a = 0.0035$$

$$\text{Ref } dB_v = 0.775 \checkmark$$

$$dB_u = ?$$

$$dB_v = ?$$

$$dB_w = ?$$

$$\text{Ref } dB_v = 1_v$$

$$\text{Ref } dB_w = 1_w$$

$$P_a \rightarrow SPL$$

$$SPL = 20 \log \left(\frac{P_a}{2 \times 10^{-5}} \right)$$

$$SPL = 20 \log \left(\frac{0.0035}{2 \times 10^{-5}} \right)$$

$$SPL = 44.8 \text{ dB SPL}$$

$$dB_v = 20 \log \left(\frac{44.8 \text{ SPL}}{0.775 \checkmark} \right)$$

$$dB_v = 20 \log (57.8)$$

$$dB_v = 35.23 \text{ dB}_v$$

$$dB_{SEL} = dB_{\cancel{SEL}} W$$

~~$$dB_w = 20 \log \left(\frac{P_a}{2 \times 10^{-5}} \right)$$~~

~~$$= 20 \log \left(\frac{44.8 \text{ dB SPL}}{2 \times 10^{-5}} \right)$$~~

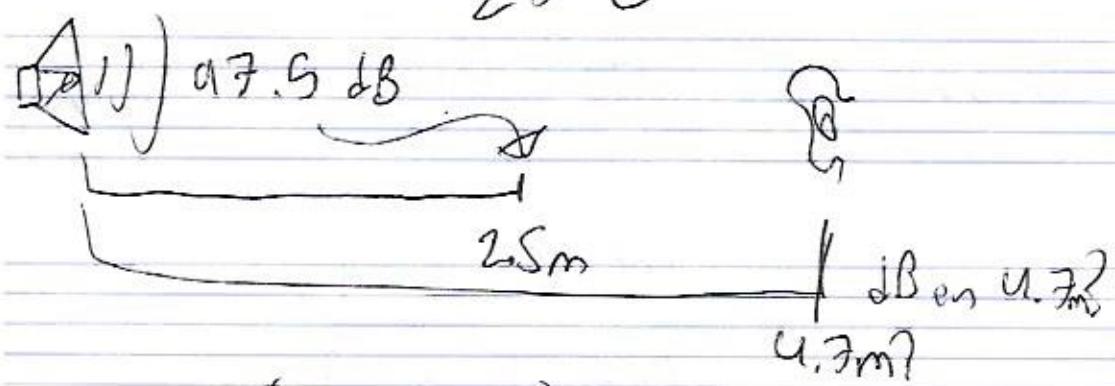
~~$$= 20 \log (2,240,000)$$~~

$$dB_w = 127 \quad dB_w = 20 \log \left(\frac{P_a}{1} \right)$$

$$dB_v = 20 \log \left(\frac{44.8}{1} \right)$$

$$= 33. dB_v$$

22 °C



~~$$20 \log \left(\frac{4.3}{25} \right) = -5.4$$~~

20 log ~~($\frac{4.3}{25}$)~~ = -5.4
21.4

$$20 \log \left(\frac{2.5}{4.3} \right) = -5.4$$

~~$$97.5 - 21.4 = 76.1$$~~

$$97.5 - 5.4 = 92.1 \text{ dB SPL}$$

Tonalidad Menor menor men NAT
 menor ARMO
 menor MECO

Tono menor: Diferentes fréq. Raz "1"

I_m men NAT

I_{m6}/I_{m5} men MECO

I_{m6}/I_{m7} DONICO

Segundo Gado

$\text{II}_{m^{\#5}}$ ~~maj7~~ men. NAT

$\text{II}_{m^{\#5}}$ men. ARMO

(lento b7)

Tercer Gado

III_{maj7} men. NAT

$\text{III}_{maj7\#5}$ m. MEZ

(lento Aug)

Cuarto Gado

IV_m^7 men. NAT

IV^7 m. melodia
(lento b7) men. MEZ

Quinto Gado

V_m^7 men. NAT

V^7 men. ARMO
(m. lento b13)

sexto Gado

b VI_{maj7} men. NAT

(b $\text{VI}_{maj7\#9}$) men. ARMO
(lento #9)

$\text{VI}_{m^{\#5}}$ m. MEZ

(lento b9)

V^7 men. MEZ
(m. lento b13)

Septimo Gado

b VII^7 men. NAT

VII^7 men. ARMO

$\text{VII}_{m^{\#5}}$ men. MELO

AG. DOM (b9, #9, b5, b13)

($\text{X}^{\#11}$, $\text{X}^{\#5}$)

$$G7\#5\#9 = G7^{b13\#9}$$

↑
GALT ma

Dominantes secundarios en Monar (en Amor)

① no es un Dominante secund. E⁷ → A^{m7}

② $\text{V}^7 / \text{II}_{m7bs}$ F# B^{m7bs}
(no existe)

③ $(\text{V}^7 / b\text{III}_{maj7})$ G⁷ ↗ C_{maj}⁷
mixo a, b13
dom. sin función dom.

④ $\text{V}^7 / \text{II}_{m7}$ A⁷ ↗ D^{m7}
mixo a, b13

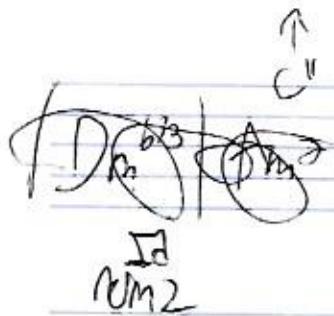
⑤ $\text{V}^7 / \text{II}_{m7}^{+}$ B⁷ ↗ E^{m7}
mixo b9, bB

⑥ $\text{V}^7 / \text{II}_{m7}^{+}$ C⁷ ↗ F_{maj}⁷
b II_{m7}^{+}
mixo a, b13

⑦ $(\text{V}^7 / b\text{VII}^7)$ D⁷ ↗ G⁷
mixo a, b13
dom. sin función d dom

Projecto Idea #1

$D_m^{b3} | C^9 | A_m^7 | B6^3 C^7 |$



$B_m | F\#m | \rightarrow | C\#m | Gm | \text{Gm}$

$D_m \rightarrow E^{bs} / D \rightarrow A7 \rightarrow D_m$

$\cap^2 | F\#m | E \quad D |$



$B_m | D | A | G | | F\#m^7 C\#7 Em7 Dm7$

$\text{Im}^7 \text{ II} \quad \text{I} \quad b\text{III}$

Lección Efectos físicos acústicos

Hass:

- dura entre $25\text{ ms} - 30\text{ ms}$
- filtro de peine

Doppler: aparente cambio de tono (en movimiento)

$$f_r = f_e \left(\frac{v_s \pm v_e}{v_s + v_e} \right)$$

Fronte Receptor Fronte Emisor Vel. Sonido

alavan	reflej.
aleja	suma

Vel Recible Vel Emisor

$$v_s = (\text{TEMP}) (0.6) + \text{REF}$$

$$\text{REF} = 331.4$$

$$20\text{ m/s} \quad f_{eq} = 850\text{ Hz}$$

f_r \rightarrow f_e \leftarrow v_s m/s

$$f_r \rightarrow \leftarrow f_e (-)$$

$$f_r \leftarrow \rightarrow f_e (+)$$

~~$f_r \rightarrow f_e (+)$~~

~~$f_r \leftarrow f_e (+)$~~

$$f_r = f_e \left(\frac{v_s \pm v_e}{v_s + v_e} \right)$$

$$f_r = f_e \left(\frac{344 \pm 20}{344 + 20} \right)$$

$$f_r \quad f_e \quad (-)$$

no mov.

$$f_r = f_e (1.0581)$$

$$f_r = 850\text{ Hz} (1.0581)$$

$$f_r \quad f_e \quad (+)$$

no mov.

$$f_r = 899.385$$

Batimiento

$$F_{\text{req}1} - F_{\text{req}2} = \frac{F_{\text{req}}}{\text{Rate}}$$

"Rate" de Batimiento

longitud de onda

$$F_{\text{req}} = 456 \text{ Hz} \quad \lambda = \frac{\text{Vel sonda}}{F_{\text{req}}}$$

TEMP = 18°

$$\lambda = ?$$

$$\lambda = \frac{(18)(0.6) + 331.4}{456} = \cancel{22.6} \quad 0.75$$

VM brml de audion

$$0.00002 \text{ Pa} \rightarrow 20 \text{ Pa} - 20 \text{ Pa}$$

Umbraal Ocular

$$20 \text{ dB} \rightarrow 20 \text{ Pa}$$

Curvas ISO Fonicas

"mini" Réseau CM

V^2/I_{m^2} A \Rightarrow I^2/I_{m^2}
en MAJ en min

mido 9 613

ALL OF ME

(A) IMAJ⁷

$Cmaj^7$	%.	E^7	%.
Jónico (a, b, 13)	Cálico (a, 13)	Mixto b9 b13	

II^7/IIm^7

A^7	%.	D^-	%.
Mixto a, b13	A mixto a, b13	Dórico (a, H, B)	Dórico (a, H, B)

II^7/III^7

E^7	%.	A^-	%.
Mixto a, b13	Cálico (a, b13)	Éolio (a, H)	Áeolico (a, H)

IV^7/V

D^7	%.	IIm^7	IV^7
Mixto a, b13	D mixto a, b13	Dórico (a, H, B)	Mixto

(B) Ima⁷

$Cmaj^7$	%.	E^7	%.
Jónico (a, b, 13)		Mixto b9 b13	

II^7/IIm^7

A^7		D^-	
IIImaj^7	IIIm^7	Imaj^7	II/IIm^7
mixto	IMÉOLICO (Dórico (a, b, 13))	E^7	Mixto a, b13

D^-

D^-	G^7	$C^6 (E^5)$	

$$W = I \times S$$

$$I = W/m^2$$

$$S = V \cdot \pi r^2$$

$$I = P_a^2$$

Potencia acústica etc

$$dB_{SIL} = 10 \log \left(\frac{I_?}{10^{-12}} \right) \rightarrow I_? = [10^{10} \left(\frac{dB_{SIL}}{10} \right)] (10^{-12})$$

$$dB_{SPL} = 20 \log \left(\frac{P_a?}{2 \times 10^{-5}} \right) \rightarrow P_a? = \left[10^{10} \left(\frac{dB_{SPL}}{20} \right) \right] (2 \times 10^{-5})$$

Suma de dB

$$10 \log \left(10^{10} \left[\frac{N_1}{10} \right] + 10^{10} \left[\frac{N_2}{10} \right] + 10^{10} \left[\frac{N_3}{10} \right] \dots \right)$$

Ley Cuadrado Ferr

$$\text{Perdida} = 20 \log \left(\frac{\text{distancia}_1}{\text{distancia}_2} \right)$$

dB - Perdida

Inical Final

$$Vel_{\text{aniso}} = Ref + 0.6(\text{C}^\circ)$$

$$\lambda = \frac{Vel_{\text{aniso}}}{\text{freq}}$$

$$Vel_{\text{aniso}} = (n(\text{C}^\circ))(0.6) + Ref$$

$$Ref = 331.4 \frac{\text{m}}{\text{s}}$$

$$dB = 20 \log \left(\frac{P_a}{Ref_{P_a}} \right)$$

$$Ref = 2 \times 10^{-5}$$
$$= 0.00002$$

$$P_a = \frac{N}{m^2}$$

$$\lambda = \frac{Ref + 0.6 (\text{C}^\circ)}{f}$$

$$Vs = 331.4 \frac{\text{m}}{\text{s}} + 0.6 (\text{temp})$$

$$V_f = Ref + 0.6 (\text{temp})$$

$$= Ref - Vel + 0.6 (\text{temp})$$

$$\text{temp} (0.6) = Ref - Vel$$

~~$$\text{temp} = \frac{Ref - Vel}{0.6}$$~~

$$\text{temp} = \frac{Vel - Ref}{0.6}$$

Maj	Menor Melódica	Menor Armónica	escalas artificiales:
			Sim. disminuida Sim. dim. T, ST
JONICO	1 men. Mel (Cm Maj) *	1 men. Arm. (Cm Maj) #7	(1, 2, 6, 3, 4, 5, 6, 7) #7
1 Cm Maj *	32 63 4 3 6 7 9 " 13	2 men. Arm. (Cm Maj) #7	9 " 13
2 dorico (Cm [#]) *	2 dorico b9 (fisico b6) (Cm [#]) *	2 locrio b9 6 (Cm [#]) *	Cm [#] b5 (C [#])
12 63 4 5, 6, 7 9 " 13	12 6, 3 4 (5) 6, 7 11 13	12 6, 3 4 (6, 5) 6, 7 11 13	12 6, 3 4 (6, 5) 6, 7 9 " 13
3 Eritro (Cm [#])	3 Lidia avg. (Cm Maj #5)	3 Jonico Avg. (C [#])	Sim. Dominante " Sim. Dom." ST, T 6, 9, #11, 13
12 6, 3 4 (5) 6, 7 11	12 3 #4 (4, 5) 6, 7 9 #11 13	12 3 #4 (5) 6, 7 9	
4 Lidia ((Cm Maj))	4 Lidia b7 (C [#])	4 Dorico #11 [#4] (Cm [#])	acorde Dominante Punto de Llamada otra Dominante E13 b2 b5 b7
12 3 #4 (5) 6, 7 9 #11 13	12 3 #4 (5) 6, 7 9 #11 13	12 6, 3 #4 (5) 6, 7 9 #11 13	
5 Mixolidio (C [#]) *	5 mixo 9 b13 (C [#]) *	5 mixo b9 b13 (C [#]) *	
12 6, 3 4 (5) 6, 7 9 " 13	12 6, 3 4 (5) 6, 7 9 " b13	12 6, 3 4 (5) 6, 7 b9 11 b13	
6 polico (Cm [#])	6 Locrio b9 (Cm [#] b5)	6 Lidio #9 (Cm Maj)	
12 6, 3 4 (5) 6, 7 9 " 13	12 6, 3 4 (5) 6, 7 9 " b13	12 3 #4 (5) 6, 7 #9 #11 13	
7 dorico (Cm [#] b5)	7 Alt. dominante (C [#] alt, b9 #9, b5, b13)] > Alt b13 (C [#])	7 Alt. dominante (C [#] alt, b9 #9, b5, b13)] > Alt b13 (C [#])	
12 6, 3 4 (5) 6, 7 11	12 6, 3 6, 4 b5 b6 b7 [todas dupl.] b13	12 6, 3 6, 4 (6, 5) b6 b7 b13	

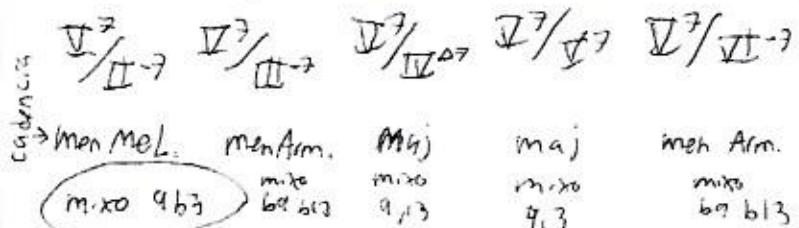
Z-S-I	Z-S-I	Z-S-I
Maj	men Mel.	men Arm.

D^m G[#] Cm Maj
dorico mixo Jonico
(9,11,13) (9,13) (9,13)

D^m G[#] Cm Maj
dorico mixo #9 b13 men.
(11,13) (9,13) (9,11,13)

Dm[#] b5 G[#] Cm Maj
locro b13 mixo #9 b13 men arm.
(11,13) (b9, b13) (9,13)

Dominantes Secundarias



Si un Dom. secundario resuelve a un acorde Maj
usa (9,13), si resuelve en menor usa (b9 b13)
y vice versa (9 b13)
mixo 9,13 → Maj (II/V, II/V)
mixo b9 b13 → men (III/II, III/II)
mixo 9 b13 → II/V

①	②	③	④	⑤	⑥	⑦
6 eocico	3 Aug	5 mixo	1 Jones	7 Locro	4 Lido	2 dancer
9, 11 ✓	ii ✓	9, 13 ✓	9, 13 ✓	ii ✓	9, #11, 13 ✓	9, 11, 13 ✓
6 eocico	4 Lida	1 Jones	7 Locro	2 dancer	6 mixo	3 Fgo
9, 11 ✓	9, #11, 13 ✓	9, 13 ii	ii ✓	9, 11, 13 ✓	9, 13 ✓	11 ✓
✓ dancer 9, 11, 13 ✓	✓ mixo 9, 13 ✓	✓ Aug ii	✓ Lido 9, #11, 13 ✓	✓ Locro ii ✓	✓ Jones 9, 13 ✓	✓ eocico 9, 11 ✓

{ Jones (9, 13) 1MA
Jones Aug (9) 3mARMO

{ dancer (9, 11, 13) 2MA
dancer b9 (11, 13) 2mMEL
dancer #11 (9, #11, 13) 4mARMO

Frigro (11) 3MA

{ Lido (9, #11, 13) 4MA
Lido aug (9, #11) 3mMEL
Lido b7 (9, #11, 13) 4mMEL [SUBS]
Lido #9 (#9, #11, 13) 6mARMO

{ Mixo (9, 13) SMA
Mixo {9, b13} 5mMEL
Mixo b9 b13 5mARMO

eocico (9, 11) 6MA

Locro (11) 7MA
Locro b9 (9, 11 b13) 7mMEL
Locro b7 (11, 13) 2mARMO

~~Locro~~
~~Lido~~
~~Lido Aug~~
~~Lido b7~~
~~Lido #9~~

